

The Role of Knowledge and Self-Efficacy in Behavioral Intention to Prevent Cervical Cancer among Female College Students

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Abstract

In order to promote cervical cancer prevention behaviors of female college students, this study aims to explore factors that influence cervical cancer prevention behavior of female college students. Specifically, this study examined mediating roles of knowledge and self-efficacy in predicting behavioral intention to prevent cervical cancer. An online survey was conducted on female college students. Analysis of 236 female college students' responses revealed that health status influenced behavioral intention to prevent cervical cancer indirectly through knowledge and self-efficacy. Exposure to Internet media influenced behavioral intention to prevent cervical cancer directly and indirectly through knowledge and/or self-efficacy. Knowledge influenced behavioral intention to prevent cervical cancer directly and indirectly through self-efficacy. Based on the findings of this study, we provided implications for planning of educational programs and campaigns to promote the cervical cancer prevention behaviors of female college students.

Keywords: *Cervical Cancer Prevention Behavior, Cervical Cancer, Knowledge, Self-Efficacy, Female College Students*

1. INTRODUCTION

Cervical cancer is a serious disease that threatens women's health. However, if detected early, it is “highly treatable and associated with long survival and good quality of life” [1]. The main cause of cervical cancer is human papilloma virus (HPV), which can be transmitted through sexual intercourse [1]. To reduce risk of cervical cancer, HPV vaccination and regular Pap tests are recommended [1]. The incidence rate of cervical cancer has decreased at an average annual rate of 2.2% since 2007, but the number of cervical cancer patients in their 20s increased 65.1% from 2,041 in 2014 to 3,370 in 2018 [2, 3]. Although the incidence of cervical cancer among the entire female population in Korea is decreasing, the number of cases of cervical cancer among young women in their 20s is increasing. Also, female college students appear to be a group with a high risk of HPV infection, so it is necessary to inform them about the risk of cervical cancer and prevention methods, and to increase their intentions for regular check-ups and vaccinations [4].

In order to promote cervical cancer prevention behaviors of female college students, this study aims to explore factors that influence cervical cancer prevention behavior of female college students. Some of previous studies examined factors influencing women's intention to prevent cervical cancer by looking at the influence of health beliefs (e.g., perceived severity and susceptibility of cervical cancer) and normative beliefs (e.g., subjective norm) on cervical cancer based on the *Health Belief Model (HBM)* and the *Theory of Planned*

Behavior (TPB) (e.g., [5-7]). In addition, previous studies focused on the direct effect of demographic and health-related variables on cervical cancer prevention behavior and showed mixed and limited findings (e.g., [4, 8]). For example, age and perceived health status were significant positive predictors of HPV vaccination intention in one study, while age was a negative predictor of HPV vaccination intention in another [4, 8]. Moreover, possible indirect effects of demographic and health-related variables on cervical cancer prevention intention have not been fully explored yet. While the impact of media exposure on various social and health behaviors was frequently examined, the influence of media exposure on cervical cancer prevention behaviors needs further scholarly attention [9, 10]. Exposure to information about cervical cancer through news and media was positively related to HPV vaccination intention [4]. However, the direct and indirect influence of exposure to different types of media (e.g., broadcast, print, Internet) on cervical cancer prevention intention needs further investigation.

Knowledge of cervical cancer was a significant positive predictor of HPV vaccination intention [8, 11, 12]. Some studies found that demographic variables such as age and income were predictors of HPV and cervical cancer knowledge [13-15], while other studies showed that age and income were not related to HPV knowledge [16, 17]. Regarding relationship between media exposure and knowledge, some studies found that exposure to HPV information through social media improved knowledge about HPV and beliefs regarding HPV vaccine [18, 19].

Self-efficacy, defined as a person's beliefs about his or her ability to perform a specific behavior well [20], positively affected intention to prevent cervical cancer (e.g., [4, 8]). Among demographic and health-related variables, age was found to influence one's self-efficacy for healthcare [21]. Regarding relationship between media exposure and self-efficacy, mass communication such as media campaigns was proposed to influence self-efficacy, which influences likelihood of compliance with recommended action [22]. With regard to relationship between knowledge and self-efficacy, cervical cancer knowledge was positively related to self-efficacy [15]. Also, human immunodeficiency virus (HIV) -related knowledge was a significant positive predictor of self-efficacy for HIV prevention [23]. Thus, knowledge of HPV and cervical cancer is highly likely to influence self-efficacy, and self-efficacy would subsequently influence intention to prevent cervical cancer.

