

The relationship between human papilloma virus and anxiety, depression and sexual dysfunction in women

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Abstract

We aimed to investigate the impact of Human Papillomavirus (HPV) positivity on women's mental health and sexual dysfunction (SD). Anxiety, hopelessness, and depression were investigated in this study as common psychological problems. This prospective cross-sectional case-control study was done on 213 participants who attended gynecology clinic from February 2021 to May 2022. The Turkish version of Female Sexual Function Index (FSFI)-6 was used to measure SD in women. The Turkish version of Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and Beck Hopelessness Scale (BHS) was used to measure depression, anxiety and hopelessness in women. According to the HPV test results, the subjects were divided into two groups: 1st group as HPV positive and 2nd group as HPV negative. 97 women in the 1st group and 116 patients in the 2nd group were included in the study. The participants' age and body mass index (BMI) were 33.91 ± 3.74 and 24.88 ± 3.01 , respectively. There was a significant difference between HPV-positive and HPV-negative women in FSFI total scores and all subdomains (p -value <0.05). There was a significant difference in BDI, BHS, and BAI (p -value <0.05). There was a significant correlation between the FSFI and BAI in HPV-positive group. There was a significant correlation between the FSFI and BAI in HPV-negative group. There was a significant correlation between the FSFI and BDI in HPV-negative group. The health system should support women with HPV in terms of mental health. These women are more exposed to depression, anxiety, hopelessness, and SD.

Keywords: human papillomavirus, female sexual function index, sexual dysfunction, quality of life

1. Introduction

Human papillomavirus (HPV) is one of the most common sexually transmitted diseases globally, and is closely related to cervical cancer as the fourth leading cause of cancer-related death in women. More than 90% of the women with this cancer are HPV-positive (1, 2). The virus generally affects the epithelial tissue of the genital area, especially in women. Its effects are usually removed by the person's immune system within two years (3). Viral infection or damage to the mucous and skin tissues of the target area begins, leading to a wound or wart at the site, indicating the ability of the HPV virus to differentiate the infected tissue of the host cellularly (4). In general, HPV virus is present in 32.1% of women worldwide. A comprehensive and multicenter study in Turkey with 2234 women reported a prevalence of 38.05%, and the 16th type had the highest prevalence (5). The prevalence of HPV is strongly correlated with the country's vaccination rate.

Infertility in women has attracted the attention of researchers for decades (6). In the conducted research, the factors affecting female infertility are studied. The effect of sexual dysfunction (SD) and psychological problems such as

stress, hopelessness, depression, and anxiety on infertility has received increasing attention in recent years. Besides women's sexual health, their mental health also affects their fertility (7). Identifying each factor besides its effect on the infertility treatment process is essential. In most societies, hopelessness, depression, and anxiety are more common in women than men. Environmental factors and some diseases can cause frustration, stress, depression, and anxiety in women. HPV has a negative effect on women's emotional and sexual health (8). HPV can cause shame in women, disrupt their relationship with their partner by reducing their femininity, and increase fear, anxiety, and stress (9). Identifying the roots of depression and anxiety in women and curing them can increase their chances of pregnancy (7).

The prevalence of SD varies among populations and is influenced by psychological, medical, economic, social, cultural, and ethnic factors (10). SD and infertility are significantly associated with each other. The effect of HPV virus on SD was assessed in some studies (6). However, further studies are needed to determine changes in sexual function and psychological problems in women after the

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diagnosis of HPV.

This study assessed the SD, hopelessness, depression, and anxiety rate in HPV-positive women and the control group. The main aim of this study was to evaluate the effect of this virus on the sexual and mental function of HPV-positive women. The contribution of this study is to evaluate the effect of a positive HPV test result on the mental health of Turkish women.

2. Materials and Methods

The Ethics Committee of Beykoz University approved this prospective cross-sectional case-control study. 213 women participated in this study between February 2021 and May 2022 at Medistate Hospital Gynecology and Obstetrics Clinic. The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki as reflected in a prior approval by the institution's human research committee. Before enrolling in the study, all participants gave their informed consent.

116 women were included in the control group, and 97 women infected with HPV in the last year were included in the study group.

