

Identifying barriers to Papanicolaou smear screening in Korean women: Korean National Health and Nutrition Examination Survey 2005

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Objective: This study was conducted to provide a nationwide analysis on barriers to cervical cancer screening in Korea. **Methods:** Data used for this study was obtained in a survey called Korean National Health and Nutrition Examination Survey (KNHANES) 2005, which collected data from 2,590 Korean women aged older than 21 years who had not had a hysterectomy and were eligible for Papanicolaou (Pap) smears. Multivariate analysis was adopted to control each demographic factor and unhealthy behavior variable. Demographic factors included age, education, income, job and region; health-related behavior factors were defined as current smoking, obesity, hormone replacement therapy and disability.

Results: The study found that cervical cancer screening rate was significantly positively associated with income (odds ratio [OR], 1.002; 95% confidence interval [CI], 1.001 to 1.002), with education (OR, 1.324; 95% CI, 1.030 to 1.703), with job (OR, 1.420; 95% CI, 1.030 to 1.957), and with hormone replacement therapy (OR, 3.732; 95% CI, 2.354 to 5.916). Meanwhile, the age (OR, 0.977; 95% CI, 0.968 to 0.985), disability (OR, 0.358; 95% CI, 0.143 to 0.894) and smoking (OR, 0.447; 95% CI, 0.280 to 0.715) were significantly negatively associated with one's chances to take cervical cytology.

Conclusion: In order to increase the rates of Korean women taking Pap test, cervical cancer screening programs will have to pay special attention to the elderly, low-income group, smokers, and the disabled.

Key Words: Papanicolaou, Barrier, Korean women

INTRODUCTION

Over the past years, mortality rate of cervical cancer has gradually decreased in Korea. Incidence of cervical cancer also stepped down from 8.6 per 100,000 in 2002 to 5.7 in 2005. However, cervical cancer, still has the highest cancer occurrence rate of 18.2% and ranked 5th on the list of cancer that Korean women have the risks to develop.¹

Invasive cancer of cervix has a long preinvasive state. Precancerous lesion of cervix and early stage of cervical cancer can be cured completely.² Therefore, it is essential to get regular check-ups. Papanicolaou (Pap) smear is an easy test, very useful to prevent and to increase the chances of early detection of cervical cancer. Early detection is the key in reducing mortal-

ity of cervical cancer. Pap smears have brought about a gradual decrease in incidence and mortality rate of cervical cancer by enabling early treatment of precancerous cervical abnormalities.³

The test itself is simple and useful, yet screening rate of cervical cancer has been very low in Korea. In a national cancer early detection program targeting low-income group, the number of those who received Pap tests stood at a mere 11.8% in 2005, while another research by the National Cancer Center which included public and private screening data, found that the rate was highest up to 59.9% in 2008.^{1,4}

Korean government takes the lead in cancer registration and prevention. All Koreans are covered by national health care insurance and screening services for five major cancers are available to everyone at no cost. In order to prevent cervical cancer, Pap smear is available every two years. Thanks to such effort, the rate of cervical cancer screening has gradually increased. However, the figure is still lower than 79% in the United States in 2003 and 80.3% in the United Kingdom in 2005.^{1,4}

Although Pap smear is a preventive health behavior, many women feel uncomfortable about the test procedure as it requires exposure of genitalia in front of a healthcare provider. Korea has been considered as an explicit male-oriented soci-

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ety for a long time. Thus, Korean women tend to have difficulty undressing and exposing themselves in front of a stranger, even though that stranger is a doctor.⁵

Several studies have indicated that a woman's decision to go for regular Pap smears is negatively influenced by fear of the test procedure, fear of the test results, and embarrassment.⁶⁻⁸ Negative emotions, such as shame, embarrassment, and uncomfortableness with a male physician were also reported as having a significant effect on perceived barriers to getting a Pap smear.⁹ Other factors identified to negatively affect women's decision to get the test include: getting old, low income, low-level of education, lack of insurance coverage, extreme body weight values, disability, uncertain self-efficacy of Pap, negative feelings toward gynecology exam and distinct characteristics of culture.¹⁰⁻²²

Several previous studies have found that there are a lot of barriers to cervical cancer screening. However, most of those studies were carried out to cover only a small part of population. A large-scale study which may represent the whole population of Korean women had not been conducted yet.

There was just a vague assumption that unhealthy behaviors would negatively affect women's decision to take Pap smears. However, there has been no study yet that systematically examined how disability, obesity, and smoking may affect Korean women's chances to take Pap tests. Therefore, this study was designed to supplement previous studies, and conducted as systematic investigation which shed light on the unhealthy behaviors that affect Pap test taking rates. It is also notable that hormone replacement therapy was included as a variable in the study.

