

Factors Associated with the Use of Uterine Cervical Cancer Screening Services in Korean Elderly Women

Original
Article

Ki Dong Ko, Sang Min Park, Kiheon Lee^{1,*}

Department of Family Medicine, Seoul National University Hospital, Seoul National University College of Medicine, Seoul; ¹Department of Family Medicine, Seoul National University Bundang Hospital, Seoul National University College of Medicine, Seongnam, Korea

Background: The Papanicolaou (Pap) smear test is an effective screening test for the early detection of uterine cervical cancer. The Pap test still plays an important role in Korean elderly women, as uterine cervical cancer remains a frequent form of cancer and an important cause of death. However, the participation rate and other factors related to the Pap test in Korean elderly women have been studied insufficiently.

Methods: This study included 654 individuals aged 65 and over who completed a cervical cancer screening questionnaire from the Third Korean National Health and Nutrition Examination Survey 2005. Using multiple logistic regression, odds ratios and confidence intervals for the association between attendance of the Pap test and sociodemographic or health-related factors were calculated.

Results: One hundred and eleven individuals (17.0%) of the study population showed compliance with Pap testing within the previous 2 years. We recognized that the most elderly women (75 years and over) or those with lower levels of education were less likely to have had the test.

Conclusion: Primary health care providers need to make efforts to improve attendance rates of Pap smear screening in Korean elderly women, individually taking into account previous Pap results, life expectancy, risk factors for cervical cancer, and preferences. More attention will especially be needed among the eldest elderly or less educated elderly women.

Keywords: Uterine Cervical Neoplasms; Vaginal Smears; Health Services for the Aged

INTRODUCTION

Although uterine cervical cancer in Korea in the past occurred most frequently in women, its incidence and mortality rates have been steadily declining.¹⁾ However, uterine cervical cancer remains a frequent form of cancer and an important cause of death.¹⁾ There are no obvious early symptoms of uterine cervical cancer, the process through precancerous steps of 7 to 20 years to uterine cervical cancer is relatively slow compared to other carcinomas, and patients with a low International Federation

Received: August 31, 2009, Accepted: May 2, 2012

*Corresponding Author: Kiheon Lee

Tel: 82-31-787-7801, Fax: 82-31-787-4014

E-mail: keyhoney@gmail.com

Korean Journal of Family Medicine

Copyright © 2012 The Korean Academy of Family Medicine

Ⓢ This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

of Gynecology and Obstetrics stage at the time of diagnosis can expect a good prognosis.²⁾ For instance, while the five-year survival rate for early invasive cancer (IA, IB, IIA) is 80% to 90%, clinical outcome in the case of advanced cancer (IIB, III, IV) is poor.²⁾ For these reasons, the Papanicolaou (Pap) smear test has been proven a very useful and effective tool that reduces mortality through early diagnosis.²⁻⁴⁾ In addition, the Pap test is relatively easy, cheap, and correct. In a meta-analysis, a sensitivity of 30% to 87% and specificity of 86% to 100% for the Pap smear test were reported.⁵⁾ Accordingly, Pap smear screening is included in national cancer screening programs of many countries. In Korea, a biennial Pap smear as a part of the National Cancer Screening Program (NCSP) is recommended for women aged 30 years old and over.⁶⁾ However, worldwide consensus about the starting period, interval, and the ending period has not been reached. The American Cancer Society, the American College of Obstetricians and Gynecologists, the US Preventive Services Task Force, and the American Academy of Family Physicians, recommend that women start Pap testing at 21 years of age or within 3 years after one's first sexual experience, and get screened every 1 to 3 years, while the interval can be increased after 30 years of age if the test results are normal three times.⁷⁻¹⁰⁾ The above American academies and organizations also suggest that discontinuation of the Pap test could be considered only if the consecutive test results are normal among women aged 65 and older.

