



Associations of health belief and health literacy with Pap smear practice among Asian immigrant women

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ABSTRACT

Purpose: To examine associations of health belief and health literacy with Pap smear practice among Asian immigrant women in South Korea.

Methods: This study used a descriptive, cross-sectional study design. A survey was conducted among 196 immigrant women who were married to South Korean men, using a questionnaire translated into English, Chinese, Vietnamese, and Korean. Trained research assistants read the questionnaire and the participants gave their answers.

Results: The most common birthplace of the immigrant women was Vietnam (43.0%), followed by China (12.2%) and the Philippines (5.6%). Of the participants, 76.5% answered that they had never had a Pap smear test. Multiple logistic regression analysis revealed that age and functional health literacy were associated with Pap smear practice among Asian immigrant women. With a one-year increase in participants' age, Pap smear practice increased 1.15 times (OR = 1.15, 95% CI: 1.07, 1.23). Furthermore, with a one point increase in functional health literacy, Pap smear practice increased 1.18 times (OR = 1.18, 95% CI: 1.02, 1.37).

Conclusions: Results suggest that more information about Pap smear tests should be provided to young immigrant women. Health providers should be made aware that Pap smear practice among young immigrant women might be infrequent and should actively recommend that they receive the tests. To improve Pap smear practice among immigrant women, it is also crucial for educational strategies to include functional health literacy. Nurses could play an important role in explaining and recommending the Pap smear test through communication with immigrant women.

1. Introduction

Although cervical cancer is the fourth most common cancer among women worldwide, it is also one of the most successfully treatable diseases with early detection (Torre et al., 2016). Cervical cancer is usually asymptomatic in its early stages; however, the disease progresses over a long, pre-invasive stage, which can last years or even decades. Therefore, regular screening can detect cervical cancer early, during the pre-malignancy phase when survival rates are the highest (Melan et al., 2017).

The Papanicolaou (Pap) smear test is a simple and effective screening method used to detect precancerous changes early that may lead to cancer in the cervix (World Health Organization, 2014). Indeed, the incidence and mortality rates of cervical cancer have largely decreased over the past 40 years due to screening and early detection in high-income countries (Melan et al., 2017; Torre et al., 2016).

In South Korea, cervical cancer is included in the national organized cancer screening program, and free Pap smear tests have been made available nationwide for women aged 20 years and over once every two years since 2016 (National Cancer Information Center, 2017). Nevertheless, the standardized mortality rate of cervical cancer in 2015 was 2.6 per 100,000 women in South Korea, which has changed little since 2000 (Korea Ministry of Health and Welfare and National Cancer Center, 2018). Furthermore, the Pap smear screening rate remains constant at 40.5%, which is much lower than the average screening rate (61.6%) among other Organization for Economic Cooperation and Development (OECD) countries (Korea Ministry of Health and Welfare and National Cancer Center, 2018; OECD, 2015).

Meanwhile, Korean society has seen a rapid increase in the number of immigrant women coming from developing Asian countries who obtain residency in South Korea by marrying Korean men. According to the 2018 National Statistics, the number of women who obtained

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residency in Korea by marrying Korean men increased from 82,828 in 2006 to 132,391 in 2018. These foreign women mostly come from Vietnam, China, and the Philippines, and their population is gradually increasing (Statistics Korea, 2019). However, the incidence rate of cervical cancer is one of the highest among women from these developing countries (Torre et al., 2016). Research has shown that only 7.4% of Chinese women have received a Pap smear (Abulizi et al., 2018). Moreover, human papillomavirus (HPV) infection, the principal cause of cervical cancer, has been reported to affect 24.5% of immigrant women in Korea (Korea Center for Disease and Prevention, 2012). Further, despite the extremely high risk for cervical cancer among Vietnamese immigrant women, only 10.9% of this population reported having had a Pap smear test (Kim and Choi, 2010; Korea Center for Disease and Prevention, 2012). Furthermore, cervical cancer ranks as the second most frequent cancer among women in the Philippines; however, the screening rate among this population is only 9.3% (Bruni et al., 2018).

Previous studies have reported barriers to Pap smear screening among Asian women. Lack of knowledge regarding the importance of the test was reported to be the main barrier preventing Chinese women from receiving Pap smears (Abulizi et al., 2018). Furthermore, it has been found that Vietnamese women have limited knowledge and information about cervical cancer and screening (Ma et al., 2013). Limited access due to the lack of screening services as well as the lack of knowledge about cancer screening tests were reported as barriers among Filipino women (Domingo and Dy Echo, 2009; Guerrero et al., 2015). Cultural norms and beliefs have also been cited as barriers to cervical cancer screening among Asian women. Many Vietnamese and Chinese women said that they considered it inappropriate to disclose private information regarding sexuality and were embarrassed about exposing their genitals to a physician (Chang et al., 2013; Ferdous et al., 2018).