As discussed above, findings regarding direct and indirect influence of demographic variables and media exposure on HPV vaccination intention are limited and inconclusive. Therefore, research question 1 and 2 are presented. Based on previous research, this study proposes knowledge and self-efficacy as possible mediators in predicting cervical cancer prevention behavior. Thus, following research questions and hypotheses are proposed.

RQ1. Which demographic and health-related variables influence behavioral intention to prevent cervical cancer, directly and indirectly through knowledge and/or self-efficacy?

RQ2. Which media-exposure variables influence behavioral intention to prevent cervical cancer, directly and indirectly through knowledge and/or self-efficacy?

H1. Knowledge will be positively related to behavioral intention to prevent cervical cancer.

H2. Knowledge will be positively related to self-efficacy.

H3. Self-efficacy will be positively related to behavioral intention to prevent cervical cancer.

H4. Knowledge will be positively related to behavioral intention to prevent cervical cancer indirectly through self-efficacy.

Figure 1 presents a proposed model of predictors of behavioral intention to prevent cervical cancer. As shown in the proposed model, this study intends to examine the relationship between the factors affecting the behavioral intention to prevent cervical cancer, focusing on the mediating roles of knowledge and self-efficacy.

Based on the results of this study, implications on planning educational programs and campaigns to promote cervical cancer prevention behaviors of female college students will be provided.

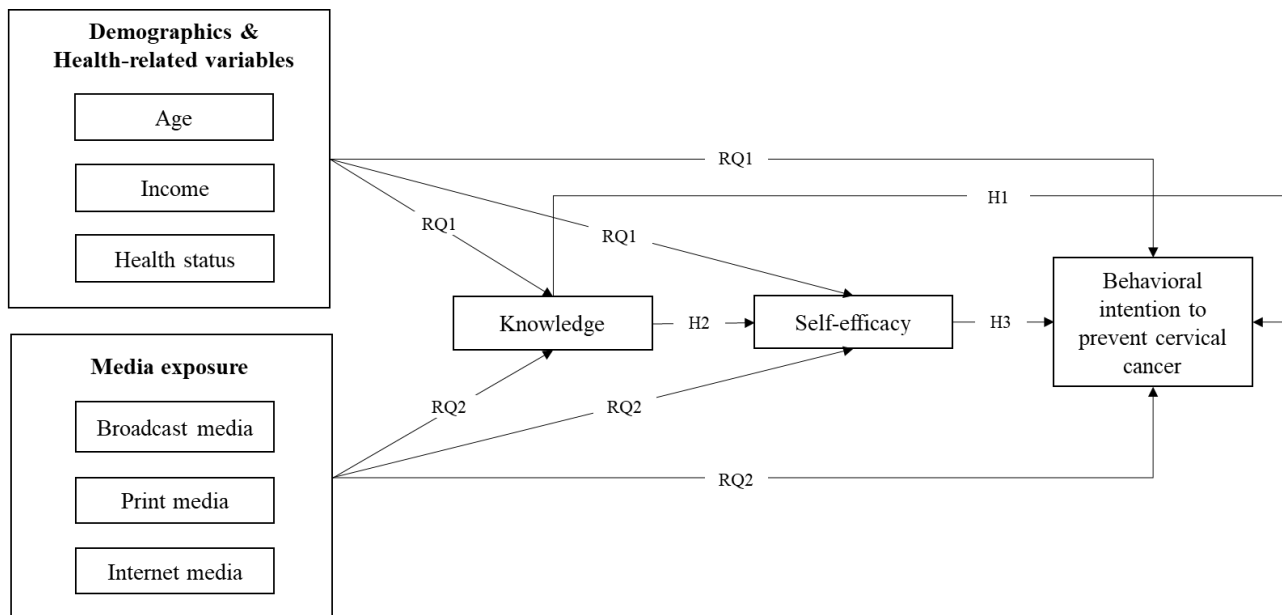


Figure 1. Proposed model

2. METHOD

2.1 Sample and Data Collection

An online survey was conducted with women attending universities in the domestic metropolitan area and Gyeongnam area. An online survey link was distributed through communication, media, and advertising-related classes. A total of 298 students participated in the survey. After briefly mentioning the purpose of the survey, informed consent was obtained. Through a set of screening questions, 57 people (5 males, 13 foreigners, 27 people who were already vaccinated with HPV vaccine up to the third, 12 people who received regular Pap tests every two years) were instructed to drop out of the survey because they were not part of the target sample. Of 241 completed questionnaires, the responses from the 5 duplicate and insincere responses were excluded. Thus, a total of 236 responses were used for the analysis.