Although Pap smear screening rates in our country are increasing, they are still at low levels compared to many developed countries where cancer screening programs have been well established.¹¹⁾ Given this reality, it is necessary to increase Pap smear screening rates and determine related factors with Pap tests. There were previous studies of Pap smear screening rates and associated factors in particular regions or hospitals.^{12,13)} However, there was no nationally representative study specific to the elderly population. This study aimed to examine attendance rates of the Pap smear as a uterine cervical cancer screening method and associated factors among elderly women aged 65 years and older, using the Third Korean National Health and Nutrition Examination Survey 2005 (KNHANES III).

METHODS

1. Study Population

The KNHANES is carried out to identify public health and related factors comprehensively in accordance with the National Health Promotion Law enacted in 1995. The survey collects a nationally representative probability sample. The third survey was conducted in April to June, 2005. The survey consisted of the Health Interview Survey, the Health Behavior Survey, the Nutrition Survey, and the Health Examination Survey. The previous studies^{14,15)} introduced research methods of this survey in detail.

We performed cross-sectional analyses of data from 2,242 women aged 65 years and older. Among them, 668 women responded to the question about the last time of a Pap test. After excluding 14 people who had hysterectomy, 654 women were eligible for our analyses.

2. Variables

Subjects were asked the question "When was the last time you had a Pap test?" with possible responses of "never", "< 1 year ago", "1 year or longer and less than 2 years ago", and "≥ 2 years ago". Women who had undergone a Pap test less than 2 years ago were considered as having received uterine cervical cancer screening. This was based on screening recommendations from the Korean National Cancer Screening Program.⁶⁾

We collected information about sociodemographic factors and health-related factors (health status and health risk factors) from self-administered questionnaires and health examination results. We assessed variables in relation to sociodemographic factors as follows. Subjects were categorized into three groups by age: age 65–69, 70–74, and ≥ 75 years. Marital status was dichotomized as living with or without spouse (unmarried, widowed, or divorced). Residential area was classed as urban (neighborhoods) or rural (towns/townships) area. Household income was calculated by dividing the household monthly income by the square root of the household size (equivalent income),¹⁶⁾ and was categorized into tertiles. Education level was divided into uneducated, elementary school, middle school, or higher, considering that study subjects were elderly women. We compared individuals with national health insurance (NHI) and those without NHI (receiving Medicaid or without medical

security). Also, two groups were made according to registration of private health insurance (PHI). Each variable of health-related factors (health status and health risk factors) was also divided as follows. Self-reported health was assessed with the question, "How is your subjective health status in general?" Women with "very poor" or "poor" health status were defined as "unhealthy" and those with "fair," "good," or "excellent" health status were designated as "healthy." The question, "Are you registered as disabled on the Korean National Disability Registry?" was used to classify the study sample into dichotomous groups about the presence of disabilities. Subjects who had a history of chronic diseases such as hypertension or diabetes were classified as having comorbidity. Life-time smokers included respondents who reported that they had smoked at least 100 cigarettes (5 pack) in their lifetime. Obesity degree was classified into four groups, as follows: normal weight, $18.5 \text{ kg/m}^2 \leq \text{BMI} < 23.0 \text{ kg/m}^2$; underweight, $< 18.5 \text{ kg/m}^2$; overweight, $23.0 \text{ kg/m}^2 \leq \text{BMI} < 25.0 \text{ kg/m}^2$; and obesity, $\geq 25.0 \text{ kg/m}^2$.

3. Statistical Analysis

First, descriptive statistics were used to describe the basic characteristics of the study subjects and Pap smear rates. Second, to identify the factors associated with participation in the Pap test, crude odds ratios and 95% confidence intervals were calculated by simple logistic regression analyses. Then, multiple logistic regression analyses were used to identify significant associated factors, with entry method including all variables identified as significantly associated with the Pap test by simple logistic analyses. We analyzed the association estimates with sampling weights to generalize to the entire population aged 65 and older. All statistical tests were two-sided tests with $P < 0.05$ used as the criterion of statistical significance and performed using STATA ver. 10.0 (Stata Co., College Station, TX, USA).

