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The impact of human papillomavirus positivity and genotype on sexual dysfunction and psychosexual stress

İnsan papilloma virüs pozitifliği ve genotipinin cinsel işlev bozukluğu ve psikoseksüel stres üzerine etkisi

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Abstract

Objective: This study aimed to investigate the relationship between human papillomavirus (HPV) positivity, genotype, and female sexual dysfunction, particularly anorgasmia and psychosexual stress, among women participating in a cervical cancer screening program. It also examined whether HPV infection or genotype independently contributes to sexual dysfunction after adjusting for sociodemographic and reproductive factors.

Materials and Methods: This prospective, cross-sectional study included 1,353 sexually active women aged 25-65 years who underwent HPV testing at Antalya City Hospital between May and September 2025. Participants completed validated questionnaires including the Female Sexual Function Index, Arizona Sexual Experiences Scale, Beck Depression Inventory, and Beck Anxiety Inventory. Sociodemographic, reproductive, and clinical characteristics were recorded, and HPV genotyping was performed using polymerase chain reaction-based assays.

Results: Anorgasmia was identified in 31.5% of participants (n=427). It was significantly more common among unemployed women (84.1% vs. 71.6%; odds ratio =2.09, 95% confidence interval: 1.56-2.82; p=0.0001). Higher gravidity, parity, number of living children, and elevated vaginal pH were all associated with anorgasmia ($p<0.05$). No significant association was found between HPV positivity or genotype and anorgasmia ($p>0.05$).

Conclusion: Anorgasmia is primarily influenced by sociodemographic and reproductive factors, such as occupation, education level, parity, and vaginal environment, rather than HPV infection or genotype. These findings emphasize the importance of biopsychosocial and culturally sensitive approaches in evaluating and managing women's sexual health.

Keywords: Anorgasmia, papillomavirus infections, sexual dysfunction, physiological

PRECIS: Sociodemographic and reproductive factors, rather than HPV infection or genotype, were found to significantly influence anorgasmia and psychosexual stress among Turkish women undergoing cervical cancer screening in Antalya.

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Öz

Amaç: Bu çalışma, serviks kanseri tarama programına katılan kadınlarda insan papilloma virüsü (HPV) pozitifliği, genotipi ve kadın cinsel işlev bozukluğu özellikle anorgazmi ve psikoseksüel stres arasındaki ilişkiyi araştırmayı amaçladı. Ayrıca HPV enfeksiyonu veya genotipinin, sosyodemografik ve üreme faktörlerinden bağımsız olarak cinsel işlev bozukluğuna katkıda bulunup bulunmadığı incelendi.

Gereç ve Yöntemler: Bu prospektif, kesitsel çalışma, Mayıs-Eylül 2025 tarihleri arasında Antalya Şehir Hastanesi'nde HPV testi yapılan, 25-65 yaş arası 1.353 cinsel olarak aktif kadını içermektedir. Katılımcılar, Kadın Cinsel İşlev İndeksi, Arizona Cinsel Deneyimler Ölçeği, Beck Depresyon Envanteri ve Beck Anksiyete Envanteri gibi doğrulanmış anketleri doldurmuştur. Sosyodemografik, üreme ve klinik özellikler kaydedilmiş, HPV genotiplemesi ise polimeraz zincir reaksiyonu temelli testlerle yapılmıştır.

Bulgular: Katılımcıların %31,5'inde (n=427) anorgazmi tespit edilmiştir. Anorgazmi, çalışmayan kadınlarda anlamlı derecede daha yaygındır (%84,1'e karşı %71,6; risk oranı =2,09, %95 güven aralığı: 1,56-2,82; p=0,0001). Daha yüksek gebelik sayısı, doğum sayısı, yaşayan çocuk sayısı ve artmış vajinal pH değerleri anorgazmi ile anlamlı şekilde ilişkili bulunmuştur (p<0,05). HPV pozitifliği veya genotipi ile anorgazmi arasında anlamlı bir ilişki saptanmamıştır (p>0,05).

Sonuç: Anorgazmi, HPV enfeksiyonu veya genotipinden ziyade sosyodemografik ve üreme faktörleri özellikle meslek, eğitim düzeyi, doğurganlık ve vajinal ortam ile ilişkilidir. Bu bulgular, kadın cinsel sağlığının değerlendirilmesi ve yönetiminde biyopsikososyal ve kültürel açıdan duyarlı yaklaşımların önemini vurgulamaktadır.