Other studies have suggested that barriers to undergoing Pap smear testing among Asian immigrant women in South Korea may include inadequate health literacy (Kim et al., 2017; Lee et al., 2014). Health literacy refers to an individual's capacity to obtain, understand, and process basic health information and services to make appropriate health decisions (Nutbeam, 2000). Immigrant populations tend to have low health literacy due to language barriers, which might lead to poorer access to healthcare services and information compared to native citizens (Fernández-Gutiérrez et al., 2018). Thus, previous studies have reported a positive association between inadequate health literacy and low use of health services among immigrant women (An et al., 2013; Gele et al., 2016). However, limited studies have explored the associations between health literacy and Pap smear test practice.

The health belief model is used to explain human behaviors related to disease prevention and early detection. This model states that four beliefs affect an individual's compliance with preventive behaviors for a given condition: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Rosenstock, 1974). Several studies have examined Pap smear test practice with the Health Belief Model and found that health belief was associated with Pap smear test practice (Daryani et al., 2016; Karimy et al., 2017; Ma et al., 2013; McFarland, 2013). Nevertheless, little is known about the associations of health belief and health literacy with Pap smear practice among immigrant women. Accordingly, the present study examined the associations of health belief and health literacy with Pap smear practice among Asian immigrant women in South Korea.

2. Methods

2.1. Design and participants

The present study used a descriptive, cross-sectional design. The participants were women who immigrated to South Korea through marriage to Korean men. The participants were recruited using a

convenience sampling method from women who visited community health centers and multicultural-family support centers in three metropolitan cities in South Korea. The inclusion criteria were 1) immigrants to South Korea from Asian countries via marriage to Korean men, 2) married women over 20 years of age, and 3) women who can communicate in one of the following languages: Korean, Vietnamese, Chinese, or English. The exclusion criteria were 1) women who did not live with their husbands, as it might contribute as a confounding variable, because previous studies have shown that divorced or separated women are less likely to have Pap smear tests (Lee and Park, 2013; Ma et al., 2013); and 2) women with gynecological diseases. The sample size was estimated using G-Power 3.1 (Faul et al., 2007). The required minimum sample size for a multiple logistic regression analysis was 180, assuming a significance level of 0.05, a power of 0.80, and an odds ratio of 1.55 based on a previous study (Park and Park, 2014). Considering the potential for participant dropout, research assistants provided 200 participants with questionnaires; however, three participants did not finish the questionnaires, and one participant did not meet the inclusion criteria (response rate 98.0%). Finally, responses from 196 participants were analyzed.

2.2. Data collection

After obtaining the approval from the Institutional Review Board the relevant university (Approval No, DGU IRB 20180002) for the study, the researcher called five selected community health centers and three multicultural-family support centers, to request their cooperation. Then, the researcher visited the centers and explained the purpose of the study to the center directors and staff.

To collect the data, the researcher employed and trained two Vietnamese women, one Filipino woman, and one Korean-Chinese woman as research assistants. All the research assistants had lived in Korea for more than 20 years and were fluent in Korean. They had also obtained certificates from public health centers. Additionally, to support immigrant women, the Korean government and community public health centers provide programs for newborn and postpartum care to immigrant women who have lived in Korea for at least 3 years and possess a minimum of a high school education; certificates are awarded to participants after program completion. Trained women visit the homes of new immigrant mothers from the same country and provide newborn and postpartum care and support (Ministry of Gender Equality and Family and Korean Institute for Healthy Family, 2018).

To train the research team, the researcher held three meetings with the research assistants a month prior to data collection. During the first meeting, the researcher explained the study purpose, data collection method, and study participants. In the first two meetings, the researcher reviewed the survey items written in Korean, English, Vietnamese, and Chinese with the research assistants. In the final meeting, the research assistants displayed a complete understanding of the survey items.

The questionnaires used for data collection were written in Korean, English Vietnamese, and Chinese. First, the Korean questionnaire was translated into English by two bilingual nursing professors. The English questionnaire was then translated into Vietnamese and Chinese by four bilingual PhD nursing students from China and Vietnam, respectively. To prevent cultural variation from affecting the meaning of the questionnaires during the translation process, the researcher explained the purpose of the study to the translators, who communicated with the participants regarding the survey items. Professors and students performed the translations separately, and professional translators compared them after translation. Inconsistencies in words and phrases were resolved through discussion with the translators. Subsequently, the questionnaires were back-translated by professional translators into Korean without having any prior information about the questionnaire. The back-translated Korean questionnaires were reviewed by two professors of women's health nursing and two professors of oncology

nursing. The content validity index (CVI) was 0.96. Finally, the questionnaires were tested through a pilot study on five immigrant women from Vietnam, five from the Philippines, and five from China. All the participants in the pilot study showed complete understanding of all the survey items. The reliability coefficient (Kuder-Richardson, 20) of the “knowledge about cervical cancer” scale was 0.70 in the pilot study. The reliability coefficients (Cronbach's alpha) of the “health beliefs” and “health literacy” scales were 0.72 and 0.68, respectively.

