

## RESEARCH ARTICLE

# Factors Predicting Nurse Intent and Status Regarding Pap Smear Examination in Taiwan: a Cross-sectional Survey

Shu-Ling Chen<sup>1</sup>, Shu-Fang Tsai<sup>2</sup>, Mei-Mei Hsieh<sup>3</sup>, Lin-Lin Lee<sup>4</sup>, Ya-Ling Tzeng<sup>5\*</sup>

## Abstract

**Background:** Nurses are the most visible, frontline personnel providing health education to patients. In particular, nurse experience with Pap examinations have the potential to influence women's attitudes toward screening for cervical cancer. However, nurses in Taiwan have lower rates of Pap testing than the general population. Understanding the factors predicting nurse intent to have a Pap exam and Pap exam status would inform interventions and policies to increase their Pap exam uptake. Therefore, the present study was undertaken. **Materials and Methods:** Data were collected by questionnaire from a convenient sample of 504 nurses at a regional hospital in central Taiwan between August and October 2011 and analyzed by descriptive statistics, confirmatory factor analysis, and logistic regression. **Results:** Nurse intention to have a Pap exam was predicted by younger age, less negative attitudes toward Pap exams, and greater influence of others recommendations. However, nurses were more likely to actually have had a Pap exam if they were older, married, had sexual experience, and had a high intention to have a Pap exam. **Conclusions:** Nurses who are younger than 34 years old, unmarried, sexually inexperienced, and with low intention to have a Pap exam should be targeted with interventions to educate them not only about the importance of Pap exams in detecting cervical cancer, but also about strategies to decrease pain and embarrassment during exams. Nurses with less negative attitudes and experiences related to Pap exams would serve as role models to persuade women to have Pap exams, thus increasing the uptake rate of Pap exams in Taiwan.

**Keywords:** Pap exam - cervical cancer - nurses - intention - Taiwan

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## Introduction

Cervical cancer was once one of the most common causes of cancer death for American women, but over the last 30 years the death rate for cervical cancer has decreased by more than 50% mainly due to increased use of the Papanicolaou (Pap) test (ACS, 2015). In Taiwan, cervical cancer was the seventh leading cause of cancer mortality among women in 2014 (MHW, 2014). Nearly 702 Taiwanese women are diagnosed annually with cervical cancer, with 6.0 deaths per 100,000 population attributed to this disease (MHW, 2014).

Women's intention to have a Pap test was associated with social norms in Korea (Kim, 2014), and was predicted by having had a previous Pap exam, worrying about developing cervical cancer, and perceiving Pap screening as important for preventing cervical cancer in Norwegian women (Burger et al., 2014). Intent to participate in cervical cancer screening was associated in women from Hong Kong with age < 37 years, having at least a college education, perceiving control over one's

health, and better knowledge about risk factors (Leung et al., 2010) and in women from mainland China with having children, perceiving that regular doctor visits are important for health, and greater knowledge about cervical screening (Gu et al., 2010; Gu et al., 2012).

Since nurses are the most visible, frontline personnel providing health education to patients and they are primarily women, they have the potential to influence women patients about Pap exams (Yoshino et al., 2012). Thus, one way to increase the cervical cancer screening rate in Taiwan would be through nurses' promotion of this screening. However, little is known about nurses' intentions and status regarding the Pap exam in Taiwan. Therefore, the aims of this study were to investigate factors predicting nurses' intent to have a Pap exam and whether they would have a Pap exam.

## Materials and Methods

### Study design

A cross-sectional survey was conducted.

<sup>1</sup>Department of Nursing, Hungkuang University, <sup>2</sup>Taichung Veterans General Hospital, <sup>4</sup>Dali Jen-Ai Hospital, Taichung, Taiwan, <sup>5</sup>School of Nursing, China Medical University, and Nursing Department, China Medical University Hospital, Taichung, <sup>3</sup>Yumin Medical Corporation, Yumin Hospital, Nantou County, Taiwan \*For Correspondence: [tyaling@mail.cmu.edu.tw](mailto:tyaling@mail.cmu.edu.tw)

### Sample and data collection

A convenience sample of nurses was recruited from a regional hospital in central Taiwan by distributing questionnaires inviting them to participate in this study. The study protocol was approved by the Institutional Review Board of the Jen-Ai Hospital, Taiwan (approval # 100-07), the second author explained the purpose of the research and assured participants' anonymity and confidentiality of responses. Written informed consent was obtained from all participants. After completing the questionnaire, nurses were given a small gift (NT\$100 [approximately US\$3] cash coupon). Of 590 questionnaires distributed between August and October 2011, 546 completed questionnaires were returned. After discarding questionnaires with missing data, 504 useable questionnaires remained, for an effective response rate of 85.4%.