RESULTS

1. Basic Characteristics of Study Subjects

Characteristics of the study population ($n = 654$) are summarized in Table 1. The proportion of elderly women aged 65–69, 70–74, and ≥ 75 was 35.5% ($n = 232$), 30.9% ($n = 202$), and 33.6% ($n = 220$), respectively. Four hundred and sixteen

Table 1. Sociodemographic and health-related factors (health status and health risk factors) of subjects ($n = 654$).

Characteristics		No. (%)
Sociodemographic factors		
Age	65–69	232 (35.5)
	70–74	202 (30.9)
	≥ 75	220 (33.6)
Marital status	With spouse	238 (36.4)
	Without spouse*	416 (63.6)
Residential area	Urban	408 (62.4)
	Rural	246 (37.6)
Monthly house income [†]	Lower tertile	216 (33.4)
	Middle tertile	227 (35.1)
	Upper tertile	204 (31.5)
Education	No	318 (48.6)
	Elementary school	252 (38.5)
	\geq Middle school	84 (12.8)
National health insurance	Insured	569 (87.0)
	Not insured [‡]	85 (13.0)
Private health insurance	Insured	184 (28.2)
	Not insured	468 (71.8)
Health status and health risk factors		
Self reported health	Healthy	243 (37.2)
	Unhealthy	411 (62.8)
Disabled [§]	No	614 (93.9)
	Yes	40 (6.1)
Comorbidity (HTN or DM)	No	269 (53.2)
	Yes	237 (46.8)
Lifetime smoker	No	555 (84.9)
	Yes	99 (15.1)
Obesity degree [¶]	Normal weight	170 (33.9)
	Underweight	23 (4.6)
	Overweight	126 (25.2)
	Obesity	182 (36.3)

HTN: hypertension, DM: diabetes mellitus, BMI: body mass index.

*Single, divorced, separated. [†]Equalized income and divided into tertiles. [‡]Medical aid beneficiaries or subjects without medical security. [§]Registered as a disabled person in National Disability Registry. ^{||}Reporting that they smoked at least 100 cigarettes (5 pack) in their lifetime. [¶]Normal weight: $18.5 \text{ kg/m}^2 \leq \text{BMI} < 23.0 \text{ kg/m}^2$, underweight: $< 18.5 \text{ kg/m}^2$, overweight: $23.0 \text{ kg/m}^2 \leq \text{BMI} < 25.0 \text{ kg/m}^2$, obesity: $\geq 25.0 \text{ kg/m}^2$.

(63.6%) were living without spouse and 408 (62.4%) were living in urban areas. Elderly women were divided according to tertiles of adjusted household monthly income: upper tertile \geq 720 thousand won ($n = 204$, 31.5%), 350 thousand won \leq middle tertile $<$ 720 thousand won ($n = 227$, 35.1%), lower tertile $<$ 350 thousand won ($n = 216$, 33.4%). Nearly half of the participants had not completed elementary school. 87.0% had NHI and 28.2% had PHI. Self-reported health was reported as unhealthy among 411 women (62.8%). Forty (6.1%) were disabled. Two hundred thirty-two (46.8%) had comorbidities such as hypertension or diabetes. ninety-nine women (15.1%) were lifetime smokers. Of the study population, 25.2% were overweight and 36.3% were obese.

2. Factors Associated with the Use of Uterine Cervical Cancer Screening in Korean Elderly Women

Among 654 elderly women aged 65 years and older, the attendance rate for the Pap test was 17.0% ($n = 111$). The results of simple logistic analyses are shown in Table 2. Women aged 70–74 (odds ratio [OR], 0.72; 95% confidence interval [CI], 0.46 to 1.14) and 75 and older (OR, 0.17; 95% CI, 0.09 to 0.32) were less likely to undergo Pap tests compared with those in the reference category (65–69 years). In addition, the factors shown to be associated with the use of the Pap test by univariable analysis were living without spouse (OR, 0.54; 95% CI, 0.36 to 0.82) and lifetime smoker (OR, 0.33; 95% CI, 0.15 to 0.73). Meanwhile, women who had graduated from elementary school (OR, 2.74; 95% CI, 1.70 to 4.43) or middle school or higher (OR, 4.07; 95% CI, 2.23 to 7.41) were more likely to receive Pap tests compared with women who had received no formal education. Residential area, income, health insurance, self reported health, disability, comorbidity, and obesity degree were not significantly associated with use of the Pap test in this study.