The trained research assistants visited the centers on arranged dates and explained the purpose of the study to each participant individually. Then, the research assistants obtained written, informed consent from the participants prior to their participation in the study. The participants were informed of the confidentiality and anonymity of the survey results, and that they could withdraw from the study at any time without penalty. The participants were also informed that the data from the collected questionnaires would be coded and their identities and personal information would not be disclosed. To ensure privacy, the research assistants collected the completed questionnaires and immediately placed them in a sealed envelope, which was delivered to the researcher by mail.

The questionnaires were provided in Korean, English, Vietnamese, and Chinese languages. The research assistants instructed the participants to select the questionnaire in the language that they were most familiar with. Then, the research assistants read the questionnaires item-by-item and asked the participants to indicate their answers. It took 20–30 min to complete the questionnaire. The participants who completed the questionnaire were given a gift card worth approximately 5 USD as a reward for their participation and cooperation in this study. The data were collected from March to September 2018.

2.3. Data

2.3.1. Participants' characteristics

This study collected data on the participants' demographics, including age, educational level, years of marriage, employment status, monthly household income, children, and birthplace. The participants self-reported their Korean proficiency level on a descriptive 5-point scale in response to the statement, “I can communicate in Korean” (1 = poorly to 5 = fluently). Pap smear practice among the women was assessed via their responses to the statement, “Have you ever had a Pap smear test?” The possible responses were either “Yes” or “No.”

2.3.2. Knowledge about cervical cancer

The participants' knowledge about cervical cancer was measured using the Knowledge about Cervical Cancer Scale developed by Lee and Park (2011). The 13 items included questions about the causes of cervical cancer, and its symptoms, treatment, and prevention. The possible answers to these questions were “yes” or “no.” An example of an item is as follows: “Cervical cancer is related to childbirth.” A correct answer was given 1 point and an incorrect answer was given 0 points. Total scores ranged from zero to 13. A high score indicated a high level of knowledge about cervical cancer. The reliability coefficient (Kuder-Richardson, 20) in this study was 0.80.

2.3.3. Health beliefs about cervical cancer

The participants' health beliefs about cervical cancer were measured using the Health Belief about Cervical Cancer Scale developed by Lee and Park (2013). This scale comprises 10 items with four subscales: perceived sensitivity, perceived seriousness, perceived benefit, and perceived barrier. Scores for perceived barriers were reverse scored. Each item was rated on a 4-point Likert scale (1 = strongly disagree, 4 = strongly agree). An example of an item is as follows: “I think that cervical care is a serious disease.” Possible total scores ranged from 10 to 40, with higher scores indicating higher levels of health beliefs about cervical cancer. The reliability coefficient (Cronbach's alpha) in this study was 0.85. The reliability coefficients (Cronbach's alpha) of the

subscales were 0.76–0.83.

2.3.4. Health literacy

The participants' health literacy was measured using the Health Literacy Assessment Scale for Asian Immigrant Women developed by An and Yang (2015) based on the Health Literacy Model (Nutbeam, 2000). This scale comprises 10 items with three subscales: functional, interactive, and critical. Each item was rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). An example of an item is “I am able to describe my symptoms effectively to the doctor.” The possible total scores ranged from 10 to 50, with higher scores indicating higher levels of health literacy. The reliability coefficient (Cronbach's alpha) in this study was 0.76. The reliability coefficients (Cronbach's alpha) of the subscales were 0.72–0.80.

2.4. Data analysis

The collected data were analyzed using SPSS Statistics 23.0 (IBM Corp., Armonk, NY, USA). The variables' reliability was assessed using Cronbach's alpha coefficient. The participants' characteristics, knowledge about cervical cancer, health beliefs about cervical cancer, and health literacy were described using means, standard deviations (SD), frequencies, and percentages. To explore the relationships between the participants' characteristics and Pap smear practice, independent *t*-tests and Chi-square tests were performed. Differences in knowledge, health beliefs about cervical cancer, and health literacy by birthplace among participants were tested using a one-way ANOVA. The post hoc test was performed using Scheffé's method. To determine the predictors of Pap smear practice among Asian immigrant women, odds ratios and 95% confidence intervals were derived using multiple logistic regression, adjusting the variables found to significantly affect the relationship between participants' characteristics and Pap smear practice (with a significance level of .05).