2.2 Measures

Using measures from past studies, a questionnaire was constructed. Variables measured in this study were demographics and health-related variables (age, income, perceived health status), media exposure (broadcast, print, Internet), mediators (knowledge of cervical cancer and HPV, self-efficacy), and dependent variable (behavioral intention to prevent cervical cancer). Table 1 specifies measurement items with mean, standard deviation, reliability scores (Cronbach's α) and sources of items. 'Adopted' items indicate that items are directly taken from the source whereas 'modified' items mean that the items are revised from the sources to be applicable to this study. Since the Cronbach's α values of all variables were above 0.7, it was judged that there was no problem in the reliability of the measurement items.

Table 1. Measurement items

Measurement Items		M	SD	Cronbach's α^1	Sources
Demographics and health-related variables					
Age	“What is your age in years?”	22.8	2.32		
Income	“In average, what is your total household income per month?” 1. Less than 1 million won 2. 1 million won - less than 2 million won 3. 2 million won - less than 3 million won 4. 3 million won - less than 4 million won 5. 4 million won - less than 5 million won 6. 5 million won - less than 6 million won 7. More than 6 million won				
Health status	“Please rate your level of agreement with the following statements.” (on a 5-point scale: poor, fair, good, very good, excellent): 1. Overall, how would you describe your health? 2. How is your health now compared to a year ago? 3. How is your health compared to others of your age?	3.96	0.90	0.884	Modified from [8]
Media exposure					
Broadcast media	“Please respond to the channels where you received information about cervical cancer and HPV.” (on a scale of 1=never to 5=very often): 1. Have you ever come across information about cervical cancer and HPV on TV? 2. Have you ever come across information about cervical cancer and HPV on the Radio?	2.45	1.17	r=0.405	Modified from [4, 24]
Print media	“Please respond to the channels where you received information about cervical cancer and HPV.” (on a scale of 1=never to 5=very often): 1. Have you ever come across information about cervical cancer and HPV in newspapers? 2. 1. Have you ever come across information about cervical cancer and HPV in magazines?	1.76	1.06	r=0.582	Modified from [4, 24]
Internet media	“Please respond to the channels where you received information about cervical cancer and HPV.” (on a scale of 1=never to 5=very often): 1. Have you ever come across information about cervical cancer and HPV on social media (Facebook, Instagram, YouTube, Twitter, etc.)? 2. Have you ever come across information about cervical cancer and HPV on online portal sites (Naver, Daum, etc.)?	3.53	1.02	r=0.533	Modified from [4, 24]
Mediators					
Knowledge	Please read the following statements and indicate whether you think it is true or false. (response options: 1=true, 2=false, 3=I do not know) 1. Cervical cancer is painful from the very beginning. (F) ² 2. Pap tests can detect cervical cancer early. (T) ³	Sum of correct answers (Range: 1 to 8) M=3.50, SD=1.79			Modified from [4, 8]

	3. Human papillomavirus (HPV) can cause cervical cancer. (T) 4. HPV is transmitted through sexual intercourse.(T) 5. If the immune system is strong, HPV does not cause disease. (F) 6. Currently, HPV can be treated with drugs and surgery. (T) 7. Cervical cancer vaccination (HPV vaccination) can prevent 100% of cervical cancer. (F) 8. Cervical cancer vaccination (HPV vaccination) provides permanent protection against cervical cancer with a single injection. (F)				
Self-efficacy	“Please rate your level of agreement with the following statements.” (on a scale of 1=strongly disagree to 5=strongly agree): 1. I can get the cervical cancer vaccine (HPV vaccine) even if it costs money. 2. I can get the cervical cancer vaccine (HPV vaccine) even if I am afraid of getting an injection. 3. I can get cervical cancer vaccination (HPV vaccine) even if it takes time. 4. I can get regular Pap tests even if it costs money. 5. I can get a Pap test for cervical cancer even if I am afraid of getting screened. 6. I can get a regular Pap test even if it takes time.	4.18	0.69	0.908	Modified from [4, 25]
Dependent variable					
Behavioral intention to prevent cervical cancer	“Please rate your level of agreement with the following statements.” (on a scale of 1=strongly disagree to 5=strongly agree): 1. I am willing to explore further information on cervical cancer prevention. 2. I am willing to consult a doctor regarding the prevention of cervical cancer. 3. I would be happy to get a cervical cancer vaccination (HPV vaccination). 4. I am willing to vaccinate against cervical cancer (HPV vaccination). 5. I would be happy to get a Pap test. 6. I am willing to undergo regular Pap tests for cervical cancer prevention.	4.25	0.65	0.885	Modified from [4, 25]