The inclusion criteria were: (1) being between the ages of 20 and 45. The exclusion criteria were: (1) being pregnant or in the breastfeeding period; (2) absence of diabetes, thyroid dysfunction, and systemic diseases.

The Turkish version of Female Sexual Function Index (FSFI-6) was used to measure SD in women (11). The total FSFI scores and each subdomain score of HPV-positive women and the controls were compared. We included six domains, including desire (the desire to have sexual experience), arousal (having interest in sexual relation before stimulations), lubrication, orgasm (reaching orgasm following arousal), satisfaction, and pain calculated based on the patients' self-report in the FSFI score. The six domains of the scale items are desire (2 questions), arousal (4 questions),

orgasm (3 questions), lubrication (4 questions), satisfaction (3 questions), and pain (3 questions). The total FSFI score was the sum of all scores obtained in all six domains. A higher score indicates improved sexuality.

The Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) are a 21-item inventory assessing the symptoms of depression and anxiety, respectively. The total score may range from 0 to 63. Beck Hopelessness Scale (BHS) is a 20-item inventory assessing the symptoms of hopelessness. Hisli, Durak, and Ulusoy assessed the reliability and validity of the Turkish version of these surveys (12-14).

The Kolmogorov-Smirnov test was performed to check the normality. All six sexual function subdomains and total sexual functioning mean scores were measured to compare the groups. The relationship between the case and control groups was studied using the chi-square test to check the variables of infertility time, smoking, dyspareunia, menstruation, and hirsutism. The Spearman test was used to examine examined a significant relationship between the questionnaire variables. The Mann-Whitney test was performed to study the difference between the two groups in all FSFI subdomains. SPSS v20 was used for statistical analyses. A value of $p < 0.05$ was accepted as statistically significant.

To calculate the sample size with the G-Power 3.1 (<http://www.gpower.hhu.de/>) program, two groups' total mean was measured based on the Mann-Whitney test with the power of 95%, effect size of 50%, and 0.05 type 1 error for at least 92 patients (15).

3. Results

The study included two 213 (mean age \pm SD: 33.91 ± 3.74). The participants' mean body mass index (BMI) was 24.88 ± 3.01 . Table 1 shows descriptive information on the study parameters. Descriptive characteristics of other variables were omitted omit for brevity.

Table 1. Descriptive information on the study parameters

Study parameters	N	Minimum	Maximum	Mean	SD
Age(yr)	213	21.00	45.00	33.91	3.74
Body mass index(BMI) kg/m ²	213	18.00	30.00	24.88	3.01
	Total	Study group (HPV-positive) (n=97)	Control group (HPV- negative) (n=116)		p-value
Working Status					
Working	108(50.7)	52(53.6)	53(45.7)		0.250
Unemployed	105(49.3)	45(46.4)	63(54.3)		
Cigarette					
Yes	97(45.5)	32(33)	65(56)		<0.001
No	116(54.5)	65(67)	51(44)		
Education					
Middle School	5(2.3)	5(5.2)	0(0)		<0.001
High School	105(49.3)	44(45)	61(52.5)		
Bachelor	84(39.4)	46(47)	38(32.7)		
Master	19(8.9)	2(2.8)	17(14.8)		
Parity					
Nulliparous	142(66.7)	72(74.3)	68(58.6)		0.031
Multiparous	71(33.3)	25(25.7)	48(41.4)		

As stated in Table 1, a chi-square test did not find a statistically significant association between study and control groups in terms of working status (p -value > 0.05). There was a statistically significant association between study and control groups in terms of cigarettes, education, and parity (p -value < 0.05).

Table 2 shows a significant difference between HPV-positive and HPV-negative women in FSFI total scores and all FSFI subdomains (p -value<0.05). FSFI subdomains scores were higher in control group women. It means that HPV-positive affects sexual function negatively.