The variables identified as important by univariable analyses were combined in multiple logistic regression analysis. The results are shown in Table 3. Of the sociodemographic factors, age group was found to be associated with the Pap test. Compared with the reference age group (65–69 years), the adjusted OR (AOR) of the age group (≥ 75) was 0.26 (95% CI, 0.13 to 0.53). There was also a clear trend toward increased rates of the Pap test with higher education levels (elementary school compared to no

education: AOR, 1.89; 95% CI, 1.16 to 3.00; middle school or higher compared to no education: AOR, 2.61; 95% CI, 1.27 to 4.33).

DISCUSSION

In summary, we found that the participation rate of Pap smear screening among women aged 65 years and over was only 17.0%, and also found that older age and low education level were independently associated with poor participation in Pap screening, using this national representative household survey. Our study is the first to investigate the factors associated with cervical cancer screening in Korean elderly women.

American academies and organizations suggest that discontinuation of the Pap test could be considered only if the consecutive test results are normal among women aged 65 and older. However, elderly Korean women have lower level of Pap smear screening rates, higher probability of abnormal Pap smears, higher incidence of cervical cancer, and a relatively higher proportion of advanced stage cervical cancer than western elderly women.^{11,17-19)} Accordingly, there is no direct evidence to support discontinuation of Pap screening in older women and consensus recommendations established for the period of the discontinuation do not exist yet. Considering these factors, the proposal to uniformly stop the screening at any age does not seem to be accepted in Korea. Hence, this study included all women aged 65 and over and showed a Pap smear screening rate of 17.0%. This figure is much lower than the 56.9% among women aged 30 years and older, which is a result of the KNHANES III.¹¹⁾ Moreover, the result indicates a very low screening rate, compared to that of western developed countries.^{20,21)} In a Canadian study, 41% of elderly women aged 65 years and over reported ever having had a Pap test within three years.²¹⁾

Compared with women 65–69 years of age, women 75 and older significantly had lower rates of screening. This result is not surprising as low participation in older old age is common in other cancer screenings as well. Pap smear screening tolerability may decrease with age. That is, the test could be significantly less comfortable in older patients because of vaginal atrophy and osteoarthritis of the hips. Our results could be explained by these factors. Existing studies showed that women living with a

Table 2. Factors associated with the Papanicolaou test by simple logistic regression.

Variables	Papanicolaou test*		
	%	Crude OR	95% CI
Sociodemographic factors			
Age			
65–69	24.5	1.0	
70–74	19.5	0.72	0.46–1.14
≥ 75	5.4	0.17	0.09–0.32
Marital status			
Living with spouse	22.2	1.0	
Living without spouse [†]	13.5	0.54	0.36–0.82
Residential area			
Urban	16.3	1.0	
Rural	17.2	1.06	0.70–1.61
Monthly house income[‡]			
Lower tertile	15.1	1.0	
Middle tertile	15.1	1.11	0.67–1.85
Higher tertile	18.9	1.27	0.76–2.12
Education			
No	9.3	1.0	
Elementary school	21.5	2.74	1.70–4.43
≥ Middle school	29.4	4.07	2.23–7.41
National health insurance			
Insured	16.0	1.0	
Not insured [§]	20.5	1.38	0.78–2.42
Private health insurance			
Insured	15.5	1.0	
Not insured	18.5	0.80	0.51–1.25
Health status and health risk factors			
Self reported health			
Healthy	16.7	1.0	
Unhealthy	16.6	1.01	0.66–1.54
Disabled			
No	16.6	1.0	
Yes	17.1	1.04	0.45–2.42
Comorbidity (HTN or DM)			
No	19.0	1.0	
Yes	19.0	1.0	0.64–1.56
Lifetime smoker[¶]			
No	18.3	1.0	
Yes	6.9	0.33	0.15–0.73
Obesity degree^{**}			
Normal weight	14.5	1.0	
Underweight	17.4	1.22	0.38–3.89
Overweight	18.5	1.36	0.74–2.52
Obesity	21.8	1.69	0.97–2.92

