

Papanicolaou Test Use Among Reproductive-Age Women at High Risk for Cervical Cancer: Analyses of the 1995 National Survey of Family Growth

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Most cases of cervical cancer are caused by sexually transmitted infections, principally certain types of the human papillomavirus.^{1,2} All sexually active women are at risk for cervical cancer, but the disease is more common among women with certain risk factors, such as early initiation of sexual intercourse, a history of multiple sexual partners (or partners with multiple sexual partners), or a history of sexually transmitted infections.³⁻⁵

Cervical cancer is one of the most preventable cancers because a precancerous condition can be identified early through the Papanicolaou (Pap) screening test.^{6,7} The incidence of precancerous lesions identified by the Pap test is highest among reproductive-age women.⁸ Of the 12 900 new US cases of cervical cancer in 2001, 44% occurred among women aged 18 to 44 years.^{3,9} In the United States, most organizations recommend annual Pap tests once a woman has become sexually active (or has reached age 18), with some recommending less frequent screening following 3 normal test results.¹⁰

The objectives of this study were to describe the prevalence of selected risk factors for cervical cancer among reproductive-age women and to assess how the presence of risk factors is associated with Pap test use, controlling for sociodemographic characteristics and health insurance status.

METHODS

Data Sources

The National Survey of Family Growth is a demographic and reproductive health survey conducted by the National Center for Health Statistics. In 1995, 10 847 women aged 15 to 44 years were interviewed in their homes regarding their pregnancy and birth history, marriage and cohabitation his-

Objectives. This study assessed the relationship between risk factors for cervical cancer and Papanicolaou (Pap) test use within the past year among reproductive-age women.

Methods. The 1995 National Survey of Family Growth, a demographic and reproductive health survey of 10 847 women aged 15 to 44, was analyzed with multiple logistic regression.

Results. Of the women, 62% reported having had a Pap test within the past year. Use was significantly higher among women with risk factors and among African American women. Use was significantly lower among uninsured, poor, and foreign-born women and among women with lower educational attainment and of "other" race/ethnicity.

Conclusions. Strategies to improve Pap test use include (1) educational campaigns that inform women of cervical cancer risk factors and encourage screening and (2) increased support for programs that expand access to Pap tests. (*Am J Public Health*. 2002;92:666-669)

tory, sexual partner history, contraceptive use, diseases related to fertility, sex behaviors, and use of Pap tests in the past year.^{11,12} The National Survey of Family Growth response rate was 79%.

Statistical Analyses

The National Survey of Family Growth has a complex survey design involving stratification, clustering, and disproportionate sampling. All proportions and population counts presented here were weighted to provide national estimates. Variance estimates for proportions and logistic regression model odds ratios (ORs) were calculated by use of the Taylor series approximation technique, taking into account the complex design of the survey.¹³

RESULTS

Risk Factors for Cervical Cancer

In 1995, 43.2% of the women reported at least 1 sexual practice or a reproductive health history that increased the risk for cervical cancer. The most frequently reported risk factors were initiating sex at age 15 or younger (25.9%) and having had 10 or more sexual partners (15.9%) (Table 1).

Pap Test Use

The majority (61.9%) of the reproductive-age women reported having had a Pap test within the past year (Table 2). The finding in bivariate analyses that Pap test use was significantly higher among women with at least 1 risk factor, compared with women without risk factors (68.1% vs 57.2%), was confirmed in multivariate analyses (OR = 1.63) (Table 2). Pap test use was significantly lower among women who were uninsured (OR = 0.54), and was comparable among women who had Medicaid coverage (OR = 1.10), relative to privately insured women. Women who were poor (i.e., resided in family with incomes below 150% of the poverty level) had lower rates of Pap test use (OR = 0.63) than did women residing in families with incomes at or above 300% of the poverty level. Relative to women with at least a college degree, women with less education had lower rates of Pap test use (e.g., less than high school graduation, OR = 0.49).