¹ Cronbach's α indicates reliabilities of measurement items.

² (F) indicates a false statement. ³ (T) indicates a true statement.

3. RESULTS

In order to verify the mediating effect of knowledge and self-efficacy in predicting behavioral intention to prevent cervical cancer, PROCESS Macro Model 6 was used [26]. The Durbin-Watson statistic was 2.064 (a value between 1.5 and 2.5), indicating there was no problem with the assumption of independence of the residuals. Variance inflation factor statistics (less than 4) indicated an absence of multicollinearity. As shown in Table 2, results of the analysis indicated that the regression model 1 with independent variables (demographics & health-related variables, media exposure, knowledge, self-efficacy) and the dependent variable (behavioral intention to prevent cervical cancer) was statistically significant ($F = 17.884, p < 0.001$).

The regression model 2 with independent variables (demographics & health-related variables, media exposure) and the dependent variable (knowledge) was also statistically significant ($F = 13.043, p < 0.001$). The regression model 3 with independent variables (demographics & health-related variables, media exposure, knowledge) and the dependent variable (self-efficacy) was also statistically significant ($F = 5.770, p < 0.001$).

Table 2. Direct and indirect effects of variables

Path (direct effects)		β	SE	t	F	$R^2(adjR^2)$	
Model 1	Demographics & health-related variables	age → BI	0.075	0.016	1.288	17.884***	0.387 (0.365)
		income → BI	-0.034	0.020	-0.637		
		health status → BI	0.105	0.043	1.779		
	Media exposure	broadcast → BI	-0.027	0.042	-0.369		
		print → BI	0.018	0.048	0.230		
Internet → BI	0.018	0.039	0.289				
knowledge	knowledge → BI	0.221	0.022	3.633***			
Self-efficacy	self-efficacy → BI	0.450	0.054	7.973***			
Model 2	Demographics & health-related variables	age → KN	0.134	0.049	2.130*	13.043***	0.255 (0.235)
		income → KN	-0.099	0.059	-1.707		
		health status → KN	0.327	0.121	5.363***		
	Media exposure	broadcast → KN	0.047	0.124	0.573		
		print → KN	-0.296	0.140	-3.554***		
Internet → KN	0.219	0.113	3.397**				
Model 3	Demographics & health-related variables	age → SE	0.054	0.020	0.796	5.770***	0.150 (0.124)
		income → SE	0.110	0.024	1.763		
		health status → SE	0.099	0.053	1.437		
	Media exposure	broadcast → SE	0.098	0.051	1.120		
		print → SE	-0.089	0.059	-0.977		
		Internet → SE	0.216	0.048	3.065**		
	Knowledge	Knowledge → SE	0.160	0.027	2.257*		
Path (indirect effects)		β	SE	LLCI	ULCI		
Demographics & health-related variables	age → KN → BI	0.008	0.006	-0.000	0.022		
	age → SE → BI	0.007	0.009	-0.011	0.026		
	age → KN → SE → BI	0.003	0.002	-0.000	0.008		
	health status → KN → BI	0.053*	0.019	0.019	0.094		
	health status → SE → BI	0.033	0.028	-0.019	0.091		
health status → KN → SE → BI	0.017*	0.009	0.002	0.035			
Media exposure	print → KN → BI	-0.040	0.017	-0.076	-0.012		
	print → SE → BI	-0.025	0.025	-0.078	0.021		
	print → KN → SE → BI	-0.013	0.007	-0.029	-0.001		
	Internet → KN → BI	0.031*	0.014	0.008	0.062		
	Internet → SE → BI	0.063*	0.024	0.019	0.114		
Internet → KN → SE → BI	0.010*	0.006	0.001	0.023			
Knowledge	KN → SE → BI	0.026*	0.013	0.004	0.054		