### Questionnaire

The questionnaire consisted of two sections. The first section asked about nurses' demographic characteristics (age, education level, and marital status) and relevant clinical characteristics (family history of gynecological cancer, sexual experience, and Pap exam experience). The second section asked about three variables related to having a Pap exam: nurses' attitudes toward having a Pap exam, influence by others' recommendations to have a Pap exam, and intention to have a Pap exam.

### Attitudes toward having a Pap exam

Attitudes toward having a Pap exam were measured by 5 items adapted from previous studies (Taylor et al., 2004; Oranratanaphan et al., 2010). Two items were positively worded ("The Pap exam will help me to understand gynecological diseases" and "The Pap exam is effective in preventing cervical cancer") and three items were negatively worded ("I am afraid that the exam will be painful, so I am unwilling to have a Pap exam," "I am afraid that the exam will be embarrassing, so I am unwilling to have a Pap exam," and "I am afraid that the test outcome will be negative, so I am unwilling to have a Pap exam"). Responses are rated on a Likert-type scale from 1 (strongly agree) to 5 (strongly disagree).

### Influence by others' recommendation to have a Pap exam

The extent of influence by others' recommendations to have a Pap exam was measured by 3 items adapted from the literature (Azjen et al., 1980; Taylor et al., 2004). The items were "I am influenced by peers' recommendations to have a Pap exam the next time I am given the chance," "I am influenced by my family members' recommendations to have a Pap exam the next time I am given the chance," and "I am influenced by my friends' recommendations to have a Pap exam the next time I am given the chance." Responses are rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

### Intention to have a Pap exam

Intention was measured using a single item, "I am willing to have a Pap exam," with responses from 1 (strongly disagree) to 5 (strongly agree). A single item

to measure intention is consistent with previous research (Azjen et al., 1980), and is a reliable and valid measure of intention.

### Statistical Analysis

Data were analyzed using SPSS, version 21.0. Data on demographic and clinical characteristics were analyzed by descriptive statistics (means, standard deviations, frequencies). The construct validities of the scales to measure attitudes toward having a Pap exam and influence by others' recommendation to have a Pap exam were examined by confirmatory factor analysis. Predictors of intention to have a Pap exam and Pap exam status were examined by logistic regression.

## Results

The sample of 504 nurses had a mean age of 34.79 years (SD= 7.51), with 53.4% of them in the 30-39 year age bracket and 49.2% having at least a baccalaureate degree. The majority was married (65.1%) and most had sexual experience (81.5%). A minority of respondents (11.5%) had a family history of gynecologic cancer. The majority of nurses had had Pap exams (n=356, 70.6%). Among these nurses, the majority had annual Pap exams for the last 1-2 years (n=220, 61.8%), 56 (15.7%) for the last 3-6 years, 9 (2.5%) for more than 6 years, and 71 (20.0%) had Pap exams irregularly or could not remember when they did. Among the 148 nurses who had not had a Pap exam, most were < 39 years old (89.2%). For details, see Table 1.

### Reliability and validity

Before examining predictors of our outcome variables (intent to have a Pap exam and Pap exam status) by logistic regression, we tested the scales for two variables (attitudes toward having a Pap exam and influence by others' recommendations to have a Pap exam) by confirmatory factor analysis. The fit indices for our model indicate an excellent fit with the data (root mean square error of approximation [RMSEA]=0.038; comparative fit index [CFI]=0.997; goodness of fit index [GFI]=0.991; adjusted goodness of fit index [AGFI]=0.977). The composite reliability for each variable was > 0.85, well above the suggested threshold of 0.70 (Joreskog et al., 1989), indicating acceptable reliability. Composite reliability assesses the internal consistency of a measure and is analogous to Cronbach's alpha coefficient, which is an appropriate estimate of reliability (Henson, 2001). The Cronbach's alpha estimates for both variables were > 0.84, indicating acceptable reliability (Nunnally et al., 1994).