MATERIALS AND METHODS

This study has taken data from the Korean National Health and Nutrition Examination Survey (KNHANES) 2005. KNHANES is nationwide health-related survey taken in Korea every three years since 1998, under the supervision of the Ministry of Health and Welfare. The purpose of survey is to calculate representative and reliable nationwide statistics on the state of health, health-related behavior and perception, foods and nutrition related conditions of Korean people. The survey, taken as part of the health promotion initiative of the Korean government, is comprised of interviews, physical exams, clinical exams and dietary life surveys. Investigated households were extracted as probability samples from the nationwide population. In 2005, a total of 7,802 individuals completed the health behavior survey, with a completion rate of 92.7%.

In this study, data was obtained from women aged older than 21 years who had not had a hysterectomy and were eligible for Pap smears. The number of all relevant women was 2,590. Demographic factors included age, education, income, job and region. Health-related behavior factors were smoking, obesity, hormone replacement therapy and disability.

Income was defined as total monthly income of family in thousand Korean Won (₩). Region was made up of two categories: urban and rural. Those living in a "dong" an administrative district in the city, were categorized to live in urban area, while others living in "eup" and "myeon" administrative districts in the country, were set to represent rural area. Participants frequently and occasionally smoking were marked as smokers. Obesity had three categories in accordance with BMI: underweight (BMI < 18.5 kg/m²), normal weight (BMI, 18.5 to < 25 kg/m²) and overweight (BMI more than 25 kg/m²). BMI = weight (kg) / height (m²). Those undergoing hormone therapy more than one year were considered as having hormone replacement therapy recently. Among women who have any kind of impairment, only those officially registered with the authorities and moderate to severe grade were marked as the disable. Low grade (5 and 6) disability was excluded due to the fact that their routine was not hassle. According to generally accepted guidelines, women are recommended to have Pap smear every 3 years.³ However, respondents of KNHANES choose among the answers: none experience of Pap, had one within 1 year, within 2 years, more than 2 years ago or not eligible for Pap. Thus, those who answered to have had a Pap smear within the past 1 and 2 years were sorted out for this study, excluding women who are not eligible for Pap in the first place. Variables were analyzed with a chi-square-test and multivariate logistic analysis was conducted to control the effects of confounding variables, and the study suggested odds ratio of each variable with 95% confidence intervals.

RESULTS

A total of 2,590 women aged older than 21 years were eligible for Pap smears. General characteristics of these women are shown in Table 1. Fifty-one point five percent of the women were aged from 31 to 50 years. Women aged over 50 years accounted for 42.1 percent. Forty-seven point six percent of the women, the biggest group in terms of education, had middle or high school education. Eighty-eight percent of women were employed and 76.3 percent lived in the urban area. Smoking women were 4.3 percent. Women under hormone replacement therapy were 3.7 percent. Women with disability were 1.4 percent and 53.9 percent of women had a Pap test within 2 years.

Table 2 shows the variable factors associated with Pap tests. This study demonstrated that cervical cancer screening rates were significantly different by age group ($p < 0.001$). Cervical cancer screening rates were 49.1% for women aged 21-30 years; 57.5% for those aged 31-50 years; and 31.8% for those aged over 50 years. Women with higher education level were significantly more likely to have had a Pap smear ($p < 0.001$). The higher income women had significantly more likely they would have had a Pap smear ($p < 0.001$). Employment was another meaningful indicator to expect women to have had Pap

Table 1. General characteristics (N=2,590)

Characteristics	No. (%)
Age	
21-30	167 (6.5)
31-50	1,334 (51.5)
51+	1,089 (42.1)
Education	
Elementary school and lower	874 (33.8)
Middle or high school	1,233 (47.6)
College and higher	483 (18.7)
Income*	
Less than 100	737 (28.5)
101-200	731 (28.2)
More than 201	1,122 (43.3)
Job	
Employed	2,280 (88.0)
Unemployed	310 (12.0)
Region	
Urban	1,976 (76.3)
Rural	614 (23.7)
Smoking	
Yes	110 (4.3)
No	2,480 (95.8)
Obesity	
Underweight	82 (3.2)
Normal weight	1,684 (65.0)
Overweight	824 (31.8)
Hormone replacement therapy	
Yes	95 (3.7)
No	2,495 (96.3)
Disability	
Yes	35 (1.4)
No	2,555 (98.7)
Pap test	
Yes	1,195 (53.9)
No	1,395 (46.1)

*Unit=10,000 Korean won.

test ($p < 0.001$). Women who lived in rural areas were significantly less likely than those in urban area to have had the screening tests ($p < 0.001$). Smoking women were significantly less likely to have taken a Pap smear ($p < 0.001$). Overweight women, compared to normal and underweight women were significantly less likely to have had the test ($p = 0.02$). Women under hormone replacement therapy were significantly more likely to get their check-ups ($p < 0.001$). The disabled women were significantly less likely to take a Pap smear ($p < 0.001$).