Weighted to generalize to Korean women aged 65 years and older.

OR: odds ratio, CI: confidence interval, HTN: hypertension, DM:diabetes mellitus, BMI: body mass index.

*Having a Papanicolaou smear test within two years was considered as receiving cervical cancer screening. [†]Single, divorced, separated.

[‡]Adjusted by number of family members (equivalized income) and divided into tertiles. [§]Medical aid beneficiaries or subjects not insured by national health insurance. ^{||}Registered as a disabled person. [¶]Reporting that they smoked at least 100 cigarettes (5 pack) in their lifetime.

**Normal weight: $18.5 \text{ kg/m}^2 \leq \text{BMI} < 23.0 \text{ kg/m}^2$, underweight: $< 18.5 \text{ kg/m}^2$, overweight: $23.0 \text{ kg/m}^2 \leq \text{BMI} < 25.0 \text{ kg/m}^2$, obesity: $\geq 25.0 \text{ kg/m}^2$.

Table 3. Factors associated with use of the Papanicolaou test by multiple logistic regression.

Variables	Papanicolaou test*	
	Adjusted OR	95% CI
Age		
65–69	1.0	
70–74	0.90	0.56–1.46
≥ 75	0.26	0.13–0.53
Marital status		
Living with spouse	1.0	
Living without spouse [†]	0.88	0.56–1.38
Education		
No	1.0	
Elementary school	1.89	1.16–3.00
≥ Middle school	2.61	1.27–4.33
Lifetime smoker [‡]		
No	1.0	
Yes	0.64	0.30–1.36

Weighted to generalize to Korean women aged 65 years and older. OR: odds ratio, CI: confidence interval.

*Having a Papanicolaou smear test within two years was considered as receiving cervical cancer screening. [†]Single, divorced, separated. [‡]Reporting that they smoked at least 100 cigarettes (5 pack) in their lifetime.

spouse better received the cervical cancer screening than women living without a spouse.^{12,13,22)} It was proposed that women living with a spouse were likely to be more sexually active, therefore consider themselves at higher risk than women without a spouse.¹²⁾ However, multiple regression analysis presented no differences in Pap smear screening by marital status. This could be due to the fact that subjects over the age of 65 are relatively sexually inactive regardless of marital status. In a Korean study, women in rural areas reported lower rates of screening than those in urban areas.¹³⁾ In contrast, this study did not find such a difference. Household income was not significantly associated with screening participation. Although some previous studies have reported that income level was positively associated with Pap smear screening,^{12,23)} household income was not significantly associated with screening participation in the present study. Currently, the NCSP has provided free-of-charge Pap screening services to Medical Aid recipients and NHI beneficiaries within the lower 50% income category.²⁴⁾ In addition, the cost of the Pap

test in Korea is very low, which could improve the accessibility of this service to low-income individuals. Most earlier studies have suggested that women with a higher level of education were more likely to participate in Pap smear screening.^{12,13,23,25)} In line with previous studies, we also found that higher education was positively associated with Pap test participation. On the other hand, insurance coverage, self reported health, comorbidity, and obesity degree were not associated with the Pap smear screening. The disabled have impaired mobility. Therefore, due to several difficulties such as more time, more assistance, and specialized equipment to complete the screening, it is a well-known fact that women with disabilities receive less Pap smear services.^{15,26)} Meanwhile, disability was found not to be significantly associated with Pap smear in the analysis. As low Pap smear screening rates in the disabled result primarily from mobility problems, women aged 65 and over who, to some extent, already have mobility problems, might not show the difference. Lastly, smoking rates in women are increasing, and women who smoke have increased risk of cervical cancer, and cervical cancer patients who smoke are likely to die earlier.²⁷⁾ Furthermore, women who smoke perceive the dangers of cervical cancer inaccurately and have a less positive attitude and practice toward the Pap screening.^{28,29)} This is a clinically important epidemiologic fact. Fortunately, in this current study, smoking was not associated with the Pap test in the multiple regression analysis, though further research is needed using more data.