All standardized loadings were > 0.50 for all items, except two (the Pap exam will help me to understand gynecological diseases, and the Pap exam is effective in preventing cervical cancer). In addition, the t values for each item were significant at the 0.05 level, supporting convergent validity of the items in each variable. Each estimated extracted variance exceeded the minimum of 0.50, as recommended (Fornell et al., 1981). The discriminant validity of the two variables (attitudes toward having a Pap exam and influence by others'

**Table 1. Sample characteristics (N=504)**

Characteristic	Mean	SD	All nurses (N=504)	Had a Pap smear	
				Yes	No
				(n=356)	(n=148)
			n (%)	n (%)	n (%)
Age, years	34.79	7.51			
<29			121(24.0)	43(12.0)	78(52.7)
30-39			269(53.4)	215(60.4)	54(36.5)
40-49			95(18.8)	81(22.8)	14(9.5)
> 50			19(3.8)	17(4.8)	2(1.4)
Education					
<High school			23(4.6)	21(5.9)	2(1.4)
College			233(46.2)	164(46.1)	69(46.6)
Baccalaureate degree			233(46.2)	160(44.9)	73(49.3)
>Graduate degree			15(3.0)	11(3.1)	4(2.7)
Marital status					
Single/divorced/widowed			176(34.9)	56(15.7)	120(81.1)
Married			328(65.1)	300(84.3)	28(18.9)
Family history of gynecologic cancer					
Yes			58(11.5)	46(12.9)	12(8.1)
No			446(88.5)	310(87.1)	136(18.9)
Sexual experience					
Yes			411(81.5)	343(96.3)	68(45.9)
No			93(18.5)	13(3.7)	80(54.1)
Duration of regular Pap exams					
1-2 years			220(43.6)	220(61.8)	0(0)
3-6 years			56(11.1)	56(15.7)	0(0)
>6 years			9(1.8)	9(2.5)	0(0)
Irregular/Cannot remember			71(14.1)	71(20.0)	0(0)
Never			148(29.4)	0(0)	148(100)

recommendation to have a Pap exam) was supported by their correlation squared, i.e., 0.026 (=0.162), which is less than both estimated extracted variances. Thus, these two variables are acceptably reliable and valid for determining predictors of nurses' intent to have a Pap exam and actually having a Pap exam. We therefore treated these two variables as observed variables (by averaging the appropriate item scores for each variable) and not as latent variables with multiple indicator items.

#### Model fit for intention to have a Pap exam

Predictors of nurses' intention to have a Pap exam were examined by first categorizing nurses who intended to have a Pap exam (n = 75) and those with no intent (n = 73) as intenders and non-intenders, respectively. Respondents were categorized as intenders if they rated 4-5 (agree-strongly agree) on the intention item. Logistic regression was then used to analyze data comparing intenders and non-intenders. Note that this analysis did not include respondents who had already had a Pap exam. Seven variables were entered into logistic regression model: age, education, marital status, family history of gynecologic

cancer, sexual experience, attitudes toward having a Pap exam, and influence by others' recommendation to have a Pap exam.

As shown in Table 2, the best-fitting model (Hosmer and Lemeshow test,  $\chi^2=5.071$ ,  $df=7$ ,  $p=0.651$ ) correctly predicted 73.6% of nurses who intended to have a Pap exam. This result implies that the odds of intending to have Pap exam were related to three independent variables: age, attitudes toward having a Pap exam, and influence by others' recommendation to have a Pap exam. Nurses >34 years old had significantly lower odds of intending to have a Pap exam than nurses < 34 years old (odds ratio [OR]= 0.22, 95% confidence interval [CI]= 0.082-0.593,  $p<0.01$ ). Nurses with less negative attitudes toward having a Pap exam had significantly greater odds of intending to have a Pap exam than those with more negative attitudes toward having a Pap exam (OR= 4.907, 95% CI= 1.618-14.884,  $p<0.01$ ). Nurses who were highly influenced by others' recommendation to have a Pap exam had significantly greater odds of intending to have a Pap exam than those who were less influenced (OR=6.844, 95% CI=2.680-17.478,  $p<0.001$ ) (Table 2). In addition, intent to have