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, KN = knowledge of cervical cancer and HPV, SE = self-efficacy, BI = Behavioral intention to prevent cervical cancer

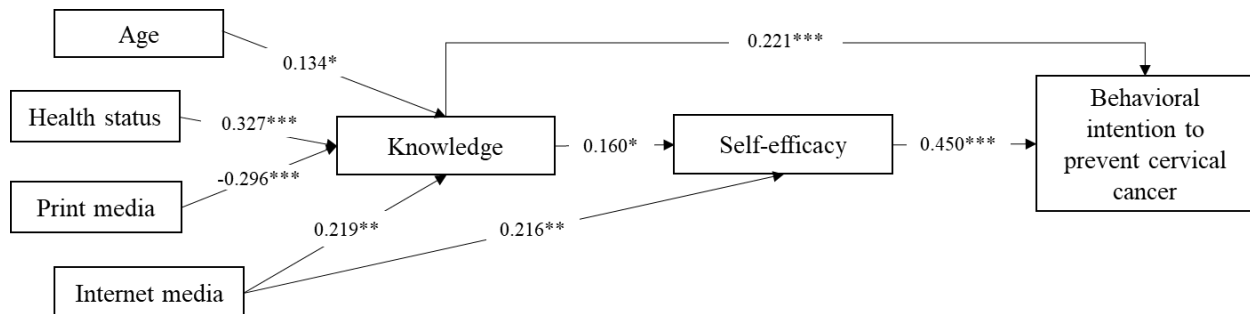
Figure 2 shows the final model with significant results. Regarding RQ1, age ($\beta = 0.134, p < 0.05$) and health status ($\beta = 0.327, p < 0.001$) were predictors of knowledge. Health status was related to behavioral intention to prevent cervical cancer indirectly through knowledge ($\beta = 0.053, 95\% \text{ CI } [0.019\sim 0.094]$) and through knowledge → self-efficacy ($\beta = 0.017, 95\% \text{ CI } [0.002\sim 0.035]$).

Regarding RQ2, exposure to print media was negatively related to knowledge ($\beta = -0.296, p < 0.001$), while exposure to Internet media was positively related to knowledge ($\beta = 0.219, p < 0.01$) and self-efficacy ($\beta =$

0.216, $p < 0.01$). Exposure to Internet media was positively related to behavioral intention to prevent cervical cancer indirectly through knowledge ($\beta = 0.031$, 95% CI [0.008~0.062]) and self-efficacy ($\beta = 0.063$, 95% CI [0.019~0.114]) respectively, and through knowledge \rightarrow self-efficacy ($\beta = 0.010$, 95% CI [0.001~0.023]).

Regarding H1-H3, knowledge was positively related to self-efficacy ($\beta = 0.160$, $p < 0.05$) and behavioral intention to prevent cervical cancer ($\beta = 0.221$, $p < 0.001$), and self-efficacy was positively related to behavioral intention to prevent cervical cancer ($\beta = 0.450$, $p < 0.001$). Thus, H1, H2, H3 were all supported.

Regarding H4, knowledge was related to behavioral intention to prevent cervical cancer indirectly through self-efficacy ($\beta = 0.026$, 95% CI [0.004~0.054]), supporting H4.



Note: Entries are standardized beta coefficients. Only significant coefficients are presented.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure 2. Final model

4. DISCUSSION

An online survey was conducted on female college students to reveal the mediating roles of knowledge and self-efficacy in predicting intention to prevent cervical cancer. The main findings of this study and theoretical significance of this study are as follows.

First, in relation to predictors of knowledge of cervical cancer and HPV, older students and those who perceive their current health status more positively and who receive information about cervical cancer and HPV through the Internet more frequently showed higher level of knowledge about cervical cancer and HPV. In addition, exposure to cervical cancer/HPV information through the Internet and knowledge of cervical cancer and HPV were found to be significant predictors of self-efficacy. On the other hand, information exposure through print media had a negative effect on knowledge level, and information exposure through broadcast media did not affect knowledge level and self-efficacy. Whether this result is because female college students use TV, radio, newspapers or magazines less frequently than the Internet, or because the information on cervical cancer and HPV delivered through broadcast or print media is little or inaccurate needs further investigation. Further research could investigate the content of cervical cancer and HPV-related information provided through various media channels in an attempt to prove the validity and usefulness of cervical cancer information on various media channels.