The results of the multivariate analyses are listed in Table 3. The results showed that the rates of taking Pap smears were significantly positively associated with income (OR, 1.002; 95% CI, 1.001 to 1.002), with education (OR, 1.324; 95% CI, 1.030 to 1.703), with job (OR, 1.420; 95% CI, 1.030 to 1.957), and with hormone replacement therapy (OR, 3.518; 95% CI, 2.354 to 5.916). Meanwhile, The age (OR, 0.977; 95% CI, 0.968 to 0.985), disability (OR, 0.358; 95% CI, 0.143 to

Table 2. Papanicolaou smear screening rates by characteristics

Characters	%	χ^2	p-value
Age			
21-30	49.1	160.3	<0.001
31-50	57.5		
51+	31.8		
Education			
Elementary school and lower	29.3	155.2	<0.001
Middle or high school	53.1		
College and higher	58.9		
Income*			
Less than 100	30.7	131.2	<0.001
101-200	44.2		
More than 201	57.6		
Job			
Employed	49.3	76.5	<0.001
Unemployed	22.9		
Region			
Urban	49.0	28.2	<0.001
Rural	36.8		
Smoking			
Yes	23.6	23.4	<0.001
No	47.1		
Obesity			
Underweight	45.1	7.7	0.02
Normal weight	48.1		
Overweight	42.2		
Hormone replacement therapy			
Yes	68.4	19.7	<0.001
No	45.3		
Disability			
Yes	17.1	12.0	<0.001
No	46.5		

*Unit=10,000 Korean won.

Table 3. Multivariants logistic regression analysis for receiving papanicolaou smear

	Odds ratio	95% Confidence interval	p-value
Age	0.977	0.968-0.985	<0.001
Education*	1.324	1.030-1.703	0.03
Income [†]	1.002	1.001-1.002	<0.001
Job [‡]	1.420	1.030-1.957	0.03
Rural [§]	0.906	0.736-1.116	0.33
Smoking	0.447	0.280-0.715	<0.001
Obesity [¶]	1.006	0.840-1.205	0.95
Hormone replacement therapy**	3.732	2.354-5.916	<0.001
Disabled ^{††}	0.358	0.143-0.894	0.03

*Middle school and higher=1, Elementary school and lower=0. [†]Unit =10,000 Korean won. [‡]Employed=1, Unemployed=0. [§]Rural=1, Urban=0. ^{||}Yes=1, No=0. [¶]Overweight=1, Underweight or normal =0. ^{**}Yes=1, No=0. ^{††}Moderate to severe registered=1, Not registered=0.

0.894) and smoking (OR, 0.447, 95% CI, 0.280 to 0.715) were significantly negatively associated with one's chances to take cervical cytology. Region and obesity were founded not to be significantly associated with Pap smear in the final analysis.

DISCUSSION

Most of the previous studies have identified lower socioeconomic status as a major barrier to Pap smear screening.^{10-12,19} Old age, low income level and low education all led to lower rates of having cervical cancer screening.²⁰⁻²² Overweight and obese women were less likely to be screened for cervical cancer, even after adjustment for other known barriers were made.¹⁶⁻¹⁸ After adjustment for important demographic characteristics, women with disabilities were less likely to report having Pap test procedure.¹³⁻¹⁵ Potential barriers of Pap include residential location and distance to assigned clinic.^{12,23,24}

The results of this study are similar to previous studies. After controlling other confounding variables, age was found to be significantly negatively associated with cervical cancer screening rates. Older women think embarrassed about taking a Pap. So, they tend to delay taking Pap until something wrong with them. That is they do not go for a Pap smear unless there are symptoms.¹² Income was also significantly associated with Pap test in multivariate analysis. This positive association suggest that women with high economic status may be more likely to have more knowledge or sources of care regarding cancer screening services so that they are more motivated to undergo certain types of preventive medical care.^{10,11,19} Similarly, women with higher education group have had more the test.^{10,11,19} Job was found to be significantly positive associated with taking a Pap test.^{10,12} Because of that almost every employees and employers must have regular checkups every year or every other year. If they didn't have checkups, employers should get punished in Korea.