Relative to non-Hispanic White women, non-Hispanic Black women reported significantly higher rates of Pap test use (OR = 1.63), whereas women classified as being of non-Hispanic "other" race/ethnicity (e.g.,

TABLE 1—Distribution of Risk Factors Associated With Cervical Cancer and Papanicolaou (Pap) Test Use Within Risk Groups Among Reproductive-Age Women: National Survey of Family Growth, 1995

Risk Factor (Sample Size)	National Estimate, in 1000s	% (95% CI)	% Having Pap Test in Past Year (95% CI) ^a
All women (10 847)	60 201	100.0	61.9 (60.7, 63.1)
Composite risk ^b (10 847)			
Any risk factors	26 035	43.2 (42.0, 44.4)	68.1 (66.5, 69.8)
No risk factors	34 166	56.8 (55.6, 57.9)	57.2 (55.7, 58.6)
Age at initiation of sex, y (9904)			
≤15	13 944	25.9 (24.9, 26.9)	64.5 (62.4, 66.6)
16–17	17 504	32.5 (31.4, 33.7)	70.0 (68.1, 71.8)
18–19	11 700	21.7 (20.8, 22.7)	67.8 (65.7, 70.0)
20–24	8909	16.6 (15.7, 17.4)	66.7 (63.9, 69.5)
25–29	1435	2.7 (2.3, 3.1)	61.4 (55.7, 67.1)
30–44	309	0.6 (0.4, 0.8)	55.0 (40.7, 69.3)
No. of sexual partners in lifetime (10 847)			
0	6009	10.0 (9.2, 10.7)	16.4 (13.8, 19.1)
1	13 978	23.2 (22.2, 24.2)	59.9 (57.7, 62.2)
2	7480	12.4 (11.7, 13.1)	65.2 (62.4, 68.0)
3	5925	9.8 (9.2, 10.5)	68.7 (65.7, 71.8)
4	5002	8.3 (7.8, 8.8)	70.3 (67.0, 73.7)
5	4881	8.1 (7.5, 8.7)	69.6 (66.2, 72.9)
6	3041	5.0 (4.6, 5.5)	72.8 (68.4, 77.2)
7	2071	3.4 (3.1, 3.8)	66.7 (61.2, 72.2)
8	1504	2.5 (2.2, 2.8)	69.6 (63.8, 75.4)
9	724	1.2 (1.0, 1.4)	72.1 (63.0, 81.1)
≥10	9585	15.9 (15.0, 16.8)	71.7 (69.3, 74.1)
History of pelvic inflammatory disease (10 844)	4561	7.6 (7.0, 8.1)	73.4 (70.1, 76.8)
History of sexually transmitted disease (STD) ^c			
Chlamydia (9888)	2557	4.8 (4.2, 5.3)	76.5 (72.7, 80.4)
Genital herpes (9895)	1236	2.3 (1.9, 2.7)	76.6 (69.5, 83.6)
Gonorrhea (9895)	1054	2.0 (1.6, 2.3)	62.2 (55.2, 69.3)
Genital warts (9893)	2431	4.5 (4.0, 5.1)	75.9 (71.7, 80.2)
Syphilis (9897)	191	0.4 (0.2, 0.5)	72.9 (55.0, 90.8)
Any STD (10 847)	6218	10.3 (9.5, 11.2)	75.2 (72.5, 77.9)
Male sexual partner having sex with other female partners (9130) ^c	7095	14.3 (13.4, 15.1)	71.1 (68.4, 73.8)

Note. CI = confidence interval.

^aWomen were shown a card listing several medical services and asked if they had received any of them from a doctor or other medical care provider. Pap test was listed and described as a “sample or test for cancers of the cervix or uterus.”

^bWomen with at least 1 of the following 5 risk factors: age at initiation of sex of 15 or younger, 10 or more lifetime sexual partners, history of pelvic inflammatory disease, history of sexually transmitted disease, and male sexual partner in past 12 months having sex with other female partners around the same time.

^cQuestions pertaining to sexually transmitted disease, numbers of sexual partners, and the sexual practices of male sexual partners were asked via audio-CASI (computer-assisted self-interview). The principal author obtained permission from the National Center for Health Statistics to use the audio-CASI portion of the interview, which is stored in the “Omitted Items File.”

significantly lower Pap test use than did native-born women (OR=0.79).

Location of Pap Tests

Pap tests were most often conducted at private doctors' offices or health maintenance organizations (78.9%; 95% confidence interval [CI]=77.5%, 80.3%) and less often conducted in clinic settings (8.0%; 95% CI=7.1%, 8.9% at publicly funded Title X family planning clinics; 10.2%; 95% CI=8.9%, 11.5% at other clinics) or at hospitals, schools, or other settings (2.8%; 95% CI=2.4%, 3.3%). Compared with women reporting no risk factors, women reporting at least 1 risk factor were more likely to have received their Pap tests at a clinic funded through the Title X program (10.1%; 95% CI=8.8%, 11.4% vs 6.1%; 95% CI=5.1%, 7.1%) and less likely to have been tested at a private doctor's office or at a health maintenance organization (74.6%; 95% CI=72.9%, 76.4% vs 82.8%; 95% CI=81.0%, 84.6%).

