

The Psychosexual Impact of Human Papillomavirus Cervical Infections

Barbara D. Reed, MD, MSPH; Mack T. Ruffin IV, MD, MPH; Daniel W. Gorenflo, PhD; and Philip Zazove, MD
Ann Arbor, Michigan

BACKGROUND. Occult human papillomavirus (HPV) infection, present in approximately 20% of women in the United States, is usually sexually transmitted, associated with substantial health risks, and unpredictable in its resolution. The potential for adverse psychosexual alterations due to HPV infection in women considered at low risk for bacterial sexually transmitted diseases is substantial, but data is lacking.

METHODS. This cross-sectional study was conducted with sexually active women aged 18 to 60 years who had been enrolled at community-based offices in the University of Michigan Vaginitis Study. Women found to have occult HPV infection of the cervix were notified, received physician consultation, and were encouraged to have colposcopy performed to assess lesion status. Responses to a follow-up written questionnaire for differences in psychosexual functioning and attitudes following diagnosis were compared among these women and those without HPV infection.

RESULTS. The women enrolled were primarily white and had a current sexual partner at the time of enrollment. They had few sexually transmitted infections and few risk factors, yet 20% had unsuspected HPV infection. Psychosexual characteristics at baseline and at follow-up, as well as perceived changes in these characteristics by the women, did not differ between women with HPV infection and those without. Stratification by potential confounders, including the presence of a vaginal infection at the time of study enrollment, household income level, ethnic background, age, marital status, and sexual history, did not alter these results.

CONCLUSIONS. Women at low risk for sexually transmitted diseases, but who had a cervical HPV infection, were similar to those not infected in reported psychosexual characteristics and functioning. Adverse changes in these characteristics between the time of the diagnosis and subsequent follow-up were no more likely in those with the diagnosis than in those without.

KEY WORDS. Women's health; human papillomavirus; psychosexual. (*J Fam Pract* 1999; 48:110-116)

Human papillomavirus infection (HPV) is the most common sexually transmitted infection,¹ and its prevalence has increased dramatically over the past 25 years.^{2,5} An estimated 24 to 40 million Americans are infected with this virus,⁶ and millions of women each year learn that they have this sexually transmitted infection that may lead to cancer.^{7,8} Current treatment is directed at eradicating cervical lesions, but this does not necessarily eradicate the virus from the genital tract. The knowledge that the virus is sexually transmitted, that it may lead to cancer, and that it may persist despite lesion eradication creates the potential for significant psychosexual trauma that may affect the daily function, behaviors, sexuality, and health of women who have this infection. Although few data are available on the psychosexual impact of the knowledge of HPV infec-

tion, studies of women with other HPV-related genital abnormalities, such as sexually transmitted infections, abnormal Papanicolaou smears, cervical cancer, and clinically apparent condyloma acuminata, suggest that adverse emotional and psychosexual changes may occur.⁹⁻¹⁶

Although the prevalence of sexually transmitted infections is higher among women known to be at high risk,¹⁷⁻¹⁹ the prevalence of HPV in women considered at low risk is substantial.²⁰ Because most women in the sexually active age range are at low risk for sexually transmitted diseases (STDs), the proportion of women with HPV who fit this low-risk profile is large, as is the probability that HPV is their only known disease of this type. Furthermore, both low-grade and high-grade cervical lesions can be missed with conventional cytology screening, and HPV testing has been shown to identify a substantial proportion of those missed.^{21,22} Because data suggest that the presence of HPV infection predicts those at high risk for cervical lesions,^{21, 22} and because tests for HPV detection have become available,^{23, 24} primary care physicians, as well as those formulating medical guidelines, will be faced with decisions about the

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From the University of Michigan Medical Center, Ann Arbor. All requests for reprints should be addressed to Barbara D. Reed, MD, MSPH, University of Michigan Medical Center, Department of Family Medicine, 1018 Fuller Street, Ann Arbor, MI 48109-0708

advantages and disadvantages of screening women for this infection and the appropriate follow-up needed after diagnosis. Information on the psychosexual responses resulting from the awareness of the presence of such an infection in women in general, and in the low-risk women who make up a large proportion of those identified, will be critical in this analysis and in the recommendation for follow-up. However, the scope and severity of these psychosexual responses in women at low risk has not been reported.

