



## Impact of an HPV diagnosis on the psychosexual sphere

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### Abstract

We aimed to evaluate the psychosexual impact of being diagnosed with human papillomavirus (HPV). A cross-sectional study was conducted to assess the anxiety and depression levels and sexual functions in women with and without HPV between March and May 2021. Beck anxiety inventory, the Beck depression inventory, and the Libido scoring system scales were used as scales. A total of 575 respondents were included; 292 (50.2%) were HPV-negative, and 283 (49.8%) were HPV-positive, of whom 170 (60,1%) had high-risk HPV genotypes 16/18 and 113 (39.9%) had non-16/18 high-risk HPV-positive patients. There was no significant association between HPV-negative and HPV-positive patients in terms of sociodemographic characteristics. While 21.6% of the HPV-positive group experienced masturbation, it was 15.1% in the HPV-negative group ( $p=0.044$ ). While severe depression was 4.9% in HPV-positive women, this rate was 1.4% in HPV-negative women ( $p=0.002$ ). The present study showed that being diagnosed with HPV made a significant difference in sexual function, except for sexual interest, but increased anxiety and depression scores. Sexual dysfunction following an HPV diagnosis cannot be explained solely by depression and anxiety.

**Keywords:** anxiety, depression, human papillomavirus (HPV), sexual function

### 1. Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection, with approximately 80% of sexually active people having been exposed at least once in their lifetime (1). More than 120 varieties of HPV have been identified and classified as high-risk or oncogenic types and low-risk or non-oncogenic types. Although HPV infections are often asymptomatic and disappear without treatment (2), persistent HPV infections are associated with cervical intraepithelial neoplasia (CIN) and cervical cancer (3, 4). This information has led to the transformation of HPV-based cervical cancer screening programs in many countries (5).

All sexually transmitted infections, including HPV, have an adverse effect on women's psychosocial and sexual lives (6). Several studies found that positive HPV test results can lead to distress, anxiety, and depression, as well as sexual dysfunction in women (7-9), resulting in decreased quality of life (10). Given that many women experience adverse psychological and sexual consequences after being diagnosed with HPV (11), the impact of HPV on mental health and sexual function should be addressed to help alleviate the psychosexual burden.

Although there is a vast amount of literature on HPV epidemiology, screening methods, vaccines, and treatments

over the past decades, yet, there have still been knowledge gaps and contradictory findings on the effects of HPV on individuals' sexual life and anxiety and depression levels. Therefore, this study aimed to assess anxiety, depression levels, and sexual functions following HPV testing.

### 2. Material and methods

We conducted a cross-sectional study from March 1, 2021, to May 30, 2021, to compare anxiety and depression levels and sexual functions in women with and without HPV.

We performed a sample size calculation based on a previously published study (12), and this gave a sample size of 482 women at a power of 80% for a confidence level of 95% and an alpha error of 5%. We assumed a refusal rate of 10%; the target sample was 530 women.

Women attending the outpatient gynecologic clinic were asked to participate in the study. Those who accepted to participate were informed about the study's purpose and assured of confidentiality. We included sexually active women over 18 years who received an HPV-positive test result for the first time and agreed to complete the questionnaire. Exclusion criteria were refusal to participate, having psychiatric disorders, chronic systemic diseases, sexual penetration

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disorders, pregnancy, pelvic organ prolapse, gynecological or urological cancer, premature ovarian insufficiency, skin conditions affecting the genital area, drugs that cause sexual dysfunction, and a history of pelvic pain or gynecological surgery. The Research Ethics Committee of the Zeynep Kamil Training and Research Hospital approved the study (Approval number: 21.06.2021-21/211). Written and verbal informed consent was taken from all participants.

The questionnaire contained items investigating sociodemographic factors such as age, education, marital status, number of children, work status, and income level. To assess levels of anxiety, depression, and sexual function, we used the Beck anxiety inventory (BAI), the Beck depression inventory (BDI), and the Libido scoring system scales (LSSS) as scales. We adopted the set of questions from the studies by Ulusoy et al. (1998), Hisli (1988), and Api et al. (2005) (13-15).