**Table 2. Logistic Regression Analysis for Predicting Intent to Have a Pap Exama (n=148)**

Variable	B	SE	Wald statistic	p	Exp(B)	95% Confidence interval for Exp(B)
Age, years <sup>b</sup>						
<34	1 (ref)					
>34	-1.513	0.506	8.956	0.003	0.22	0.082-0.593
Education						
< College (< 4 years)	1 (ref)					
> Baccalaureate (4-5 years)	-0.043	0.414	0.011	0.918	0.958	0.426-2.156
Marital status						
Single/divorced/widowed	1 (ref)					
Married	0.743	0.616	1.456	0.228	2.103	0.629-7.0.36
Family history of gynecologic cancer						
Yes	0.514	0.498	1.064	0.302	1.672	0.629-4.442
No	1 (ref)					
Sexual experiences						
Yes	0.305	0.461	0.439	0.508	1.357	0.550-3.346
No	1 (ref)					
Attitudes toward having a Pap exam <sup>c</sup>						
less negative	1.591	0.566	7.894	0.005	4.907	1.618-14.884
more negative	1 (ref)					
Influence by others' recommendation <sup>d</sup>						
High	1.923	0.478	16.168	<0.001	6.844	2.680-17.478

<sup>a</sup>Intention to have a Pap exam was categorized as high if nurses rated 4-5 (agree-strongly agree) on the intention item; <sup>b</sup>Age was dichotomized based on the median age of 34 years; <sup>c</sup>Attitudes toward having a Pap exam were categorized as less negative if the average score was >4 points and more negative if the average score was < 4 points; <sup>d</sup>Influence by others' recommendation was categorized as high if the average score was > 4 points and low if the average score was < 4 points

**Table 3. Summary of Logistic Regression Analysis for Pap Exam (N=504)**

Variable	B	SE	Wald statistic	p	Exp(B)
Age, years <sup>a</sup>					
<34	1 (ref)				
>34	1.452	0.34	18.247	<0.001	4.272
Education					
< college	1 (ref)				
> Baccalaureate	-0.408	0.295	1.913	0.167	0.665
Marital status					
Single/divorced/widowed	1 (ref)				
Married	1.884	0.314	36.046	<0.001	6.58
Family history of gynecologic cancer					
Yes	0.183	0.341	0.287	0.592	1.201
No	1 (ref)				
Sexual experiences					
Yes	2.34	0.413	32.05	<0.001	10.379
No	1 (ref)				
Attitude toward Pap exam <sup>b</sup>					
less negative	0.335	0.321	2.41	0.296	1.398
more negative	1 (ref)				
Influence by others' recommendation <sup>c</sup>					
High	0.484	0.312	2.41	0.121	1.622
Low	1 (ref)				
Intention to have a Pap exam <sup>d</sup>					
High	1.702	0.374	20.678	<0.001	2.634
Low	1 (ref)				

<sup>a</sup>Age was dichotomized based on the median age of 34 years; <sup>b</sup>Attitudes toward Pap exam were categorized as less negative if the average score was > 4 points and more negative if the average score was < 4 points; <sup>c</sup>Influence by others' recommendation was categorized as high if the average score was >4 points and low if the average score was < 4 points; <sup>d</sup>Intention to have a Pap exam was categorized as high if nurses rated 4-5 (agree-strongly agree) on the intention item

a Pap exam was not significantly predicted by nurses' education, marital status, family history of gynecologic cancer, and sexual experience (Table 2).

### Model fit for having a Pap exam

Predictors of nurses' Pap exam status, i.e., whether they would actually have a Pap exam, were first examined by grouping those who intended to have a Pap exam and those who did not have a Pap exam ( $n = 148$ ) and comparing them with those who had already had a Pap exam ( $n = 356$ ). Logistic regression was then used to determine factors differentiating nurses' Pap exam status. Eight variables were entered into the logistic regression model: age, education, marital status, family history of gynecologic cancer, sexual experience, attitudes toward having a Pap exam, influence by others' recommendations to have a Pap exam, and intention to have a Pap exam.

As shown in Table 3, the best-fitting model (Hosmer and Lemeshow test,  $\chi^2=6.721$ ,  $df=8$ ,  $p=0.567$ ) correctly predicted 86.1% of nurses who had had a Pap exam. This result implies that the odds of having a Pap exam were related to four independent variables: age, marital status, sexual experience, and intention to have a Pap exam. Older nurses had significantly greater odds of having a Pap exam than younger nurses (OR=4.272, 95% CI=2.194-8.316,  $p<0.001$ ). Married nurses had 6.58 times greater odds of having a Pap exam than unmarried nurses (OR=6.580, 95% CI= 3.557-12.171,  $p<0.001$ ). Nurses with sexual experience had 10.379 times greater odds of having a Pap exam than those without sexual experience (OR= 10.379, 95% CI= 4.617-23.333,  $p<0.001$ ). In addition, nurses with higher intention to have a Pap exam had significantly greater odds of having a Pap exam than those with lower intention (OR= 5.487, 95% CI= 2.634-11.428,  $p<0.001$ ) (Table 3). Finally, having a Pap exam was not significantly predicted by nurses' education, family history of gynecologic cancer, attitudes toward having a Pap exam, and influence by others' recommendations to have a Pap exam (Table 3).