We examined the impact of the diagnosis of cervical HPV infection on the psychosexual behavior of infected compared with uninfected women. We tested the hypothesis that women with a low prevalence of STDs in general, but with cervical HPV infection, would report significantly more negative psychosexual changes after diagnosis than those without this diagnosis.

METHODS

PATIENT ENROLLMENT

The University of Michigan Family Practice Vaginitis Study took place between March 1, 1990, and June 1, 1992, during an ongoing prospective evaluation of women with and without symptoms of vaginitis. It was conducted in 2 primary care offices in the Ann Arbor, Michigan, area — practices consisting primarily of middle-class, primary care patients drawn from an ethnically mixed but primarily white population. Participants were women aged 18 to 50 years, who presented at one of the offices with either vaginal symptoms (itching, swelling, odor, or discharge) or for a routine pelvic examination. All participants were required to have a current sexual partner, be willing to return for at least 4 follow-up visits over 12 months, and to invite their sexual partner to participate in the study by filling out a self-administered questionnaire and submitting body fluids for *Candida* cultures. Before participation, all women completed an informed consent document approved by the University of Michigan Institutional Review Board. The follow-up evaluations and partner data are not part of the study reported here.

The protocol, methods used in collecting specimens, and details of all testing performed (including polymerase chain reaction [PCR] analysis) have been reported previously.^{20,25} HPV serotypes identified by PCR were 6, 11, 16, 18, 31, 33, 35, 45, 52, and unknown types.

All women with HPV infection diagnosed by the PCR method were called by one of the investigators (B.D.R.) and informed of the infection. They were told that HPV-infection is a very common sexually transmitted infection, that it may have been present for some time, that there was some risk of unidentified HPV-related lesions being present on the cervix, and that in a small percentage of cases such lesions could progress to cancer if not diagnosed and managed appropriately. Colposcopy was recommended to all HPV-infected women to assess

whether they had such lesions. They were told that detection of lesions might indicate the need for further treatment or for further monitoring. The infectious nature was discussed, and questions were answered.

SUPPLEMENTARY QUESTIONNAIRE

In the summer of 1992, a 3-page self-administered questionnaire was developed and mailed to all study participants enrolled for at least 6 months in the vaginitis study to assess current psychosexual activities and changes in these activities since enrollment, without specific reference to HPV infection or genital warts. The date of enrollment was used as a common reference point for each woman to use in answering the questions. An awareness of any health problems identified since enrollment was assessed, followed by a checklist documenting any other life events experienced since (eg, divorce, death, change in living conditions, and so forth). To evaluate the format, phrasing, and clarity of the questions, the instrument was pilot tested on 10 women not in the study who otherwise met the eligibility criteria.

Participants were asked to list their current frequency of intimate activities with their sexual partner (eg, touching, kissing, caressing, masturbation, oral sex, sexual intercourse), the frequency of negative feelings toward sexual activity, and the frequency of satisfaction with sexual aspects of their current relationship. These ratings were made on a 6-point scale with the ascending labels of less than once a month, once a month, 2 to 3 times a month, once a week, 2 to 6 times a week, and daily. This was followed by questions assessing the women's perception of change in these behaviors since enrollment (after 6 months or more). These ratings were made on a 5-point scale, with anchors of much less than before (1 point) and much more than before (5 points).

SURVEY PROTOCOL

The questionnaire that described the reasons for the survey and assured confidentiality of responses was mailed to the study participants with a cover letter from one of the investigators (B.D.R.). A stamped return envelope was included. Two weeks later, a reminder postcard was sent to all nonresponders. Two weeks after the cards were mailed, nonresponders were called and encouraged to complete the questionnaire, and additional surveys were mailed as needed.²⁶

ANALYSIS

Statistical comparisons of the demographic variables were made between responders and nonresponders, followed by the calculation of frequencies and summary statistics on all variables for the responders. Participants were classified as HPV-positive or HPV-negative, with results stratified by the presence of vaginal symptoms at the time of enrollment to assess confounding by this characteristic. Demographic differences between the groups were examined with chi-square tests (including

stratified analysis for confounders) and *t* tests where appropriate. Mann-Whitney tests were used to determine differences in frequencies of psychosexual activities between those reported in the enrollment questionnaire and those in the follow-up questionnaire. Chi-square analysis was used to assess differences in the negative changes in psychosexual functioning, and stratified analysis and logistic regression were used to assess confounding.