The findings of this study revealed the significant disparities in getting cervical cancer screenings among women with disabilities compared to without disabilities. Women with disabilities encounter more physical, attitudinal, or broad system-level barriers to preventive health care. For many women with physical disabilities, getting regular cancer screenings can be quite challenging. These women have reported difficulty in securing reliable transportation and, accessible parking, finding clinics with specialized equipments, getting into a doctor's office, and undressing, transferring, and positioning for medical examinations.¹³⁻¹⁵

Compared to women who not smoked, current smokers are significantly more likely not to have regular Pap test. Smoking is a recognized risk factor of cervical cancer.² Unfortunately, although smokers often acknowledge the health risks posed by smoking, they tend to minimize or deny their own risk while attributing a greater degree of risk to other smokers. This is called optimistic bias, a sense of personal immunity to

the health risks of smoking, which may be related to other unhealthy behaviors as well. For example, a number of personality characteristics associated with smoking may also predispose smokers to neglect regular screenings. There is evidence that smokers have greater depression, negative affectivity, anxiety sensitivity and hostility; a tendency toward sensation seeking and impulsivity; deficient coping skills; a present time perspective; and a tendency to rationalize risk.²⁵⁻³⁵

In this study, compared with women who not had hormone replacement therapy, women currently under hormone therapy are significantly more likely to have regular Pap tests. In most cases, women start taking hormone replacement therapy around 50 after menopause. Although, age has inverse relationship with the rates of taking Pap tests, those undergoing hormones therapy tend to get regular Pap smears because they visit doctor regularly and receive doctor's care. The fact affects our result, compared with women who never had hormone therapy, women under hormone therapy were found to three times more likely to have had Pap tests.

Though obesity was significantly negatively associated with Pap tests in the bivariate analysis, association was not significant in multivariate analysis, in which confounding variables were controlled. Such difference may have resulted from the fact that age worked as confounding variables. Obesity were significantly different by age group ($p < 0.001$). Old women tend to be overweight than those in other age groups ($p < 0.001$), whereas age has a significantly negative association with Pap tests ($p < 0.001$). When controlling age variable only to evaluate the probability of age working as a confounding variable, the association between obesity and Pap tests was not significant. Therefore obesity might be not a contributing factor in receiving Pap tests. Similarly, urban region were significantly positively associated with Pap test in bivariate analysis, yet did not have significant association in multivariate analysis. In the case, age and income worked as confounding variables. Region are significantly correlated with age and income ($p < 0.001$). The more aged peoples and low income group have lived in rural area ($p < 0.001$), while ages and income are significantly associated with Pap test ($p < 0.001$). When age and income were controlled, region were found not to be significantly associated with Pap tests, either.

The findings of this study imply that selective intervention for the elderly, low-income group, smokers, low-educated, jobless and the disabled may be useful to increase the rates of cervical cancer screening. In other words, cancer screening programs will have to pay special attention to the elderly, low-income, low-educated and jobless group in order to encourage them to get Pap tests. Measures such as increasing visiting checkup schedule and establishing mobile gynecology exam system would help women in elderly housing area to have greater access to cervical cancer screening. In addition, there should be promotion campaigns targeting the low-income and low-educated group, and visiting checkup system should be established in low-income high density residential

areas, such as permanent rental apartments. When age and income were controlled, smokers were less likely to obtain a Pap smear. Thus antismoking campaigns should be designed to include connected cervical cancer screening program, and ultimately, specialized programs for female smokers will have to be developed. Lastly, it is extremely difficult for those with disability to obtain a Pap smear, as it takes so much time for each person to get the Pap test. Those with disabilities need more time, more assistance and specialized equipments to complete the screening. Private clinics may not have enough resources for their needs, other measures should be considered. For example, public institutions may offer cancer screening examinations for the disabled person, and private clinics should be able to provide such screening services for those with disabilities at a higher charge.

This study had started where the previous studies on the same subject ended, and has the following strengths. First, this study can serve as a representative, nationwide population-based analysis of barriers to cervical cancer screening in Korea. Second, a wide variety of factors associated with Pap test-such as age, education, disability, jobs, region, obesity, smoking, and hormone therapy were controlled by multivariate analysis in order to have a better understanding of the barriers to Pap smear screening in Korea.

Despite such strengths, there are also several limitations to this study. First, while several independent variables were assessed in this study, the variables not covered in this study, such as use of oral contraceptive, mood status, current health status, childbirth history, age of first delivery, etc. may also have influenced cervical cancer screening performance. Various variables were controlled, but not all of them were used to analyze the actual effects of the barriers to Pap. For example, the kind of disability was neglected in this study. Those with impaired internal organ may not have barriers to take Pap tests. Thus, depending on the type of impairments, barriers to Pap screening may be different. Second, as this study shows cross-sectional results from the KNHANES 2005, this study cannot suggest causal explanations. Therefore, future studies will be necessary to identify the effects of variables not covered in this study and to perform longitudinal and causal analysis.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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