This study has several limitations. First, as self-administered questionnaires were used for much of the findings, recall bias leading to possible inaccuracy might occur. Second, this current study did not consider accompanying cervical cancer symptoms, although the cancer screening program is designed for individuals with no associated symptoms. Therefore, there might be some women with symptoms indicative of uterine cervical cancer in the study sample, which is selection bias. Third, information about regular Pap smear screening was not obtained, because women who had a recent Pap test within the last 2 years were considered as receiving uterine cervical cancer screening. For this reason, there could be misclassification bias in terms of regular Pap test participation. Fourth, as our study used the secondary national data, we could not collect information about the associated factors such as past medical history of sexual transmitted disease, knowledge or attitude about screening and uterine cervical cancer

vaccination. Future studies should further explore this association using detailed and large data.

In order to increase the rates of Pap testing, primary care physicians are responsible for education of and recommendations for the screening. The results of this current study suggest that more attention will be needed among the eldest elderly or less educated elder women, individually taking into account previous Pap results, life expectancy, risk factors for cervical cancer, and preferences.³⁰⁾

CONFLICT OF INTEREST

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

REFERENCES

1. Lee KW, Song JY. Epidemiology of cervical cancer. *J Korean Med Assoc* 2007;50:762-8.
2. Cannistra SA, Niloff JM. Cancer of the uterine cervix. *N Engl J Med* 1996;334:1030-8.
3. Koss LG. The Papanicolaou test for cervical cancer detection: a triumph and a tragedy. *JAMA* 1989;261:737-43.
4. Laara E, Day NE, Hakama M. Trends in mortality from cervical cancer in the Nordic countries: association with organised screening programmes. *Lancet* 1987;1:1247-9.
5. Nanda K, McCrory DC, Myers ER, Bastian LA, Hasselblad V, Hickey JD, et al. Accuracy of the Papanicolaou test in screening for and follow-up of cervical cytologic abnormalities: a systematic review. *Ann Intern Med* 2000;132:810-9.
6. Choi KS, Park EC, Shin HR, Kim CM, Oh DK. National cancer screening program in Korea. *J Korean Assoc Cancer Prev* 2004;9:116-22.
7. Smith RA, Cokkinides V, von Eschenbach AC, Levin B, Cohen C, Runowicz CD, et al. American Cancer Society guidelines for the early detection of cancer. *CA Cancer J Clin* 2002;52:8-22.
8. ACOG Committee on Practice Bulletins--Gynecology. ACOG Practice Bulletin no. 109: Cervical cytology screening. *Obstet Gynecol* 2009;114:1409-20.
9. U.S. Preventive Services Task Force. Screening for cervical cancer: recommendations and rationale [Internet]. Rockville: Agency for Healthcare Research and Quality; 2003 [cited 2012 Feb 22]. Available from: <http://www.uspreventiveservicestaskforce.org/3rduspstf/cervcan/cervcanrr.htm>.
10. American Academy of Family Physicians. Summary of policy recommendations for periodic health examinations, December, 2001 [Internet]. Leawood: AAFP; c2012 [cited 2012 Feb 22]. Available from: <http://www.aafp.org/exam.xml>.
11. Choi EJ, Kim DJ, Lee WC, Whang IY. Establishment of an efficient management system for advanced outcome of the National Health Screening Policy. Seoul: Korea Institute for Health and Social Affairs; 2009.
12. Shin HC. Social and behavioral predictors of cervical cancer screening practices among Korean women. *J Korean Acad Fam Med* 2001;22:1823-36.
13. Park YS, Chung EK, Choi JS, Park KS, Shin MH, Kweon SS, et al. Cancer screening rates and its related factors in a rural and urban communities. *J Korean Acad Fam Med* 2006;27:21-32.
14. Park HS, Han JH, Choi KM, Kim SM. Relation between elevated serum alanine aminotransferase and metabolic syndrome in Korean adolescents. *Am J Clin Nutr* 2005;82:1046-51.
15. Ko KD, Lee KY, Cho BL, Park MS, Son KY, Ha JH, et al. Disparities in health-risk behaviors, preventive health care utilizations, and chronic health conditions for people with disabilities: the Korean National Health and Nutrition Examination Survey. *Arch Phys Med Rehabil* 2011;92:1230-7.
16. Liberatos P, Link BG, Kelsey JL. The measurement of social class in epidemiology. *Epidemiol Rev* 1988;10:87-121.
17. Jo H, Jeon YT, Hwang SY, Shin HR, Song YS, Kang SB, et al. Increasing trend in the incidence of cervical cancer among the elderly in Korea: a population-based study from 1993 to 2002. *Acta Oncol* 2007;46:852-8.
18. Brun JL, Stoven-Camou D, Trouette R, Lopez M, Chene G, Hocke C. Survival and prognosis of women with invasive cervical cancer according to age. *Gynecol Oncol* 2003;91:395-401.
19. Mandelblatt J, Gopaul I, Wistreich M. Gynecological care of