Table 2. Comparing HPV- and HPV+ patients in terms of mean FSFI total scores and subdomain sexual function scores

Category	Study group (HPV-positive) (mean ± SD)	Control group (HPV- negative) (mean ± SD)	p -value
Desire	3.43 ± 1.22	4.60 ± 1.08	<0.001
Arousal	4.04 ± 1.10	4.36 ± 1.12	0.034
Lubrication	3.27 ± 0.94	4.18 ± 1.15	<0.001
Orgasm	3.14 ± 1.00	3.88 ± 1.12	<0.001
Satisfaction	3.03 ± 1.13	3.69 ± 1.26	<0.001
Pain	2.58 ± 1.34	3.66 ± 1.77	<0.001
Total FSFI score	19.49 ± 2.92	24.16 ± 3.63	<0.001

FSFI: Female Sexual Function index, HPV: Human papillomavirus, SD: Standard deviation

Table 3 shows a significant difference between HPV-positive and HPV-negative women in BDI, BHS, and BAI (p -value<0.05). It means that HPV-positive affects mental health negatively.

Table 3. Age, BMI, BDI, BHS, and BAI mean values according to the human papillomavirus result

Category	Study group (HPV-positive) (mean ± SD)	Control group (HPV- negative) (mean ± SD)	p -value
Age(year)	33.81 ± 2.48	33.99 ± 4.55	0.939
BMI(kg/m2)	23.39 ± 2.89	26.13 ± 2.49	<0.001
BDI	24.05 ± 7.44	10.51 ± 7.67	<0.001
BHS	12.72 ± 4.47	1.46 ± 1.14	<0.001
BAI	19.54 ± 6.08	3.46 ± 2.56	<0.001

BDI: Beck Depression Inventory, BAI: Beck Anxiety Inventory, FSFI: Female Sexual Function Index, BHS: Beck Hopelessness Scale, SD: Standard deviation, HPV: Human papillomavirus

Fig. 1 shows the effect of HPV on mental health issues and sexual dysfunction.

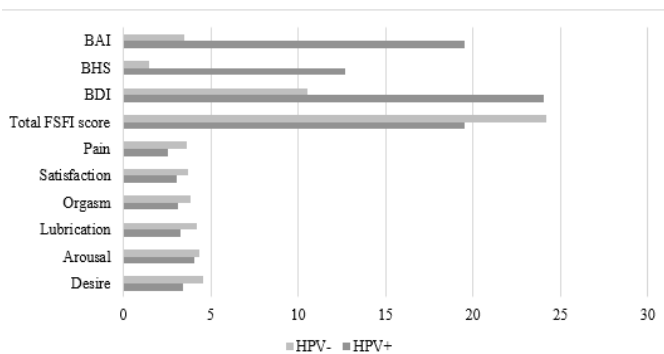


Fig. 1. The effect of HPV on mental health issues and sexual dysfunction

Table 4 shows the correlation between FSFI and mental health scales according to HPV result. Spearman's rho correlation coefficient was used to assess the relationship between FSFI total score and three scales (BDI, BHS and BAI). No significant correlation was found between the FSFI and BDI in study group (r = 0.022, p -value > 0.05). There was no significant correlation between the FSFI and BHS in study group (r = -0.122, p -value > 0.05). There was significant correlation between the FSFI and BAI in study group (r = 0.250, p -value < 0.05). FSFI was significantly correlated with the BDI in control group (r = -0.270, p -value < 0.05). No significant correlation was found between the FSFI and BHS in control group (r = -0.052, p -value > 0.05). There was significant correlation between the FSFI and BAI in control group (r = -0.189, p -value < 0.05).

Table 4. The correlation between FSFI and mental health scales according to the human papillomavirus result

		BDI	BHS	BAI
HPV-positive	FSFI			
	Correlation Coefficient	0.022	-0.122	0.250
	p -value	0.830	0.236	0.014
HPV-negative	FSFI			
	Correlation Coefficient	-0.270	-0.052	-0.189
	p -value	0.003	0.582	0.043

4. Discussion

This study dealt with the effect of HPV-positivity on sexual dysfunction, BDI, BAI, and BHS in women. Our findings showed that HPV-positivity harmed women's mental health. Hopelessness, anxiety, and depression were significantly more common in HPV-positive women. According to the results, sexual dysfunctions were substantially more common in HPV-positive women. Both case and control groups were found to have similar correlations between SD and anxiety.

