

## **Knowledge About Human Papillomavirus Among Adolescents**

Dell DL, Chen H, Ahmad F & Stewart DE.

***"This is a non-final version of an article published in final form in***

Dell DL, Chen H, Ahmad F & Stewart DE. Knowledge about human papillomavirus among adolescents. *Obstetrics & Gynecology* 2000; 96(5):653-656."

***[https://doi.org/10.1016/S0029-7844\(00\)01009-7](https://doi.org/10.1016/S0029-7844(00)01009-7)***

## **ABSTRACT**

**Objective:** To assess knowledge of human papillomavirus (HPV) among high school-aged adolescents.

**Methods:** We administered written surveys to 523 innercity high school students in Toronto, Canada, that asked about HPV, other sexually transmitted diseases (STDs), and Papanicolaou testing. We also asked them to report doctor or clinic visits and whether they received sexual health information at those visits. The predictor variables used in analysis were gender and sexual experience.

**Results:** Eighty-seven percent of our population [95% confidence interval (CI) 84%, 89%) had not heard of HPV. Although adolescent women were more knowledgeable about Papanicolaou testing than adolescent men, only 39% of sexually experienced adolescent women knew who should get a Papanicolaou test. Sexually experienced and inexperienced adolescents failed to identify correctly their STD risk. Both genders showed greater knowledge about human immunodeficiency virus (HIV) than other diseases. Among adolescent women, 85% had visited a doctor or clinic within the past year, but only 29% had talked about sexual health.

**Conclusion:** Knowledge of HPV infection and cervical cancer screening was low in this urban adolescent population. Improved efforts are needed for prevention of HPV infection and HPV-related cervical changes. Programs modeled after HIV-education programs might be effective. Doctors' offices and clinics providing health care to adolescents should take greater responsibility in sexual health education.

Human papillomavirus (HPV) infection is the most frequent sexually transmitted disease (STD) in North America. Risk factors of infection include lifetime multiple sex partners, history of infection with other STDs, cigarette smoking, and early age at first intercourse. It is not a reportable disease in the United States or Canada,

---

but at least 15% of sexually active adults in the United States are estimated to have clinical or subclinical infections.<sup>1</sup> Some strains of HPV are strongly associated with cervical dysplasia and cervical cancer. Cervical cancer is the second most common cancer in women worldwide.<sup>2</sup> The estimated incidence of cervical cancer in the United States in 1996 was 15,700 new cases with 4900 deaths.<sup>3</sup> Canada reported 1300 new cases and an estimated 390 deaths in 1997.<sup>4</sup>

Studies in the United States showed that sexually active college women lack awareness of HPV, are at considerable risk of contracting HPV, and are not practicing behaviors that would reduce the risk of HPV infection and sequelae.<sup>5</sup> In one study, 35% of sexually experienced women who did not perceive themselves at risk of HPV infection tested positive for it.<sup>6</sup> Little has been written about high school-aged adolescents' knowledge of HPV. Studies that examined sexual health knowledge and practices of high school students in the United States and Canada often have not included questions about HPV. The purpose of the present study was to determine what urban adolescents know about HPV and cervical cancer screening.

### *Materials and Methods*

Over 2 days, 523 senior high school students attending an inner-city school in Toronto, Ontario, Canada completed written surveys during English classes. The survey was approved by the University Health Network Research Ethics Board and solicited self-report information on awareness of HPV, estimated prevalence of HPV and other STDs, symptoms caused by HPV (including asymptomatic infections), who gets Papanicolaou tests, why Papanicolaou tests are done, what "sexually active" means, and preventive measures for cervical cancer. When applicable, Likert scales were used.

We also collected information about age, grade in

**Table 1.** Demographic Characteristics

Gender and age	Completed grade			Sexually experienced (% by age and gender)
	10	11	12	
Male students ( <i>n</i> = 230)				
≤ 15 y	3	0	0	0
16 y	54	4	0	13 (6%)
17 y	12	51	6	24 (10%)
18 y	1	13	57	32 (14%)
≥ 19 y	0	1	27	10 (4%)
Total	70	69	90	79 (34%)
Female students ( <i>n</i> = 276)				
≤ 15 y	2	0	0	0
16 y	99	1	1	13 (5%)
17 y	18	54	6	20 (7%)
18 y	0	14	54	22 (8%)
≥ 19 y	0	1	26	4 (1%)
Total	119	70	87	59 (21%)

school, ethnicity, gender, sexual activity, perception of risk of acquiring an STD, experience with STDs (concern about possible diagnoses and actual diagnoses), and events associated with most recent visits to a doctor or clinic. Data were analyzed using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL).  $\chi^2$  test was used to assess differences in answers between gender and sexual experience, with statistical significance at 5%.