DISCUSSION

Results of these analyses suggested that the presence of cervical cancer risk factors was associated with higher Pap test use; that African American and Hispanic women have achieved rates of Pap test use comparable to or greater than those of other women; and that lack of health insurance, low educational attainment, poverty, and being of “other” race/ethnicity or foreign born were associated with lower rates of Pap test use. The sociodemographic correlates of Pap test use in these analyses were consistent with those identified in other studies.^{14,15}

Higher-risk women might have enhanced opportunities for screening because of greater exposure to health care providers—nearly half (47.4%; 95% CI=45.7%, 49.1%) of the women reporting risk factors said that they had used a reproductive health service (e.g., family planning services, prenatal care) in the previous year, compared with just over a third (34.9%; 95% CI=33.6%, 36.2%) of the women who did not report any risk factors. Almost all (86.5%; 95% CI=85.5%, 87.6%) women who had received a reproductive health service reported

Asian and Pacific Islander, Native American descent) had significantly lower Pap test use (OR=0.66). Hispanic women's Pap test use

was not significantly different from that of non-Hispanic White women (OR=0.92). Women born outside of the United States had

TABLE 2—Number and Distribution of Reproductive-Age Women, Percentage Who Reported Receipt of a Papanicolaou (Pap) Test in Past Year and Results of Multivariate Logistic Regression Model, by Health and Sociodemographic Characteristics: National Survey of Family Growth, 1995

	National Estimate, in 1000s	% Distribution (95% CI)	% Using Pap Test (95% CI) ^a	OR (95% CI)
All women ^b	60 201	100.0	61.9 (60.7, 63.1)	...
High risk ^c				
Yes	26 035	43.2 (42.0, 44.4)	68.1 (66.5, 69.8)	1.63 (1.46, 1.81)
No	34 166	56.8 (55.6, 57.9)	57.2 (55.7, 58.6)	...
Insurance				
Medicaid only	7259	12.1 (11.2, 12.9)	61.1 (58.2, 64.1)	1.10 (0.93, 1.29)
No insurance	7011	11.6 (10.9, 12.4)	46.6 (43.3, 49.8)	0.54 (0.46, 0.64)
At least some private insurance	45 498	75.6 (74.4, 76.7)	64.6 (63.2, 66.0)	...
Age at interview, y				
≤ 17	5496	9.1 (8.4, 9.8)	23.0 (20.2, 25.9)	0.43 (0.33, 0.56)
18–19	3573	5.9 (5.4, 6.5)	50.5 (45.9, 55.2)	1.13 (0.88, 1.46)
20–24	8946	14.9 (14.1, 15.7)	69.2 (66.5, 72.0)	2.06 (1.73, 2.45)
25–29	9794	16.3 (15.6, 17.0)	70.6 (68.1, 73.2)	1.72 (1.46, 2.01)
30–34	10 982	18.3 (17.5, 19.0)	69.4 (67.0, 71.9)	1.51 (1.29, 1.77)
35–39	11 297	18.8 (18.1, 19.5)	63.2 (60.6, 65.8)	1.06 (0.91, 1.24)
≥ 40	10 015	16.7 (16.1, 17.5)	62.4 (60.2, 64.7)	...
Marital status				
Never married	22 679	37.7 (36.5, 38.9)	52.1 (50.0, 54.3)	0.61 (0.52, 0.71)
Currently married	29 673	49.3 (48.1, 50.4)	68.6 (67.1, 70.1)	...
Formerly married	7 849	13.0 (12.3, 13.8)	64.8 (62.4, 67.3)	0.87 (0.76, 1.00)
Educational attainment ^d				
< High school graduation	5396	11.3 (10.4, 12.2)	51.7 (48.5, 55.0)	0.49 (0.41, 0.58)
High school graduation or general equivalency diploma	18 177	38.1 (36.8, 39.5)	65.8 (64.0, 67.7)	0.71 (0.62, 0.82)
Some college, no degree	8772	18.4 (17.5, 19.3)	68.2 (65.6, 70.7)	0.75 (0.64, 0.86)
≥ College degree	15 332	32.2 (30.8, 33.5)	73.5 (71.4, 75.5)	...
Poverty-level income, ^e %				
0–149	13 586	22.6 (21.5, 23.6)	55.3 (52.9, 57.8)	0.63 (0.54, 0.73)
150–299	19 618	32.6 (31.5, 33.7)	57.2 (55.3, 59.0)	0.69 (0.61, 0.77)
≥ 300	26 995	44.8 (43.5, 46.2)	68.6 (67.1, 70.2)	...
Race/ethnicity				
Hispanic	6702	11.1 (9.9, 12.4)	52.3 (49.6, 54.9)	0.92 (0.80, 1.07)
Non-Hispanic White	42 522	70.6 (69.0, 72.3)	63.3 (61.9, 64.6)	...
Non-Hispanic Black	8210	13.6 (12.4, 14.8)	67.6 (65.1, 70.1)	1.63 (1.42, 1.87)
Non-Hispanic other	2767	4.6 (3.8, 5.4)	47.6 (40.8, 54.5)	0.66 (0.48, 0.90)
Birthplace				
United States	54 419	90.4 (89.5, 91.3)	63.0 (61.8, 64.2)	...
Outside of United States	5782	9.6 (8.7, 10.5)	51.5 (48.0, 55.0)	0.79 (0.66, 0.96)
Language of interview				
Spanish	1390	2.3 (1.9, 2.7)	43.4 (37.2, 49.5)	0.96 (0.69, 1.35)
English	58 811	97.7 (97.3, 98.1)	62.3 (61.2, 63.5)	...