RESULTS

The supplemental self-administered questionnaire described above was mailed to 265 women, all of whom were involved in a heterosexual relationship at the time of study enrollment. This group consisted of 218 HPV-negative women and 47 HPV-positive women, 169 of whom completed and returned the survey (64%). Respondents included 138 women without HPV infection, 30 women with HPV infection, and 1 woman of unknown HPV status. Nonresponders were statistically similar to responders in age, marital status, level of education, partners' level of education, months since study enrollment, presence of vaginal symptoms, and HPV status. Nonresponders were significantly more likely to be current or former smokers ($P = .01$), have a household income less than \$14,000 per year ($P = .05$), and to be of an ethnic group other than white (7.2% vs 19.2% black, Asian, Native American or other nonwhite group in the respondents vs the nonrespondents, $P = .01$).

Thirty-nine of the respondents (25.2%) reported learning of a health problem other than *Candida vulvovaginitis* as a result of participating in the vaginitis study. Of these women, 19 had received a new diagnosis of HPV infection (45.2% of the 39 women with a new health problem or 23.2% of all respondents). Women with HPV infection were more likely to report learning about a health problem as a result of the study than were those without this infection (odds ratio = 8.11; 95% confidence interval, 3.28 - 20.1; $P = .00001$). Thirty-seven of

the 39 women (94.9%) learning about a health problem reported discussing the problem with their current partner (one of the women no longer had a current partner).

Of the 30 women with HPV infection, all were told of their HPV infection status and were encouraged to have colposcopy performed — 23 (76.7%) followed through with this recommendation. Of these, 9 (39.1%) had HPV-related lesions found on colposcopically directed biopsies (6 with cervical intraepithelial neoplasia [CIN] and 3 with changes suggestive of condyloma).

Twelve respondents (7.1%) no longer had a sexual partner, and data on partner status was lacking on 1 respondent; 3 of these were HPV positive, and the remaining 10 were HPV negative. This HPV-positive rate did not differ significantly from the rate in those with a current sexual partner ($P = .51$). The responses of those without a current

TABLE 1

Demographic Characteristics of Respondents Who Had a Current Partner, Stratified by HPV Status

Characteristic	HPV Negative N=128	HPV Positive N=27	Statistical Significance at $P > .05$
Mean age in years	33.7	31.7	NS
Mean education in years	15.1	15.5	NS
White, %	92.9	96.2	NS
Not married or living as married, %	22.0	42.3	$P = .03$
Mean number of past pregnancies	1.7	1.2	NS
Household income ≤\$14,000, %	5.5	15.4	NS
Current smoker, %	11.0	8.0	NS
Ever smoked, %	31.5	28.0	NS
Current oral contraceptive user, %	25.0	42.3	NS
Ever used oral contraceptives, %	84.4	92.3	NS
Mean age at first intercourse, in years	18.2	19.1	NS
Mean number of sexual partners ever	6.2	11.4	$P = .01$
Mean months known current partner	126.8	80.4	$P = .03$
Mean months between enrollment in study and receipt of supplemental questionnaire	16.0	15.4	NS
Number of life stresses since enrollment	3.8	4.1	NS
Vaginal symptoms present at the time of enrollment, %	65.6	81.5	NS

HPV denotes human papillomavirus.
Note: HPV status was unknown for 1 woman who had a current partner.

partner were excluded from further analysis.

The characteristics of the respondents who had a current sexual partner, stratified by their HPV infection status, are shown in Table 1.

Frequency of current physical intimacy is shown in Table 2, and thoughts or emotions about sexual activity are presented in Table 3 for the 155 women who had a current sexual partner. Differences on these variables between the groups of women with and without HPV infection were determined using Mann-Whitney comparisons of the rankings of responses for each group. There was no statistical difference between the 2 groups on any of the variables measured.