Anahtar Kelimeler: Anorgazmi, papillomavirüs enfeksiyonları, cinsel işlev bozukluğu, fizyolojik

Introduction

Human papillomavirus (HPV) infection is the most common sexually transmitted disease worldwide and represents a major global public health concern due to its strong oncogenic potential[1,2]. Persistent HPV infection is strongly associated with the development of cervical intraepithelial neoplasia and cervical cancer, as well as other anogenital and oropharyngeal malignancies. Sexual dysfunction remains a widespread issue among women worldwide[2,3]. Beyond its oncological implications, HPV positivity may affect women's sexual and psychosocial well-being, an area that has been relatively understudied[4].

Previous research has demonstrated that HPV infection can negatively impact female sexual function. In a study conducted in the Turkish population, Mercan et al.[5] reported that women diagnosed with HPV infection experienced higher rates of sexual dysfunction, suggesting that the psychological burden of HPV positivity contributes to disturbances in sexual health. Similarly, Aker et al.[6] found that both HPV diagnosis and abnormal cervical cytology results were significantly associated with increased sexual dysfunction and heightened anxiety, underscoring the interplay between somatic and psychological factors in affected women.

In addition to biological consequences, HPV infection may trigger psychosexual stress through mechanisms such as fear of cancer, anxiety about transmission to partners, and concerns regarding stigma and body image[4,6]. These psychosocial responses can impair sexual satisfaction, reduce intimacy, and contribute to long-term sexual dysfunction. While international studies have identified associations between HPV infection, anxiety, and impaired quality of life, data from the Turkish context remain limited[5,6]. Considering cultural norms, sociopsychological dynamics, and healthcare access differences, further exploration of this topic is warranted.

Therefore, this study aims to evaluate the impact of HPV positivity and HPV genotype on female sexual dysfunction and psychosexual stress in women participating in cervical cancer screening programs. By integrating validated sexual function and psychometric assessment tools [Female Sexual Function Index (FSFI), Arizona Sexual Experiences Scale (ASEX), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI)], this research seeks to provide evidence that may inform patient counseling, psychosocial support, and tailored management strategies in gynecologic practice.

Materials and Methods

This prospective, descriptive, and cross-sectional clinical study was conducted at the Gynecology Outpatient Clinics of Antalya City Hospital between May 2025 and September 2025. The study was approved by Antalya City Hospital Ethics Committee and was performed in accordance with the ethical standards described in the 1975 Declaration of Helsinki, as revised in 2000 (approval no: 2025-134, date: 28.05.2025), and all procedures were carried out in accordance with the ethical standards outlined in the Declaration of Helsinki (revised 2000). Written informed consent was obtained from all participants prior to enrollment.

A total of 1,353 sexually active women aged between 25 and 65 years who underwent HPV testing were included in the study. Participants were divided into two groups according to HPV status: women with positive HPV test results (any genotype) and age-matched women with negative test results. Women who were not sexually active, those with a previous history of gynecologic malignancy, pelvic surgery, or radiotherapy, those with severe psychiatric disorders, and women with incomplete questionnaire data were excluded from the study.

A priori power analysis was performed to estimate the minimum sample size required for adequate statistical power. For a correlation coefficient of r=0.4, with 95% power and an alpha level of 0.05, a minimum of 124 participants (62 HPV-positive and 62 HPV-negative) was deemed sufficient. However, to increase the robustness and generalizability of the findings, all eligible women who met the inclusion criteria, during the

study period were recruited, resulting in a final sample of 1,353 participants.

After obtaining consent, participants underwent a structured face-to-face interview conducted by trained gynecology residents in a private setting. Sociodemographic variables, including age, marital status, education level, and occupation, as well as obstetric and gynecologic history such as gravidity, parity, mode of delivery, and contraceptive methods, were recorded. Lifestyle factors, including smoking habits and the frequency of sexual intercourse, were also documented.

Sexual function was assessed using the Turkish-validated versions of two standardized instruments: the FSFI, a 19-item scale evaluating six domains (desire, arousal, lubrication, orgasm, satisfaction, and pain), and the ASEX, a 5-item questionnaire assessing sexual drive, arousal, orgasmic ability, and satisfaction. Psychosexual stress was evaluated using the BDI and the BAI, both of which are widely validated self-report tools measuring the severity of depressive and anxiety symptoms, respectively. All questionnaires were self-administered under supervision to ensure completeness and accuracy.