### 2.1. Beck Anxiety Inventory

The Beck anxiety inventory (BAI) is a 21-item, four-point Likert-like scale (0-3) questionnaire aimed at assessing anxiety symptoms. The total score ranges between 0 and 63 points, with higher scores indicating more severe anxiety.

### 2.2. Beck Depression Inventory

The Beck Depression Inventory (BDI) is a 21-item, four-point Likert-like scale (0-3) questionnaire that aims to assess the severity of depression in normal and psychiatric populations. The total score ranges between 0 and 63 points, with higher scores indicating more severe depressive symptoms.

### 2.3. Libido Scoring System Scale

The libido scoring system (LSS) scale, which includes four questions on four domains; orgasmic function, coital frequency, sexual desire, and self-sexual interest (masturbation), was used to assess female sexual function. A total score ranges between 0 and 12 points, with higher scores indicating better sexual functioning.

### 2.4. Statistical Analysis

We analyzed the data using IBM SPSS for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Qualitative variables were expressed with frequency (n) and percentage (%) values. Quantitative variables were presented with mean and standard deviation (mean + SD) values. The Chi-Square test was used to compare categorical variables between groups. P-values less than 0.05 were considered to indicate statistically significant.

## 3. Results

A total of 575 women were eligible for the final analysis. The mean age of the patients was 35 years. Overall, 42.4% of the participants were university graduates, 47.0% were unemployed, 55.8% were married, 86.8% had two or fewer children, and 29.6% had a monthly income below 2000 Turkish Liras. All sociodemographic characteristics and HPV results of the study participants are presented in Table 1.

**Table 1.** Baseline characteristics of participants

	n (%)
<b>Age (years)</b>	35 (19-72)
<b>Education</b>	
Illiterate	10 (1.7)
Primary	132 (23)
Secondary	189 (32.9)
Tertiary (University/College)	244 (42.4)
<b>Marital Status</b>	
Single	178 (31)
Married	321 (55.8)
Widowed/Divorced	76 (13.2)
<b>Number of children</b>	
0	200 (34.8)
1	128 (22.3)
2	171 (29.7)
3	52 (9)
≥4	24 (4.2)
<b>Employment</b>	
Unemployed	270 (47)
Governmental employee	64 (11.1)
Laborer	67 (11.7)
Self-employed	174 (30.3)
<b>Financial Status</b>	
≤2000 TL	170 (29.6)
2001-3000 TL	166 (28.9)
3001-4000 TL	106 (18.4)
≥4001 TL	133 (23.1)
<b>HPV Results</b>	
HPV (-)	292 (50.8)
HPV (+)	283 (49.2)

Abbreviations: HPV, human papillomavirus; TL, Turkish Liras

Of the 575 women, 292 (50.8%) were HPV-negative, and 283 (49.2%) were HPV-positive. The two groups did not differ in educational level, marital status, number of children, occupation, and financial status (Table 2).

**Table 2.** Comparison of HPV status by sociodemographic characteristics

	HPV (-) n (%)	HPV (+) n (%)	p
<b>Education</b>			
Illiterate	4 (40)	6 (60)	0.387
Primary	73 (55.3)	59 (44.7)	
Secondary	88 (46.6)	101 (53.4)	
Tertiary (University/College)	127 (52)	117 (48)	
<b>Marital status</b>			
Single	86 (48.3)	92 (51.7)	0.279
Married	172 (53.6)	149 (46.4)	
Widowed/Divorced	34 (44.7)	42 (55.3)	
<b>Number of children</b>			
0	98 (49)	102 (51)	0.484
1	64 (50)	64 (50)	
2	94 (55)	77 (45)	
3	22 (42.3)	30 (57.7)	
≥4	14 (58.3)	10 (41.7)	
<b>Employment</b>			
Unemployed	135 (50)	135 (50)	0.223
Governmental employee	31 (48.4)	33 (51.6)	
Laborer	42 (62.7)	25 (37.3)	
Self-employed	84 (48.3)	90 (51.7)	