Table 4 shows the reported change in frequency of physical intimacy activities and thoughts or emotions about sexual activity from the time of enrollment to the period after learning of the results of the laboratory tests. There were no significant differences between the physical intimacy activities, and thoughts or emotions between women who had been informed of their HPV

infection and women without a diagnosis of HPV infection. Because the women were originally enrolled on the basis of the presence or absence of vaginal symptoms, and because 68.4% of our respondents had originally had such symptoms, we assessed the effect of this variable on these change factors, using logistic regression analysis, entering HPV and the symptomatic status of the women as covariates. No significant differences were found.

DISCUSSION

The data presented here indicate that the presence of HPV infection of the cervix as determined by PCR test-

ing was not associated with altered levels of reported psychosexual functioning after the diagnosis was known compared with the period immediately before the diagnosis. Women with HPV infection of the cervix, with and without low-grade squamous intraepithelial lesions, make up the majority of the millions of HPV-infected women in the United States. Hence, knowledge about the impact of this diagnosis on sexual functioning and attitudes has implications for these women and the physicians who must assist them in the postdiagnosis period.

Previous studies of psychosexual effects of STDs, cytologic abnormalities, condyloma acuminata, and cer-

TABLE 2

Percent of Women Reporting Frequency of Physical Intimacy at the Time of the Supplemental Questionnaire (n=155)

	<1 per month	1 per month	2 to 3 times per month	1 per week	2 to 6 times per week	Daily
Hugging	2	1	3	2	20	72
Kissing	1	1	2	2	17	77
Intercourse	5	3	18	18	54	2
Masturbation	55	11	18	10	5	1
Oral sex to partner	24	16	25	17	18	0
Oral sex from partner	30	14	25	14	17	0

Note: There were no significant differences at $P = .05$ among those who were HPV negative and those who were HPV positive.

TABLE 3

Percent of Women Reporting Frequency of Thoughts and Emotions About Sexual Activity (n=155)

	<1 per month	1 per month	2 to 3 times per month	1 per week	2 to 6 times per week	Daily
Feel angry	14	12	25	23	15	11
Think about sex	1	5	8	17	48	21
Aroused without physical contact	14	16	17	25	23	5
Angry at previous partner	71	11	13	3	1	1
Negative feelings about relationships	60	24	10	3	2	1
Satisfied with sexual relationship	9	7	11	16	36	24

Note: There were no significant differences in these characteristics between the HPV-positive and HPV-negative women.

vical cancer suggested differences between case patients and control subjects. The differences in their findings and those reported in our study may reflect the extent of the abnormality present, the need for invasive or morbid therapies, and the retrospective nature of many of the studies. For instance, a study of men and women attending STD clinics indicated that 9% to 11% reported having a "sexual problem"¹⁰ but did not address HPV infection in particular, did not define "sexual problem," and had no prospective assessment of the potential association between the diagnosis of an STD and subsequent psychosexual issues within the relationship.

Other reports suggest that the diagnosis of less serious but physically apparent HPV infections is associated with psychosexual implications. Women who had clinically apparent anogenital warts reported more physical symptoms of local pain, tenderness, and discharge; felt less pleasantness; and were less active and socially oriented than control subjects before and after treatments, and displayed significant anxieties about cancer and cure.¹⁵ A survey was sent to subscribers of *HPV News* by the American Social Health Association (ASHA), most of whom had visible genital warts (60%), were predominantly white, highly educated (70% with a college education or higher), and were not in a steady relationship (55%). Of 454 women (58% response rate), many reported feeling less desirable because of their HPV infection (72% at the time of diagnosis and 47% in the year preceding the survey) and enjoyed sexual contact less (68% and 42%, respectively).¹⁶ They reported that knowledge of the infection affected their ability to approach a new partner, that they were less spontaneous in their sexual activity, and had sex less frequently. Contrary to these studies, but similar to most infected women, those in our study did not have physically apparent external genital warts. In addition, the ASHA survey would by design select for women who were concerned enough to subscribe to a news publication on HPV infections, and for those who were among the 58% who responded to the survey, both characteristics suggesting an elevated level of impact of the infection on their lives.