3. Results

3.1. Participants' characteristics and relationship to Pap smear practice

Table 1 displays the characteristics of the participants. The mean age of the participants was 32.34 (SD = 5.86) years, and the mean length of marriage was 8.62 (SD = 5.36) years. Of the 196 participants, 55.1% (n = 108) had an educational level of a bachelor's degree or above and 67.9% (n = 133) were unemployed. The largest proportion had a monthly household income of 2000 to 3000 USD (n = 91, 46.4%). The most frequently reported birthplace was Vietnam (n = 132, 43.0%), followed by China (n = 24, 12.2%).

Of the 196 participants, 150 (76.5%) women answered that they had never had a Pap smear test, while 46 (23.5%) answered that they had. The mean age was significantly higher among women who had received Pap smear tests than among those who had never received one ($p < .001$).

3.2. Mean scores of knowledge, health beliefs about cervical cancer, and health literacy

Table 2 shows the mean scores of the study variables. The mean score for knowledge about cervical cancer was 7.28 (SD = 2.47) out of 13, and the scoring range was 2.00–12.00. When the knowledge score is converted to a percentile, this score corresponds 56 points. The mean score for health beliefs about cervical cancer was 25.73 (SD = 4.93) out of 40, and the scoring range was 10.33–37.00. Finally, the mean score for health literacy was 33.13 (SD = 6.13) out of 50, and the scoring range was 15.00–50.00.

Differences in knowledge, health beliefs about cervical cancer, and health literacy by participants' birthplace.

Table 3 shows the differences in knowledge, health beliefs about

Table 1
Participants' characteristics and relationship to Pap smear screening (N = 196).

Characteristics	n (%) or Mean ± SD	Pap smear screening		t or χ^2	p
		Never (n = 150)	Yes (n = 46)		
Age (years)	32.34 ± 5.86	31.34 ± 5.48	35.59 ± 5.93	4.51	< .001
Length of marriage (years)	8.62 ± 5.36	8.33 ± 5.52	9.59 ± 4.71	-1.41	.162
Educational level					
High school or less	88 (44.9)	72 (48.0)	16 (34.8)	2.49	.115
Bachelor's degree or above	108 (55.1)	78 (52.0)	30 (65.2)		
Employment status					
Employed	63 (32.1)	48 (32.0)	15 (32.6)	0.01	.938
Unemployed	133 (67.9)	102 (68.0)	31 (67.4)		
Monthly household income (USD)					
< 2000	57 (29.1)	44 (29.3)	13 (28.3)	1.22	.543
2000 - < 3000	91 (46.4)	72 (48.0)	19 (41.3)		
≥ 3000	48 (24.5)	34 (22.7)	14 (30.4)		
Children					
Have	155 (79.1)	34 (22.7)	7 (15.2)	1.18	.277
Not	41 (20.9)	116 (77.3)	39 (84.8)		
Birthplace					
Vietnam	132 (67.3)	104 (69.3)	28 (60.9)	8.52	.158 ^a
China	24 (12.2)	13 (8.7)	11 (23.9)		
Philippines	11 (5.6)	9 (6.0)	2 (4.3)		
Cambodia	7 (3.6)	5 (3.3)	2 (4.3)		
Japan	8 (4.1)	7 (4.7)	1 (2.2)		
Others (Indonesia, Mongolia, Uzbekistan)	14 (7.1)	12 (8.0)	2 (4.3)		
Korean proficiency					
Poor	54 (27.6)	46 (30.7)	8 (17.4)	4.05	.257 ^a
Fair	89 (45.4)	67 (44.7)	22 (47.8)		
Good	44 (22.4)	30 (20.0)	14 (30.4)		
Fluent	9 (4.6)	7 (4.6)	2 (4.4)		

^a Fisher's exact test.

Table 2
Mean scores of the study variables (N = 196).

Variables	Mean ± SD	Min – Max
Knowledge about cervical cancer (13)	7.28 ± 2.47	2.00–12.00
Health belief about cervical cancer (10)	25.73 ± 4.93	10.00–37.00
Perceived sensitivity (2)	4.43 ± 1.95	2.00–8.00
Perceived seriousness (2)	5.96 ± 2.01	2.00–8.00
Perceived benefit (2)	6.17 ± 1.87	2.00–8.00
Perceived barrier (4)	9.14 ± 3.56	4.00–16.00
Health literacy (10)	33.13 ± 6.13	15.00–50.00
Functional (4)	14.72 ± 3.73	4.00–20.00
Interactive (4)	11.22 ± 4.36	4.00–20.00
Critical (2)	7.18 ± 2.41	2.00–10.00

(), Number of items.

cervical cancer, and health literacy by birthplace among Asian immigrant women. While there were no differences in knowledge and health literacy, health beliefs were significantly affected by birthplace among the immigrant women ($p = .002$). In Scheffé's post hoc test, the mean of health beliefs was significantly higher among Vietnamese women than Filipino women ($p = .002$).

Table 3
Differences in Asian immigrant women's knowledge, health beliefs about cervical cancer, and health literacy by birthplace (N = 196).