**Table 2.** Comparison of HPV status by sociodemographic characteristics (continue)

Financial Status			
≤2000 TL	84 (49.4)	86 (50.6)	0.717
2001-3000 TL	86 (51.8)	80 (48.2)	
3001-4000 TL	50 (47.2)	56 (52.8)	
≥4001 TL	72 (54.1)	61 (45.9)	

Abbreviations: HPV, human papillomavirus; TL, Turkish Liras

In comparing libido scoring system domains among women who were HPV-negative and HPV-positive, 21.6% of HPV-positive patients experienced masturbation, and 15.1% in the HPV-negative group ( $p=0.044$ ). While severe depression was 4.9% in HPV-positive women, this rate was 1.4% in HPV-negative women ( $p=0.002$ ). Orgasmic function, sexual intercourse frequency, and sexual desire did not differ between HPV-positive and HPV-negative groups (all  $p>0.05$ ). Comparison of Libido Scoring System domains, anxiety, and depression in HPV-positive and HPV-negative women are demonstrated in Table 3.

**Table 3.** Comparison of Libido scoring system (LSS), anxiety and depression across groups

	HPV (- n (%))	HPV (+ n (%))	p
<b>Sex Frequency</b>			
None	51 (17.5)	60 (21.2)	0.691
≤once a week	133 (45.5)	127 (44.9)	
twice a week	70 (24)	61 (21.6)	
≥ twice a week	38 (13)	35 (12.4)	
<b>Masturbation</b>			
Does not	248 (84.9)	222 (78.4)	<b>0.044</b> *
Does	44 (15.1)	61 (21.6)	
<b>Who starts the sexual activity</b>			
Always Partner	49 (16.8)	48 (17)	0.819
Mostly Partner	208 (71.2)	195 (68.9)	
Mostly Herself	31 (10.6)	37 (13.1)	
Always Herself	4 (1.4)	3 (1.1)	
<b>Orgasm</b>			
Never	60 (20.5)	70 (24.7)	0.060
Sometimes	158 (54.1)	123 (43.5)	
Frequently	66 (22.6)	76 (26.9)	
Always	8 (2.7)	14 (4.9)	
<b>Libido Scoring System</b>			
Loss of Libido	67 (22.9)	78 (27.6)	0.077
Low Libido	157 (53.8)	122 (43.1)	
Good Libido	65 (22.3)	80 (28.3)	
High Libido	3 (1)	3 (1.1)	
<b>Depression</b>			
Minimal Depression	192 (65.8)	146 (51.6)	<b>0.002</b> *
Mild Depression	57 (19.5)	73 (25.8)	
Moderate Depression	39 (13.4)	50 (17.7)	
Severe Depression	4 (1.4)	14 (4.9)	
<b>Anxiety</b>			
Minimal Anxiety	167 (57.2)	140 (49.5)	0.071
Mild Anxiety	65 (22.3)	67 (23.7)	
Moderate Anxiety	46 (15.8)	48 (17)	
Severe Anxiety	14 (4.8)	28 (9.9)	

Abbreviations: HPV, human papillomavirus; BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; LSS, Libido Scoring System

#### 4. Discussion

The present study indicated that HPV-positive women had more sexual interest than HPV-negative women. We found no

association between positive HPV test results and the domains of sexual desire, frequency of sexual activity, and orgasmic experience. We found higher depression levels in HPV-positive women compared to the control group. However, we did not observe a significant difference in anxiety levels between groups.