- elderly women. Another look at Papanicolaou smear testing. *JAMA* 1986;256:367-71.
20. Ostbye T, Greenberg GN, Taylor DH Jr, Lee AM. Screening mammography and Pap tests among older American women 1996-2000: results from the Health and Retirement Study (HRS) and Asset and Health Dynamics Among the Oldest Old (AHEAD). *Ann Fam Med* 2003;1:209-17.
 21. Maxwell CJ, Bancej CM, Snider J, Vik SA. Factors important in promoting cervical cancer screening among Canadian women: findings from the 1996-97 National Population Health Survey (NPHS). *Can J Public Health* 2001;92:127-33.
 22. Liao CC, Wang HY, Lin RS, Hsieh CY, Sung FC. Addressing Taiwan's high incidence of cervical cancer: factors associated with the Nation's low compliance with Papanicolaou screening in Taiwan. *Public Health* 2006;120:1170-6.
 23. Juon HS, Seung-Lee C, Klassen AC. Predictors of regular Pap smears among Korean-American women. *Prev Med* 2003; 37(6 Pt 1):585-92.
 24. Yoo KY. Cancer control activities in the Republic of Korea. *Jpn J Clin Oncol* 2008;38:327-33.
 25. Lin SJ. Factors influencing the uptake of screening services for breast and cervical cancer in Taiwan. *J R Soc Promot Health* 2008;128:327-34.
 26. Ramirez A, Farmer GC, Grant D, Papachristou T. Disability and preventive cancer screening: results from the 2001 California Health Interview Survey. *Am J Public Health* 2005; 95:2057-64.
 27. Odongua N, Chae YM, Kim MR, Yun JE, Jee SH. Associations between smoking, screening, and death caused by cervical cancer in Korean women. *Yonsei Med J* 2007;48:192-200.
 28. Marteau TM, Hankins M, Collins B. Perceptions of risk of cervical cancer and attitudes towards cervical screening: a comparison of smokers and non-smokers. *Fam Pract* 2002; 19:18-22.
 29. Lin SJ. Factors influencing the uptake of screening services for breast and cervical cancer in Taiwan. *J R Soc Promot Health* 2008;128:327-34.
 30. Walter LC, Covinsky KE. Cancer screening in elderly patients: a framework for individualized decision making. *JAMA* 2001;285:2750-6.