Birthplace	Knowledge about cervical cancer (Mean ± SD)	Health beliefs about cervical cancer (Mean ± SD)	Health literacy (Mean ± SD)
Vietnam	7.40 ± 2.46	26.42 ± 5.03 ^a	33.30 ± 6.22
China	7.33 ± 2.48	25.25 ± 3.22	33.13 ± 7.26
Philippines	6.45 ± 2.98	21.27 ± 5.00 ^b	31.73 ± 4.10
Cambodia	6.00 ± 2.71	24.86 ± 5.21	32.29 ± 7.27
Japan	7.63 ± 2.62	21.38 ± 5.07	36.88 ± 4.09
Others (Indonesia, Mongolia, Uzbekistan)	7.07 ± 2.02	25.86 ± 3.23	30.93 ± 4.23
F (p)	0.73 (.601)	3.95 (.002) a > b (< .05) [*]	1.12 (.350)

^{*}Scheffé test.

Table 4
Multiple logistic regression for predictors of Pap smear screening among Asian immigrant women (N = 196).

Variables	OR	95% CI	p
Age (per 1 year)	1.15	(1.07, 1.23)	< .001
Knowledge about cervical cancer (per 1 point)	1.13	(0.98, 1.26)	.089
Health beliefs about cervical cancer (per 1 point)			
Perceived sensitivity	1.08	(0.82, 1.42)	.600
Perceived seriousness	0.77	(0.57, 1.02)	.066
Perceived benefit	1.20	(0.84, 1.72)	.309
Perceived barrier	1.10	(0.97, 1.24)	.125
Health literacy (per 1 point)			
Functional	1.18	(1.02, 1.37)	.029
Interactive	0.95	(0.86, 1.05)	.296
Critical	1.04	(0.83, 1.29)	.741

OR = odds ratio; CI = confidence interval.

3.3. Predictors of Pap smear practice among Asian immigrant women

Table 4 shows the predictors of Pap smear practice among Asian immigrant women. Age and functional health literacy were significantly associated with Pap smear practice. With an increase in age by one year, Pap smear practice increased 1.15 times (OR = 1.15, 95%

CI: 1.07, 1.23). Furthermore, as functional health literacy increased by one point, Pap smear practice increased 1.18 times (OR = 1.18, 95% CI: 1.02, 1.37).

4. Discussion

In this study, only 23.5% of Asian immigrant women in South Korea have undergone Pap smear screening. This is only about half the rate of Korean women who report having done a Pap smear test (40.5%; National Cancer Information Center, 2017). The National Medical Insurance System Plan covers everyone residing in South Korea and is a co-pay system priced by employee and employer. Thus, more than 97% of its population has health insurance or medical aid. The benefit for foreign residents is the same as that for Korean nationals (National Health Insurance Service, 2017). Further, women aged 20 years or older are eligible for a free Pap smear test every two years with health insurance coverage (National Cancer Information Center, 2017). Nevertheless, the Pap smear test rate is considerably low among immigrant women.

The present study found that Pap smear practice among immigrant women was associated with their age. It has also been reported that Pap smear practice is very low not only among Asian immigrant women but also among young Korean women under the age of 30 years, compared to that among Korean women in their 40s or older (National Cancer Information Center, 2017). According to a recent national report (Korea Ministry of Health and Welfare and National Cancer Center, 2018), women in their 20s and 30s account for 55% of all cervical cancer cases. The Pap smear test requires women to expose their genitals and can often induce feelings of embarrassment or discomfort. It has been reported that young women in Asia feel embarrassed and ashamed during pelvic examinations, which may serve as a barrier to Pap smear practice (Chang et al., 2013; Cho, 2014; Vu et al., 2013). However, because cervical cancer is associated with a high cure rate with early detection, it is crucial that women begin having Pap smear tests in their 20s (National Cancer Information Center, 2017). Therefore, relevant health policies must be strengthened to provide more information about cervical cancer screening to young immigrant women. Further, health providers must be aware that Pap smear practice may be low among young immigrant women and therefore, must actively recommend that these women undertake Pap smear tests regularly.

In the present study, there were differences in health beliefs according to the participants' birthplace; however, health beliefs were not associated with Pap smear practices among Asian immigrant women. In the Health Belief Model, culture is one of the modifying factors affecting four subscales of health beliefs: perceived sensitivity, seriousness, benefit, and barrier (Janz and Becker, 1984). The findings from the present study are consistent with a systematic review study, which found that sociocultural factors of immigrants influence their health-related beliefs (Johnson et al., 2008). In contrast to the present study's findings, a previous study (Karimy et al., 2017) found significant differences in health beliefs between women who had done a Pap smear test and those who had never done one.