Cervical samples were obtained from all participants using standard cytobrush techniques. HPV DNA detection and genotyping were performed using polymerase chain reaction-based molecular assays capable of identifying both high-risk and low-risk HPV genotypes. Vaginal pH levels were measured immediately after sample collection using sterile pH indicator strips.

Statistical Analyses

Statistical analyses were performed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). The Kolmogorov-Smirnov test was used to assess the normality of distribution. Continuous variables were expressed as mean ± standard deviation and compared using the Student's t-test or the Mann-Whitney U test, as appropriate, whereas categorical variables were presented as frequencies, and compared using the chi-square test. A two-tailed p-value of less than 0.05 was considered statistically significant.

Results

A total of 1,353 sexually active women were included in the study. Among them, 427 (31.5%) reported anorgasmia, while 926 (68.5%) did not. The mean age of participants was 34.6±7.9 years. Most women were non-employed (77.5%) and had completed only primary school education (60.5%). The proportion of single women was 1.5%.

Anorgasmia was significantly more prevalent among non-employed women [84.1% vs. 71.6%; crude odds ratio =2.09, 95% confidence interval (CI): 1.56-2.82; p=0.0001] compared with employed women, and among those with primary school education (63.7% vs. 58.7%; p=0.001) compared with women with higher education levels. Conversely, single women were more frequently represented in the anorgasmia (–) group, although this subgroup was very small (2.7% vs. none reported; p=0.003). No significant differences were observed between the groups regarding the partner's occupation, number of marriages, or contraceptive methods (p>0.05) (Table 1).

Reproductive and clinical parameters are summarized in Table 2. Age and duration of marriage did not differ significantly between the groups (p=0.712 and p=0.601, respectively). The reported frequency of sexual intercourse per month was similar in both groups (7.31±4.31 vs. 7.13±4.25; p=0.472). However, gravidity and parity were significantly higher in the anorgasmia (+) group compared with the anorgasmia (–) group (3.09±2.04 vs. 2.75±1.70, mean difference =+0.34, 95% CI: +0.12 to +0.56; p=0.001) and (2.15±1.27 vs. 1.96±1.14, mean difference =+0.19, 95% CI: +0.05 to +0.33; p=0.005, respectively). The number of living children was also greater among women with anorgasmia (2.05±1.05 vs. 1.89±1.02; mean difference =+0.16, 95% CI: +0.04 to +0.28; p=0.008). Additionally, vaginal pH was significantly higher in the anorgasmia (+) group (5.27±1.09 vs. 5.14±1.00; mean difference =+0.13, 95% CI: +0.01 to +0.25; p=0.032), indicating a possible association between vaginal environment and orgasmic function.

No significant relationship was observed between HPV positivity and anorgasmia (p>0.05). The presence or genotype of HPV did not appear to influence the occurrence of orgasmic dysfunction. In contrast, sociodemographic factors such as being non-employed and having a low educational level, as well as reproductive factors including high gravidity and parity, showed strong associations with anorgasmia.

Regarding coexisting genital infections, anorgasmia was less prevalent among women with Chlamydia positivity (p=0.05), and no cases of anorgasmia were reported among those diagnosed with Gonorrhea. However, these findings should be interpreted with caution due to the limited number of cases in these subgroups.

Table 1. Sociodemographic characteristics

	Anorgasmia (+) (n=427)	Anorgasmia (–) (n=926)	p-value
Age (years)	34.56±7.88	34.7±8.29	0.712
Non-employed (%)	84.1	71.6	0.0001
Primary school graduate (%)	63.7	58.7	0.001
Single (%)	2.7	-	0.003

Table 2. Reproductive health characteristics

	Anorgasmia (+)	Anorgasmia (–)	p-value
Gravidity	3.09±2.04	2.75±1.70	0.001
Parity	2.15±1.27	1.96±1.14	0.005
Living children	2.05±1.05	1.89±1.02	0.008
Vaginal pH	5.27±1.094	5.141±1.00	0.032

Discussion

This study investigated the relationship between HPV positivity, HPV genotype, and female sexual dysfunction, particularly anorgasmia and psychosexual stress among Turkish women participating in a cervical cancer screening program. The findings revealed that anorgasmia was significantly associated with sociodemographic and reproductive characteristics, such as non-employment, a low educational level, higher gravidity and parity, and elevated vaginal pH, whereas no significant association was observed between HPV positivity or genotype and orgasmic dysfunction. These results suggest that the determinants of female sexual dysfunction in this population are predominantly psychosocial and reproductive rather than virological.