Second, among demographics and health-related variables, health status was found to influence behavioral intention to prevent cervical cancer indirectly through knowledge and self-efficacy. Two paths from health status to behavioral intention (i.e., health status \rightarrow knowledge \rightarrow behavioral intention, health status \rightarrow knowledge \rightarrow self-efficacy \rightarrow behavioral intention) were found to be statistically significant. In other words, if an individual perceives their current health status positively, they might pay more attention to issues relevant to their health, which might be related to increased level of knowledge about cervical cancer and HPV, and then might increase intention to prevent cervical cancer. On the other hand, if one's health status is perceived

negatively, the level of knowledge about cervical cancer and HPV tend to be low, and intention to prevent cervical cancer may also be low. To female college students who are not in good health, it might be helpful to provide entertainment-education contents to increase interest in and knowledge of cervical cancer prevention issues.

Third, exposure to Internet media influenced behavioral intention to prevent cervical cancer indirectly through knowledge and self-efficacy. All three paths from exposure to Internet media to behavioral intention (i.e., Internet media → knowledge → behavioral intention, Internet media → self-efficacy → behavioral intention, Internet media → knowledge → self-efficacy → behavioral intention) were found to be statistically significant. This indicates that receiving information about cervical cancer and HPV through the Internet leads to an increase in intention to prevent cervical cancer by increasing the level of knowledge of cervical cancer and HPV and/or by increasing self-efficacy in preventing cervical cancer. The findings underline the importance of the Internet as a medium of delivering information about cervical cancer and HPV to female college students.

It is noteworthy that this study found that self-efficacy plays a mediating role between media exposure and intention to prevent cervical cancer and between knowledge and intention to prevent cervical cancer. As exposure to information on cervical cancer and HPV through Internet media was found to increase self-efficacy, it is necessary to deliver content that can enhance one's self-efficacy in confidently performing cervical cancer prevention behaviors, rather than simply providing information through the Internet. According to Social Cognitive Theory, self-efficacy can be increased through vicarious experiences by observing peers' or role models' behaviors [27]. For example, providing vivid contents on social media showing the process of a female student or a role model receiving HPV vaccination and Pap tests could help facilitate observational learning.

Previous studies mainly examined the direct effect of knowledge level on cervical cancer prevention behavior [8, 11, 12]. This study is meaningful in that it revealed knowledge plays a mediating role in predicting cervical cancer prevention behavior. Health status and information exposure to Internet indirectly influenced behavioral intention to prevent cervical cancer through knowledge. In addition, the level of knowledge about cervical cancer was relatively low at 3.5/8 (sum of correct answers), suggesting that it is necessary to provide accurate information about cervical cancer and HPV to female college students. The results of this study showed that the more frequently female college students received information about cervical cancer and HPV through Internet media, the more they had correct knowledge about cervical cancer and HPV, and the higher their intention to prevent cervical cancer. The findings of this study emphasize the need to actively utilize the Internet media as a channel to deliver information about cervical cancer prevention to female college students.

Thirty-eight percent of the total variance in behavioral intention to prevent cervical cancer was explained by the proposed model. Future research could increase the explanatory power of the model by considering not only media exposure, but also interpersonal communication such as conversation with friends or family, and various other factors that might influence one's knowledge level, self-efficacy, and behavioral intention. Also, this study focused on cervical cancer prevention intentions of female college students. If future research examines factors influencing vaccination intention of male college students who are also recommended to get HPV vaccination, more diverse societal implications in increasing HPV vaccination rate could be discovered.

5. CONCLUSION

In order to promote cervical cancer prevention behaviors of female college students, this study examined factors that influence cervical cancer prevention behavior of female college students. The current study revealed that female college students' knowledge level about cervical cancer and HPV and their self-efficacy

for cervical cancer prevention behavior are important mediators in predicting cervical cancer prevention behavior. In addition, the findings of this study emphasize the importance of Internet media such as social media or online portal sites as a channel to reach female college students and to increase their knowledge and self-efficacy regarding cervical cancer prevention. Based on the results of this study, we suggest that strategies to increase the knowledge level of cervical cancer and HPV among young women and to increase their self-efficacy in performing cervical cancer prevention behaviors should be developed in planning cervical cancer prevention campaigns.

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