## Results

Demographic characteristics of the population are given in Table 1. Among 523 students surveyed, 54% were female and 46% were male. Responses from 17 students who did not indicate their sex were excluded from gender analysis but included in analysis by sexual experience. The age range was 15 to over 20 years. Most students were 16, 17, or 18 years old. The last grade completed was either grade 10, 11, or 12 (Ontario high school has 13 grades). The population was ethnically, culturally, and racially diverse, with students identifying themselves from over 25 different ethnic groups.

Sexual activity by age is also shown in Table 1. Twenty-seven percent of students (95% confidence interval [CI] 23%, 31%) reported current or previous sexual activity and were classified as sexually experienced. The 73% (95% CI 69%, 77%) of students who denied current or previous sexual activity were classified as sexually inexperienced. More men than women reported being sexually experienced (difference in frequency 12.7%; 95% CI 5%, 20%;  $\chi^2 = 10.2$ ;  $P = .001$ ).

Most students of both sexes (87%; 95% CI 84, 89%) said that they had never heard of HPV or were unsure if they had heard about it. Only one student in five

(22%) who was sexually experienced had heard of HPV, compared with 9% of sexually inexperienced students (difference in frequency 12.5%; 95% CI 5%, 19%;  $\chi^2 = 14$ ;  $P < .001$ ). Most students who knew about HPV learned about it in school classes or through public media (radio, TV, newspapers, or magazines). Women were more likely to have heard about HPV from a parent, guardian, doctor, or nurse; no men had heard about HPV from those sources.

When students were asked to indicate how commonly certain STDs were, fewer than half (46%; 95% CI 41%, 51%) correctly identified HPV infection as occurring commonly or frequently. The next most common STDs, chlamydia and gonorrhea, were correctly identified as occurring commonly or frequently by 45% (95% CI 41%, 50%) and 63% (95% CI 58%, 67%) of students, respectively. Sexually transmitted diseases with lower prevalence but more serious consequences were misidentified by most students as occurring commonly; 78% (95% CI 75%, 82% and 95% CI 74%, 81%) of students rated genital herpes and human immunodeficiency virus (HIV) or AIDS as commonly or frequently occurring diseases. There were no statistically significant differences in knowledge of frequency of STDs by gender or sexual experience.

When asked about specific symptoms that could be caused by HPV infection (no symptoms, warts, abnormal Papanicolaou tests, or cervical cancer), "not sure" was the most common response. Human papillomavirus was incorrectly identified as a cause of HIV or AIDS by 28% (95% CI 24%, 32%).

Knowledge of Papanicolaou testing was predictably better among women than men. More women (39%) than men (17%) could identify correctly who should get a Papanicolaou test (difference in frequency 21.7%; 95% CI 14%, 29%;  $\chi^2 = 28.5$ ;  $P < .001$ ); more women (57%) than men (33%) knew why a Papanicolaou test is done (difference in frequency 23.7%; 95% CI 15%, 32%;  $\chi^2 = 28.7$ ;  $P = .001$ ). Students who were sexually experienced (40%) were more knowledgeable than sexually inexperienced (27%) students about Papanicolaou testing (difference in frequency 15.7%; 95% CI 4%, 23%;  $\chi^2 = 11.8$ ;  $P = .001$ ). In general, knowledge about Papanicolaou testing was low, with half of men and a third of women saying they were not sure who should have Papanicolaou smears done. Among all students, 15% (95% CI 12%, 18%) considered themselves at risk of STDs, with no gender differences noted. Among sexually experienced students, 35% (95% CI 27%, 43%) perceived themselves at risk. Among the sexually inexperienced, 8% (95% CI 5%, 10%) perceived themselves at risk of getting an STD.

Most students (82%, 95% CI 79%, 86%) had visited a doctor or clinic within the past year, more women

doing so (85%) than men (78%). About half of students went to visits unaccompanied. Men (58%) went to the doctor alone more frequently than women (42%; difference in frequency 15.5%; 95% CI 7%, 24%;  $\chi^2 = 11.9$ ;  $P = .001$ ); sexually experienced students (57%) went to the doctor alone more frequently than sexually inexperienced students (46%; difference in frequency 10.6%; 95% CI 1%, 20%;  $\chi^2 = 4.5$ ;  $P = .04$ ). Among students who did not go to the doctor alone, most went with parents or guardians. Sexually experienced students were less likely to go with parents or guardians and more likely to go with friends or sexual partners.