The current study observed a statistically significant relationship between mental health problems (hopelessness, anxiety and depression) and positive HPV. Studies highlighted the negative effects of HPV- positivity on mental health in women. Several studies showed that anxiety was more common in HPV-positive women. Depression and hopelessness were reported in fewer studies than anxiety in HPV-positive women. Lin et al. (16) reported negative emotions in HPV-positive women, including fear, anxiety and suspicion, by interviewing 20 Taiwanese women. McCaffery et al. (17) showed HPV-positivity had negative effects on mental health problems such as anxiety and stress in a study of 271 white, black, and Asian women. Lin et al. (18) showed increased anxiety and stress as a positive HPV outcome (19). Felden et al. reported HPV-positive causes reluctance to engage in sexual activity, stress, and anxiety in women. Mercan et al. (20) studied anxiety and depression in the case and control groups of 133 HPV-positivity Turkish women. In this study, six weeks after the positive HPV result, an evaluation of anxiety and depression was performed, and a significant relationship was found between HPV-positivity and depression, but not anxiety. Heinonen et al. (21)

measured the effect of HPV-positivity on 238 Finnish women over 12 months. The negative effects of HPV-positivity on quality of life, sleep, sexual activity, anxiety, and distress were shown. Maissi et al. (22) showed that anxiety, distress, and concern were higher in HPV-positive women. The negative impact on mental health problems increased when women were less aware of the meaning of their test results. Waller et al. (23) reported a significant relationship between HPV-positive and negative emotions. With increasing awareness of the prevalence of this virus, the negative psychological consequences and anxiety were significantly reduced. Uzun et al. (24) reported HPV-positivity as the cause of increased anxiety and depression, which has decreased over time. Rask et al. (25) found that HPV-positivity was associated with reduced quality of life and anxiety in a study of Swedish women. Results of this study reported that a significant relationship was found between anxiety and HPV-positivity but not depression. Alay et al. (6) reported a negative effect of different types of HPV on anxiety in 80 Turkish women. Highest level of anxiety reported in women with 16/18 HPV.

In line with similar studies in the literature, according to the results, HPV-positive women face sexual dysfunction problems. All subdomains of the FSFI index were lower in the HPV-positive women. These values indicate that HPV-positive had a significant effect on female sexual function. Ferenidou et al. (26) showed a decrease in sexual desire in HPV-positive women. Uzun et al. (24) did not observe a significant relationship between sexual dysfunction and HPV-positivity with continuous visits of women in the first, third, sixth, and twelfth months. In this study, women's employment, financial status, and age were considered influential in sexual satisfaction. Caruso et al. (27) showed a decline in all aspects of women's sexual quality of life following a positive HPV outcome. Ekmez and his brother (28) reported increased anxiety and sexual dysfunction after the diagnosis of HPV-positivity. According to the research findings, the partner's sex life is also negatively affected by the positive HPV result. Fornage et al. (29) reported no significant association between sexual health and HPV-positivity while showed a positive HPV result as an increase in anxiety. Ilgen et al. (30) showed no significant relationship between female sexual function and HPV. Physicians should be aware of the adverse effects on the sexual function of HPV-positive women. However, more comprehensive and detailed research is required to prove the association between sexual dysfunction and HPV, especially over the long term.

The most important limitations of this study are the lack of sufficient information about sexual dysfunction, hopelessness, anxiety, and depression in HPV-positive women before the test. Continuous evaluation of these patients during 3-month and 6-month periods could better demonstrate the durability of adverse effects of HPV-positivity. Further research is suggested to show a significant

relationship between the negative effects and women's awareness of this virus as part of the research.

HPV-positivity causes hopelessness, anxiety, depression, and sexual dysfunction in women. The health system should support women with HPV in terms of mental health. Increasing women's awareness of this virus, its different types, and its high prevalence can significantly affect the reduction of negative emotions. Free vaccination and giving necessary information about its positive impact among health centers can increase women's sexual and mental health.

Conflict of interest

The authors declared that there was no conflict of interest in this study.

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Authors' contributions

Concept: N.G.,T.G., Design: N.G.,T.G., Data Collection or Processing: N.G.,T.G., Analysis or Interpretation: N.G.,T.G., Literature Search: N.G.,T.G., Writing: N.G.,T.G.

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