The cervical cancer screening programs are generally population-based interventions. Globally, millions of women receive HPV-positive test results at cervical screening programs each year. World Health Organization recognizes HPV as a global burden, associated with an estimated 570,000 new cases of cervical cancer and leading to 311,000 deaths worldwide (16). Additionally, a diagnosis of HPV may be associated with adverse psychological, behavioral, and sexual effects; this translates into a significant number of individuals being exposed to negative psychological and behavioral consequences. This has led many researchers to investigate the impact of an HPV diagnosis on mental health and sexual behavior. To date, much work in this field has been carried out, yet, there have still been contradictory findings due to differences in the study designs, heterogeneity in the cervical screening programs, and lack of a well-accepted definition of emotions (17). For instance, the randomized controlled trial on the psychosexual impact of HPV testing in primary cervical screening conducted in 2008 by Kitchener et al. from England found that psychosexual functioning did not differ between those who received an HPV+ or HPV- result (18). In another study reported by Maggino et al. among 72 women attending a gynecological clinic, there were no significant differences in interest in sex, sexual arousal, sexual satisfaction, frequency of sex, sexual satisfaction, and sexual pleasure/orgasm between women who were HPV+ and HPV- over 6 to 12+ months (10). A third study by Reed et al. found no difference in sexual satisfaction, frequency of sex, or sexual arousal (19). These findings are in contrast to those reported by Ferenidou on 51 women whose HPV-positive results were recently disclosed, 41% reported a decrease in the frequency of sex, 22% reported feeling dissatisfied with their sex life, 22% reported difficulty in reaching orgasm, and decreased sexual desire following an HPV diagnosis (20). Our findings suggest that among women with HPV+ or HPV- results, testing positive for HPV may have no significant adverse sexual effects on both frequencies of sex, sexual desire, and orgasm; however, the difference reaches significance only with a sexual interest in HPV+. While there is a large amount of clinical, socioeconomic, and demographic data on HPV testing, this particular area of psychosexual outcomes is lacking and might have been overlooked to date. One possible explanation was that the study participants ranged from 18 to 72 years. Since sexual function in postmenopausal women over the age of 50 is different from women of childbearing age, this may affect the results obtained.

The majority of prior research found an increase in psychological morbidity, particularly short-term anxiety, following HPV-positive test results (10, 21, 22). However, we

did not observe a significant difference in anxiety levels after an HPV-positive test result. On the contrary, we found higher depression levels in women diagnosed with HPV compared to those without HPV. Our results support previous research in this area (18, 23). As we evaluated the patients shortly after their HPV-positive results, anxiety and depression may not have yet developed in such a short time. In addition, patients with severe lesions undergoing treatment for HPV may have experienced a deterioration in mental health. Unfortunately, we were unable to evaluate patients after a gynecological procedure. Moreover, it should be kept in mind that clinical and statistical heterogeneity makes it difficult to conclude the psychosexual impact of testing HPV-positive (23, 24).

Several limitations to this study are worth considering when interpreting the results. Firstly, the study's cross-sectional design did not allow us to infer causality between testing positive for HPV and emotional response. Due to the short duration of the study, we could not conclude the long-term effects of HPV infection on mental health status and sexual dysfunction. Unfortunately, we were unable to obtain relevant data on the patients' cytologic results, presence of genital warts, HPV vaccination status, and their partner's or husband's sexual function. Lastly, considering Türkiye's context, these findings may not apply to other settings due to cultural, religious, and ethnic diversity. Notwithstanding these limitations, this study has several strengths in that it has a large sample size comparing healthy and HPV-positive subjects that maximizes the interpretability of the study findings. A reliable, validated instrument was used to measure anxiety, depression, and sexual dysfunction since emotional responses are difficult to categorize, and healthcare providers and patients are reluctant to talk about sexual issues and sexually transmitted diseases.

The present study was designed to evaluate the psychosexual impact of testing positive for HPV. This study showed that being diagnosed with HPV made no significant difference in anxiety levels and sexual function, except for sexual interest, but increased depression scores. We believe that our findings add substantially to our understanding of the short-term psychosexual consequences of being diagnosed with HPV. Considering the large number of women participating in cervical cancer screening programs each year and are likely to be affected by psychosocial and sexual aspects, further studies are needed to investigate the psychological, social, and sexual effects of being diagnosed with HPV.

#### **Ethical statement**

The Research Ethics Committee of the Zeynep Kamil Training and Research Hospital approved the study (Approval number: 21.06.2021-21/211).

#### **Conflict of interest**

The authors have no conflicts of interest.

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#### **Authors' contributions**

Concept: E.K., M.A., Design: E.K., M.A., Data Collection or Processing: U.K.Ö., C.M.A., D.Y., Analysis or Interpretation: K.N.B., E.K., Literature Search: E.K., U.K.Ö., M.A., C.M.A., D.Y., K.N.B., Writing: E.K., U.K.Ö., M.A., C.M.A., D.Y., K.N.B.

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