## Discussion

Among our sample of 504 nurses, 148 (29.4%) had not had a Pap exam, and the majority was < 29 years old ( $n=78$ , 52.7%) and single ( $n=120$ , 81.1%). However, among the 356 nurses who had had a Pap exam, only 43 (12%) were < 29 years old, suggesting that younger nurses were less likely to have a Pap exam. Our findings indicate that 70.6% of nurses did have a Pap exam in 2014, which is much higher than 48.9% of Taiwanese nurses having a Pap test in 2006 (Chung et al., 2011). On the other hand, the uptake rate of Pap smear for Taiwanese nurses in both studies is much lower than the uptake rate for Canadian nurses (97.4%) (Ratner et al., 2009). This inconsistency is likely due to differences in healthcare systems, policies, and cultural factors between Asian and Western countries.

Among the 148 nurses who never had a Pap exam, intention to have a Pap exam was predicted by age, attitudes toward having a Pap exam, and influence by others' recommendation to have a Pap exam. Intention to have a Pap exam was greater in nurses <34 years old, with less negative attitudes toward having a Pap exam, and more influenced by others' recommendation to have a Pap exam. Our finding that intention to have a Pap exam was less likely in nurses with more negative attitudes

toward Pap exams, e.g., fearing that it might be painful, embarrassing, or the test result would be negative, is consistent with previous reports that women were less likely to participate in cervical cancer screening if they were embarrassed (Moreira et al., 2006; Cheng et al., 2010; Tung et al., 2010), had a negative body image, feared the outcome (Oscarsson et al., 2008), and feared it would be painful (Moreira et al., 2006; Cheng et al., 2010). Our finding that Taiwanese nurses were more likely to have a Pap test if they were highly influenced by peer, family and friends' recommendations is consistent with reports that informal social support from friends and family was associated with Pap smear uptake in Singaporean (Seow et al., 2000), Mexican-American (Suarez et al., 1994), and Vietnamese-American women (Taylor et al., 2004).

Among all 504 nurses, having a Pap exam was predicted by age, marital status, sexual experience, and intention to have a Pap exam. Nurses who were older, married, sexually experienced and highly intended to have a Pap exam were more likely to have a Pap exam than those who were younger, not married, had no sexual experience and low intention. Our results on married women being more likely to have a Pap exam is consistent with reports that being married was associated with cervical cancer screening in Vietnamese-American women (Nguyen et al., 2002; Taylor et al., 2004), Chinese-American women (Ma et al., 2013), Australian women (Siahpush et al., 2002), and Indian nurses.<sup>27</sup> This association is probably due to two reasons. First, married women may receive more frequent obstetric or gynecological care, which would enhance their opportunities for Pap tests. Second, because sexual relationships outside marriage are not culturally accepted in South Asia (Bott et al., 2003; Singh et al., 2012), younger, unmarried women may perceive that participation in cervical screening will imply they are sexually active and incur social stigma.

The results of our study are subject to some limitations. First, our results are based on data from 504 nurses at a regional hospital in central Taiwan. As it was a convenience sample, findings may not generalize to all nurses in Taiwan. Second, questioning nurses about having or their intent to have a Pap exam is problematic for those who did not have a Pap exam or were not married but had sexual experience because they may not wish to disclose such information.

In conclusions, nurses were more likely to intend to have a Pap exam if they were younger than 34 years, had less negative attitudes toward Pap exams, and were highly influenced by others' recommendations to have a Pap exam. Nurses were more likely to actually have a Pap exam if they were older than 34 years, married, had sexual experience, and highly intended to have a Pap exam than those who were younger, not married, sexually inexperienced, and with little intention to have a Pap exam. These findings can be used to target nurses and develop outreach efforts. This is the first investigation on factors predicting nurses' intentions and status regarding the Pap examination in Taiwan. The findings highlight the need to target nurses who are younger than 34 years, unmarried, without sexual experience, and with low intention to have a Pap exam to increase the uptake of Pap exams.



Since nurses have more contact with patients than other healthcare providers, improving their uptake of Pap exams would enable them to serve as a role model and persuade women to have a Pap exam. Our findings can also be used to guide the development of public education programs and policies that encourage women to regularly have an annual Pap exam.

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