Pap smear practice has been reported to be influenced by monthly income, health insurance, education level, knowledge about cervical cancer, and preferences for a female health provider (Abulizi et al., 2018; Anaman-Torgbor et al., 2017; Ferdous et al., 2018). Confounding variables not included in this study may have affected the results. In addition, the present study could not include the cultural differences of the participants. However, another study (McFarland, 2013) found that there were no differences in health beliefs between women who had done Pap smear and those who had never done one. It seems that there are inconsistencies in previous study results. Further research is needed to examine the associations between health beliefs, Pap smear practices, and cultural background. Furthermore, future studies should thus identify the factors that influence Pap smear practice among Asian immigrant women in consideration of various confounding variables as

well as health beliefs.

The present study revealed that functional health literacy and age were associated with Pap smear practice among Asian immigrant women. Functional health literacy refers to basic reading and writing skills, which enable individuals to understand health information concerning the possible risks of not having Pap smears and how to use health services effectively (Nutbeam, 2000). A previous study (An and Yang, 2015) also found that functional health literacy explained most of the total variance in health literacy among immigrant women. The capacity to obtain and understand health information is an important determinant in making appropriate health decisions among immigrant women (Gele et al., 2016). Moreover, in a recent systemic review study (Fernández-Gutiérrez et al., 2018), health literacy interventions were shown to be effective in improving functional health literacy in immigrant populations. Health care providers should be aware that functional health literacy might influence cervical cancer screening practices among immigrant women. Furthermore, interventions to enhance functional health literacy would likely increase Pap smear screening rates among Asian immigrant women in South Korea. In a recent study, recommendations received from health workers were one of the most important facilitators of cervical cancer screening practices among immigrant women (Anaman-Torgbor et al., 2017). Thus, nurses could play a critical role in recommending Pap smear tests to immigrant women. To promote cervical cancer screening practices, nurses can communicate with immigrant women to provide them with an easy explanation of the Pap smear test and ensure that they have understood the information.

In addition to knowledge about cervical cancer and Pap smear testing, health beliefs and health literacy, and cultural and religious beliefs have been reported as factors influencing cervical cancer screening practices among immigrant women (Anaman-Torgbor et al., 2017; Ferdous et al., 2018). The present study identified that age and functional health literacy were associated with Pap smear test practices among Asian immigrant women, when adjusted for knowledge and health beliefs about cervical cancer. Nevertheless, the results of this study should be examined in relation to the different cultural backgrounds of Asian immigrant women in Korea. To enhance our understanding of cervical cancer screening practices among immigrant women, future studies need to include cultural factors, and should identify factors associated with cervical cancer screening practice.

4.1. Limitations

Pap smear practice may be influenced by several factors. In this study, knowledge about cervical cancer, health belief, and health literacy were included in the analysis, and it is possible that other confounding variables such as accessibility of medical organization may have affected the results. Furthermore, since the study population was married women living with their husbands, married status might influence Pap smear practice. Moreover, we only studied married Asian immigrant women living in Korea; thus, generalizing our findings to all Asian immigrant women should be done with caution. Finally, according to a previous study (Kim and Choi, 2010), only a minority of the immigrant women reported undergoing regular Pap smear screenings (10.9%), so we divided the participants into those who had never done a Pap smear test and those who had. The fact that we did not analyze Pap smear frequency may be a limitation of this study.

5. Conclusions

The results of the present study showed an association between Pap smear practice and age and functional health literacy among Asian immigrant women: Pap smear practice increased with age and functional health literacy. These results suggest that more information about Pap smear testing should be provided to young immigrant women, and health policies should be strengthened to promote Pap

smear screening among this population. Health care providers should ensure that young immigrant women understand the importance of Pap tests, and recommend that they receive them regularly. Particularly, nurses may play an important role in explaining the importance of Pap smear screening and recommending that all women undergo the testing once every two years. Nurses need to communicate with immigrant women to provide clear explanations concerning the need for regular Pap smear testing and to ensure that they have adequately understood the information. To ensure they have understood properly, nurses could use pamphlets or posters published in the immigrant women's native languages. Interventions to enhance functional health literacy would likely increase Pap smear test practices among Asian immigrant women. Furthermore, nurses should consider patients' cultural backgrounds when providing educational interventions with a focus on boosting immigrant women's functional health literacy.

Declarations of interest

The authors declare no conflicts of interest.