Lerman and colleagues¹⁰ studied psychosexual differences associated with having an abnormal HPV-related cytology smear in a group of 224 women who were primarily black, young (63% younger than 25 years), and of lower socioeconomic status. The differences in psychosexual characteristics were most pronounced in women who declined a follow-up evaluation with colposcopy compared with those who agreed to colposcopy. Those who declined colposcopy indicated a heightened worry of cancer, generalized anxiety, impairment in daily activity, decreased sexual interest, and sleep disturbance,

TABLE 4

Percent of Women Reporting Adverse Changes in Psychosexual Behavior and Emotions After Receiving a Diagnosis of HPV Infection (N=27) and After Receiving No Such Diagnosis (N=128)

	HPV-Positive Group	HPV-Negative Group
Less hugging	7	11
Less kissing	11	11
Less caressing	11	12
Less intercourse	11	19
More masturbation	8	18
Less oral sex to partner	4	15
Less oral sex from partner	19	20
More pain with intercourse	14	6
More pain with masturbation	0	2
More anger at current partner	22	16
More thinking about sex	17	9
More arousal without physical contact	11	13
More anger at previous partner	4	2
More thinking about previous partner	7	3
Less sexual satisfaction	8	14

Note: There were no significant differences among those with and those without HPV infection at $P = .05$.

HPV denotes human papillomavirus.

whereas those who had a colposcopy follow-up reported impairment only in daily activity and sleep disturbance. The women in our study were older, primarily white, and of higher socioeconomic level, and most agreed to having follow-up colposcopic evaluation. These demographic characteristics, the high follow-up rate, and the lower average level of disease substantiated by colposcopy (HPV infection without cervical lesions in the majority of women), may explain the lower risk of reported psychosexual differences.

It is also unknown how the women in the previous studies were informed of their health risks from their HPV infection or their cervical lesions. Female subscribers to the *HPV News* who responded to a survey reported dissatisfaction with the communication strategies of the health care providers who diagnosed their HPV infection, citing failure to provide advice on emotional issues surrounding the infection, ask questions about sexual practices to provide the best health care, and make referrals to other sources of information.¹⁶ New information has been available in the past several years on the natural history of HPV infection, the low

rate of progression, and the high probability of regression. The women in our study were presented with an optimistic outlook, with plans for careful monitoring for progression or regression, and treatment if progression to CIN2 should occur. This may have decreased the potential psychosexual sequelae.

There are population selection and sample size limitations to this study. First, the participants were women involved in long-term, stable heterosexual relationships, were older than patients typically seen in tertiary care centers and STD clinics, and were predominantly white. This is a profile often encountered in community-based practices, in which most asymptomatic HPV infections of the cervix might be seen, as opposed to that in STD clinics. Extrapolation to other populations is not indicated, and further research should determine whether in other age groups, ethnic groups, or social stability subgroups the psychosexual sequelae are different. Second, our patient population included a large number of women originally enrolled with genital symptoms of vaginitis. Although we controlled for possible effects of such symptoms on psychosexual functioning, further research in asymptomatic populations would be useful. Third, the number of patients in the study limits the power to detect small differences in psychosexual variables, although larger, clinically valuable differences would be evident (≥ 0.60 power to detect medium effect sizes). Fourth, the data collection instrument, although similar in style to those used in other studies,¹⁴ was developed specifically for this study and has not been previously evaluated for reliability and validity. Fifth, it is possible that those women not returning the supplementary questionnaire were those most disturbed and affected by the diagnosis of cervical HPV infection. Our comparison of responders and nonresponders suggests the groups were comparable in HPV infections status as well as in age, marital status, education, and presence of symptoms, without evidence of bias based on this diagnosis. Finally, the data collected included change variables that relied on patient recall of sexual behaviors and attitudes — hence, a risk of recall bias exists. However, the data were collected within a study of vaginitis, and the specific question of HPV infection was not linked to the follow-up questionnaire. Thus, we believe systematic bias for patients to answer in a given direction was minimal.

CONCLUSIONS

The presence or absence of HPV infection of the cervix as determined by PCR testing in a group of primarily white, low-risk women presenting to community-based practices for a pelvic examination (for vaginal symptoms or for routine gynecologic care) was not associated with differences in the frequency of sexual activities and attitudes or in differences in perceived changes in such activities and attitudes since the diagnosis was made. This data, augmented in the future by studies in other cultural or ethnic populations, gives primary care

providers the information they will need as they weigh the benefits and risks of HPV testing on their low-risk patients.

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