Note. Ellipses indicate referent category for the multiple logistic regression model (model includes only variables shown in table).

^aWomen were shown a card listing several medical services and asked if they had received any of them from a doctor or other medical care provider. Pap test was listed and described as a "sample or test for cancers of the cervix or uterus."

^bSample size was 10 847. Estimates of Pap test use include women reporting hysterectomy (5% of the women). Some women with hysterectomies have a uterine cervix and are candidates for Pap tests (presence of cervix was not determined in the National Survey of Family Growth).

^cWomen reporting at least 1 of the following 5 risk factors: age at initiation of sex of 15 or younger, 10 or more lifetime sexual partners, history of pelvic inflammatory disease, history of sexually transmitted disease, and male sexual partner in past 12 months having sex with other female partners around the same time.

^dDescriptive statistics for educational attainment were limited to women aged 22 years and older at time of interview (sample size was 8868).

^ePoverty-level income was based on the respondents' combined family income from all sources in the 12 months before the survey divided by the 1994 poverty thresholds established by the US Bureau of the Census.

having received a Pap test, suggesting that the test is routinely provided during family planning and pregnancy-related visits.

Despite higher rates of Pap test use among women with risk factors, nearly one third of the higher-risk women reported that they did not have a Pap test in the past year, leaving much room for improvement. Strategies to improve Pap test use include implementation of educational campaigns that inform women of cervical cancer risk factors and encourage screening and provision of increased support for programs that expand access to Pap tests. The largest program to promote cancer screening among low-income and underserved women is the National Breast and Cervical Cancer Early Detection Program, which operates in all states with support from the Centers for Disease Control and Prevention. From 1991 to 1997, more than a million Pap tests were performed as part of the program, but estimates are that fewer than 15% of the women eligible for the program are served.^{16–18} Family planning clinics that offer services on a free and reduced-fee basis (e.g., Title X clinics) also provide opportunities to increase the use of Pap tests, especially among women at higher risk for cervical cancer.¹⁹

One caution to interpreting results of cancer screening behavior from surveys is the problem of respondents misrepresenting their actual behavior.^{20–23} An inability to recall events, the desire on the part of respondents to provide socially desirable answers, or the failure to correctly date events in memory can all contribute to misrepresenting Pap use in surveys.²⁴ Despite these shortcomings, the 1995 National Survey of Family Growth provided valuable information on the determinants of Pap tests and descriptive information on where tests are conducted. ■

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Contributors

M. Hewitt conducted analyses of the National Survey of Family Growth and drafted the paper. S. Devesa provided tabulations from the Surveillance, Epidemiology, and End Results Program on the epidemiology of cervical cancer and assisted in the analysis plan and the writing of the paper. N. Breen reviewed background literature and assisted in the analysis plan and the writing of the paper.

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