Only 58% (95% CI 53%, 62%) of students had time to talk with their doctors alone. Sexually experienced students (73%) were more likely to talk with doctors alone than sexually inexperienced students (52%; difference in frequency 20.7%; 95% CI 12%, 30%;  $\chi^2 = 17.3$ ;  $P < .001$ ). Only 21% (95% CI 18%, 25%) of the students had ever talked to their doctors or nurses about sexual health, with women (29%) more likely than men to do so (12%; difference in frequency 17.4%; 95% CI 11%, 24%;  $\chi^2 = 22.6$ ;  $P < .001$ ) and sexually experienced (44%) more likely than sexually inexperienced (13%; difference in frequency 31.9%; 95% CI 23%, 41%;  $\chi^2 = 60.3$ ;  $P < .001$ ) students to talk about sexual issues. Women (12%) were more likely than men (4%) to initiate discussions about sexual health with their health professionals (difference in frequency 7.7%; 95% CI 3%, 12%;  $\chi^2 = 10.1$ ;  $P = .002$ ); sexually experienced (23%) students were more likely than sexually inexperienced (3%) ones to initiate discussions about sexual health (difference in frequency 19.8%; 95% CI 7%, 27%;  $\chi^2 = 53.4$ ;  $P < .001$ ).

## Discussion

Demographics showed this adolescent population to be appropriately comparable by gender. Extreme diversity in reported ethnicity and limited sample size did not allow us to make comparisons between cultural subgroups. The students reported a surprisingly low rate of sexual experience, only 27% of students reporting any current or past sexual activity. Previous studies in Canada<sup>7</sup> and the United States<sup>8</sup> consistently reported prevalence rates of sexual experience in the 50–58% range for adolescents of similar age and school settings. Whether this was an underreporting phenomenon or a unique characteristic of this multicultural population could not be determined.

Low levels of HPV knowledge (13%) were consistent with published data for college-age and older groups.<sup>5,6,9</sup> Although sexually experienced students were more likely to have heard of HPV (22% versus 9%), none of them knew much about the subject,

specifically that HPV was the most common STD among North American women. They had limited knowledge about the range of symptoms associated with HPV infection (asymptomatic, genital warts, abnormal Papanicolaou tests, and cervical cancer)<sup>10,11</sup> and they did not understand much about Papanicolaou testing.

There was confusion among those adolescents about the personal risk of contracting an STD. In our study, only one student in three who was sexually experienced considered themselves at risk, which is consistent with findings among other United States and Canadian high school and university students.<sup>12–16</sup> From a public health perspective, those results cause significant concern. When a population is at high risk of infection but does not know that a condition exists, what symptoms are attributable to it, or the consequences of it, prevention is difficult.

The health belief model, which postulates that individuals will engage in preventive health behavior if they believe themselves at risk of contracting a condition and that the benefits of preventive actions outweigh the barriers to or costs of such actions, clearly does not work for adolescent populations.<sup>16</sup> Using that model with 400 college-age women, Burak and Meyer<sup>16</sup> could explain only 15% of the variance between intention and screening behavior. Like others, they concluded that more research was needed to figure out what message about HPV needs to be sent to whom. The link between sexual behavior, HPV, and cervical cancer mandates regular gynecologic screening and Papanicolaou tests for all adolescent women.

An apparent missed opportunity is the doctor's office or clinic. Although 82% of our population had seen a doctor within the past year, only 58% had time to talk with the doctor alone, and only 21% talked about sexual health issues. Among sexually experienced students, only 44% talked with a doctor or nurse about sexual health.

We also found that sexually inexperienced adolescents considered themselves at risk of contracting sexually transmitted diseases, but our survey did not capture the basis of their concern. As found in other studies, our students had higher levels of HIV knowledge and lower levels of knowledge of HPV and other STDs.<sup>17,18</sup> Effective HIV education is likely to have a positive effect on HPV prevention, because condom use reduces the rates of both diseases, although it is not fully protective against HPV infection. As a result of HIV or AIDS prevention programs in the developing world, the rates of syphilis, gonorrhea, chlamydia, and unplanned pregnancies have decreased from promotion of condom use.<sup>19</sup>

Students reported that they received most of their

information from school classes and media sources, which sends a clear message to health educators that they must devise programs that will help adolescents get information about HPV infection and its consequences. Only women had heard of HPV from doctors or nurses, but we do not know why.