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References

- Abulizi, G., Abulimiti, T., Li, H., Abuduxikuer, G., Mijiti, P., Zhang, S., Maimaiti, A., Tuergan, M., Simayi, A., Maimaiti, M., 2018. Knowledge of cervical cancer and Pap smear among Uyghur women from Xinjiang, China. *BMC Women's Health* 18, 21–28. <https://doi.org/10.1186/s12905-018-0512-5>.
- An, J.S., Kim, H.R., Yang, S.J., 2013. Factors related with health literacy in Asian immigrant women in Korea. *J. Korean Acad. Community Health Nurs.* 24, 377–387. <https://doi.org/10.12799/jkachn.2013.24.4.377>.
- An, J.S., Yang, S.J., 2015. Development of a health literacy assessment scale for asian immigrant women in South Korea. *J. Korean Acad. Community Health Nurs.* 26 (4), 330–341. <http://doi.org/10.12799/jkachn.2015.26.4.330>.
- Anaman-Torgbor, J.A., King, J., Correa-Velez, I., 2017. Barriers and facilitators of cervical cancer screening practices among African immigrant women living in Brisbane, Australia. *Eur. J. Oncol. Nurs.* 31, 22–29. <http://doi.org/10.1016/j.ejon.2017.09.005>.
- Bruni, L., Albergo, G., Serrano, B., Mena, M., Gómez, D., Muñoz, J., Bosch, F.X., de Sanjosé, S., 10 December 2018. ICO/IARC information centre on HPV and cancer (HPV information centre). Human papillomavirus and related diseases in Philippines. Summary Report. <https://www.hpvcentre.net/statistics/reports/PHL.pdf?t=1559474177321> accessed 2 June 2019.
- Chang, S.C., Woo, J.S., Yau, V., Gorzalka, B.B., Brotto, L.A., 2013. Cervical cancer screening and Chinese women: insights from focus groups. *Front. Psychol.* 4, 48. <http://doi.org/10.3389/fpsyg.2013.00048>.
- Cho, E.J., 2014. A path analysis on factors influencing women's embarrassment undergoing Papanicolaou tests for uterine cervical neoplasms screening. *Asian Oncol. Nurs.* 14, 162–172. <https://doi.org/10.5388/aon.2014.14.3.162>.
- Daryani, S., Shojaeezadeh, D., Batebi, A., Charati, J.Y., Naghibi, A., 2016. The effect of education based on a health belief model in women's practice with regard to the Pap smear test. *J. Canc. Policy* 8, 51–56. <http://doi.org/10.1016/j.jcpc.2015.11.001>.
- Domingo, E.J., Dy Echo, A.V., 2009. Epidemiology, prevention and treatment of cervical cancer in the Philippines. *J. Gynecol. Oncol.* 20, 11–16. <http://doi.org/10.3802/jgo.2009.20.1.11>.
- Faul, F., Erdfelder, E., Lang, A.G., Buchner, A., 2007. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical science. *Behav. Res. Methods* 39, 175–191. <https://doi.org/10.3758/BF03193146>.
- Ferdous, M., Lee, S., Goopy, S., Yang, H., Rumana, N., Abedin, T., et al., 2018. Barriers to cervical cancer screening faced by immigrant women in Canada: a systematic scoping review. *BMC Womens Health* 18, 165. <http://dx.doi.org/10.1186/s12905-018-0654-5>.
- Fernández-Gutiérrez, M., Bas-Sarmiento, P., Albar-Marín, M.J., Paloma-Castro, O., Romero-Sánchez, J.M., 2018. Health literacy interventions for immigrant populations: a systematic review. *Int. Nurs. Rev.* 65, 54–64. <https://doi.org/10.1111/inr.12373>.
- Gele, A.A., Pettersen, K.S., Torheim, L.E., Kumar, B., 2016. Health literacy: the missing link in improving the health of Somali immigrant women in Oslo. *BMC Public Health* 16, 1134. <https://doi.org/10.1186/s12889-016-3790-6>.
- Guerrero, A.M., Genuino, A.J., Santillan, M., Praditsithikorn, N., Chantarastapornchit, V., Teerawattananon, Y., Alejandria, M., Toral, J.A., 2015. A cost-utility analysis of cervical cancer screening and human papillomavirus vaccination in the Philippines. *BMC Public Health* 15, 730. <https://doi.org/10.1186/s12889-015-2046-1>.
- Janz, N.L., Becker, M., 1984. The health belief model: a decade later. *Health Educ. Behav.* 11, 1–47.
- Johnson, C.E., Mues, K.E., Mayne, S.L., Kiblawi, A.N., 2008. Cervical cancer screening among immigrants and ethnic minorities: a systematic review using the Health Belief Model. *J. Low. Genit. Tract Dis.* 12, 232–241. <https://doi.org/10.1097/LGT.0b013e31815d8d88>.
- Karimy, M., Azarpira, H., Araban, M., 2017. Using Health Belief Model constructs to examine differences in adherence to Pap test recommendations among Iranian Women. *Asia Pac. J. Cancer Prev.* 18, 1389–1394. <https://doi.org/10.22034/APJCP.2017.18.5.1389>.