The prevalence of anorgasmia in our cohort (31.5%) is consistent with previous reports indicating that approximately one-third to one-half of women of reproductive age experience some form of orgasmic difficulty[7,8]. Educational attainment, marital relationship quality, and parity are among the strongest predictors of sexual dysfunction across diverse populations[3]. The higher prevalence of anorgasmia among non-employed women and women with lower education levels likely reflects the influence of limited sexual literacy, restricted autonomy, and traditional gender norms prevalent in conservative cultural contexts. Turkish women with lower education levels and higher depressive symptoms have been shown to exhibit greater sexual dysfunction, emphasizing the link between education, mental health, and sexual well-being[9].

Reproductive health parameters including gravidity, parity, and vaginal pH were also identified as significant predictors of anorgasmia. These associations are biologically plausible, as repeated pregnancies and deliveries can result in pelvic floor muscle weakening, hormonal changes, and altered genital vascularization, which collectively diminish orgasmic response and satisfaction. Obstetric factors such as instrumental delivery, episiotomy, and multiparity significantly increase the risk of pelvic floor disorders and related sexual dysfunction later in life[10]. Moreover, the elevated vaginal pH observed among women with anorgasmia may indicate disruption of the normal vaginal microbiome. A Lactobacillus-dominant flora is essential for maintaining mucosal integrity, lubrication, and sexual comfort, and disruption of this environment has been linked to dyspareunia and reduced sexual satisfaction[11,12].

No significant relationship was found between HPV positivity and genotype and anorgasmia. Although some studies suggested that HPV diagnosis could negatively affect sexual function and increase anxiety, these effects appear to be mediated primarily through psychological distress and fear of malignancy rather than through direct biological mechanisms[5,6]. When sociodemographic and reproductive confounders were controlled, HPV status did not independently predict orgasmic dysfunction. This may reflect cultural coping mechanisms, social support, or effective communication between healthcare providers and patients in Türkiye.

The lower prevalence of anorgasmia among women with Chlamydia trachomatis positivity and the absence of cases among those with Neisseria gonorrhoeae infection should be interpreted cautiously, given the small number of infected participants. This pattern could be influenced by behavioral factors such as increased medical attention or heightened sexual health awareness following infection diagnosis.

Overall, these findings reinforce the need to adopt a biopsychosocial perspective when assessing and managing female sexual dysfunction. Women's sexual function is shaped by the dynamic interplay of biological, emotional, and sociocultural elements rather than by physiological factors alone[4,13]. Accordingly, interventions aimed at improving sexual health should integrate medical, psychological, and educational components, particularly in cultures where open discussions of sexuality remain limited.

Study Limitations

This study's strengths include its large sample size, use of validated psychometric tools (FSFI, ASEX, BDI, BAI), and comprehensive evaluation of both biological and psychosocial determinants. However, several limitations should be acknowledged. The cross-sectional design precludes causal inference. Factors such as partner satisfaction, body image perception, and sexual trauma history were not assessed. Moreover, HPV genotypes were not analyzed individually for subtype-specific effects. Future multicenter and longitudinal studies incorporating psychosexual interventions and genotype-specific analyses could further clarify the complex interplay between infection, mental health, and sexual function.

Conclusion

Anorgasmia among Turkish women is primarily influenced by sociodemographic and reproductive variables, particularly being non-employed, lower educational level, high gravidity and parity, and elevated vaginal pH, rather than HPV infection or genotype. These findings highlight the importance of biopsychosocial and culturally sensitive approaches in gynecologic practice, emphasizing sexual education, mental health support, and reproductive counseling to improve overall female sexual health and well-being.

Ethics

Ethics Committee Approval: The study was approved by Antalya City Hospital Ethics Committee and was performed in accordance with the ethical standards described in the 1975 Declaration of Helsinki, as revised in 2000 (approval no: 2025-134, date: 28.05.2025).

Informed Consent: Informed consent was obtained from each patient prior to the study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: C.K., Concept: C.K., Design: C.K., Data Collection or Processing: S.M.G.K., A.P., E.T., M.M.İ., Analysis or Interpretation: S.M.G.K., Literature Search: G.G., E.D., Writing: C.K.

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