These students did not know that HPV can cause cervical cancer, and they do not know enough about prevention of HPV infection or cervical cancer screening. The usual sources that provide adolescents with health education and health care need to capitalize on the emerging literature about adolescent sexual behavior to create more effective sexual health prevention messages, especially for HPV. Public systems might use adolescent focus groups to create more effective messages.<sup>18,20-22</sup>

## References

1. Koutsky L. Epidemiology of genital human papillomavirus infection. *Am J Med* 1997;102:3-8.
2. Kenney JW. Risk factors associated with genital HPV infection. *Cancer Nurs* 1996;19:353-9.
3. American Cancer Society. *Cancer facts and figures—1996*. Atlanta, Georgia: American Cancer Society, 1996.
4. National Cancer Institute of Canada. *Canadian cancer statistics 1997*. Toronto, Canada; 1997.
5. Vail-Smith K, White DM. Risk level, knowledge, and preventive behavior for human papillomaviruses among sexually active college women. *J Am Coll Health* 1992;40:227-30.
6. Ramirez JE, Ramos DM, Clayton L, Kanowitz S, Moscicki AB. Genital human papillomavirus infections: Knowledge, perception of risk, and actual risk in a nonclinic population of young women. *J Womens Health* 1997;6:113-21.
7. Thomas BH, DiCenso A, Griffith L. Adolescent sexual behavior: Results from an Ontario sample. Part I: Adolescent sexual activity. *Can J Public Health* 1998;89:90-3.
8. Rosenthal S, Lewis LM, Succop PA, Burklow KA, Nelson PR, Shedd KD, et al. Adolescents' views regarding sexual history taking. *Clin Pediatr* 1999;38:227-38.
9. Keller ML, Egan JJ, Mims LF. Genital human papillomavirus infection: Common but not trivial. *Health Care Women Int* 1995;16:351-64.
10. American College of Obstetricians and Gynecologists. *Human papillomavirus (HPV) infection*. Washington, DC: American College of Obstetricians and Gynecologists, 1992.
11. Beutner KR, Tyring S. Human papillomavirus and human disease. *Am J Med* 1997;102:9-15.
12. Svenson LW, Varnhagen CK, Godin AM, Salmon TL. Rural high school students' knowledge, attitudes and behaviours related to sexually transmitted diseases. *Can J Public Health* 1992;83:260-3.
13. Biro FM, Rosenthal SL, Stanberry LR. Knowledge of gonorrhea in adolescent females with a history of STD. *Clin Pediatr* 1994;33:601-5.
14. Nadeau D, Boyer R, Godin G, Manhes G, Fortin C, Duval B. Knowledge and attitude to sexually transmitted diseases and condoms in students and undergraduate students. *Can J Public Health* 1993;84:181-5.
15. Hernandez JT, Smith FJ. Inconsistencies and misinterpretations putting college students at risk of HIV infection. *J Adolesc Health* 1990;11:295-7.
16. Burak LJ, Meyer M. Using the health belief model to examine and predict college women's cervical cancer screening beliefs and behavior. *Health Care Women Int* 1997;18:251-62.
17. Langille DB, Andreou P, Beazley RP, Delaney ME. Sexual health knowledge of students at a high school in Nova Scotia. *Can J Public Health* 1998;89:85-9.
18. Hillier L, Warr D, Haste B. Rural youth: HIV/STD knowledge levels and sources of information. *Aust J Rural Health* 1998;6:18-26.
19. Shah CP. *Public health and preventive medicine in Canada*. 4th ed. Toronto, Canada: University of Toronto Press, 1998.
20. Duncan SC, Strycker LA, Duncan TE. Exploring associations in developmental trends of adolescent substance use and risky sexual behavior in a high-risk population. *J Behav Med* 1999;22:21-34.
21. Fahs PS, Smith BE, Atav AS, Britten MX, Collins MS, Morgan LC, et al. Integrative research review of risk behaviors among adolescents in rural, suburban, and urban areas. *J Adolesc Health* 1999;24:230-43.
22. Tyden T, Bergholm M, Hallen A, Odland V, Olsson SE, Sjoden PO, et al. Evaluation of an STD-prevention program for Swedish university students. *J Am Coll Health* 1998;47:70-5.