- Kim, S.Y., Choi, S.Y., 2010. Pap smear screening participation behavior and related factors in married immigrant women. *Korean J. Women Health Nurs.* 16, 255–265. <https://doi.org/10.4069/kjwhn.2010.16.3.255>.
- Kim, K., Kim, S., Gallo, J.J., Nolan, M.T., Han, H.R., 2017. Decision making about Pap test use among Korean immigrant women: a qualitative study. *Health Expect.* 20, 685–695. <https://doi.org/10.1111/hex.12507>.
- Korea Center for Disease and Prevention, 2012. Cohort of East Asian immigrant in Korea. http://www.nih.go.kr/NIH_NEW/not/NihKrInfo0122.jsp/ accessed 23 December 2018.
- Korea Ministry of Health and Welfare, National Cancer Center, 2018. Quality guidelines of cervical cancer screening second ed. https://www.kaim.or.kr/guideline/file/cancer_file_05.pdf/ accessed 23 December 2018.
- Lee, E.J., Park, J.S., 2011. Knowledge about cervical cancer, health beliefs and human papillomavirus vaccination rate in female university students. *J. Korean Oncol. Nurs.* 11, 65–73. <https://doi.org/10.5388/jkon.2011.11.1.65>.
- Lee, E.J., Park, J.S., 2013. Predictors associated with repeated Papanicolaou smear for cervical cancer screening. *Asian Oncol. Nurs.* 13, 28–36. <https://doi.org/10.5388/aon.2013.13.1.28>.
- Lee, F.H., Wang, H.H., Yang, Y.M., Tsai, H.M., 2014. Barriers faced by Vietnamese immigrant women in Taiwan who do not regularly undergo cervical screenings: a qualitative study. *J. Adv. Nurs.* 70 (1), 87–96. <https://doi.org/10.1111/jan.12168>.
- Ma, G.X., Gao, W., Fang, C.Y., Tan, Y., Feng, Z., Ge, S., et al., 2013. Health beliefs associated with cervical cancer screening among Vietnamese Americans. *J. Women's Health* 22, 276–288. <https://doi.org/10.1089/jwh.2012.3587>.
- Melan, K., Janky, E., Macni, J., Ulric-Gervaise, S., Dorival, M.J., Veronique-Baudin, J., Joachim, C., 2017. Epidemiology and survival of cervical cancer in the French West-Indies: data from the Martinique Cancer Registry (2002–2011). *Glob. Health Action* 10, 1337341. <https://doi.org/10.1080/16549716.2017.1337341>.
- McFarland, D.M., 2013. Associations of demographic variables and the Health Belief Model constructs with Pap smear screening among urban women in Botswana. *Int. J. Women's Health* 5, 709–716. <http://doi.org/10.2147/IJWH.S50890>.
- Ministry of Gender Equality and Family, Korean Institute for Healthy Family, 2018. Promotional system of supporting projects. <https://liveinkorea.kr/portal/KOR/page/contents.do> accessed 1 June 2018.
- National Cancer Information Center, 2017. Cervical cancer. https://www.cancer.gov/key/lay1/program/S1T21C223/cancer/view.do?cancer_seq=4877/ accessed 27 December 2018.
- National Health Insurance Service, 2017. National statistics of 2016 health insurance. https://www.kefplaza.com/statistics/stats_view.jsp?num=1248/ accessed 29 December 2018.
- Nutbeam, D., 2000. Health literacy as a public goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot. Int.* 15, 259–267. <https://doi.org/10.1093/heapro/15.3.259>.
- OECD, 2015. Screening, survival and mortality for cervical cancer. In: *Health at a Glance 2015: OECD Indicators*. OECD Publishing, Paris. https://doi.org/10.1787/health_glance-2015-53-en.
- Park, Y.S., Park, J.S., 2014. Predictors of follow-up screening in women with abnormal Pap smears. *Asian Oncol. Nurs.* 14, 84–92. <https://doi.org/10.5388/aon.2014.14.2.84>.
- Rosenstock, I.M., 1974. The health belief model and preventative health behavior. *Health Educ. Health Educ. Behav.* 2, 354–386. <https://doi.org/10.1177/109019817400200405>.
- Statistics Korea, 2019. Marriage immigrant population. http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=2819 accessed 26 July 2019.
- Torre, L.A., Siegel, R.L., Ward, E.M., Jemal, A., 2016. Global cancer incidence and mortality rates and trends—an update. *Cancer Epidemiol. Biomark. Prev.* 25, 16–27. <https://doi.org/10.1158/1055-9965.EPI-15-0578>.
- Vu, L.T., Bui, D., Le, H.T., 2013. Prevalence of cervical infection with HPV type 16 and 18 in Vietnam: implications for vaccine campaign. *BMC Canc.* 13, 53. <https://doi.org/10.1186/1471-2407-13-53>.
- World Health Organization, 2014. Comprehensive cervical cancer control: a guide to essential practice, second ed. <http://www.who.int/reproductivehealth/publications/cancers/cervical-cancer-guide/en/> accessed 27 December 2018.