



Evaluation of the Factors Associated with utilization of Uterine Cervical Neoplasms screening services in Iranian women: Application of Protection Motivation Theory

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Abstract

Uterine Cervical Neoplasms is one of the most common cancers in women. Uterine Cervical Neoplasms screening is one of the essential measures for preventing this disease, and its purpose is to detect lesions in the premalignant stage and reduce the risk of death due to this cancer. This study aimed to determine predictive factors for the utilization of cervical neoplasm screening services in Iranian women.

This descriptive cross-sectional study was conducted on 200 women referred to health centers of Torbat Heydariyeh City by random cluster sampling method. The data was collected using a researcher-made questionnaire including demographic data and constructs of the Protection Motivation Theory (PMT) using self-report. Descriptive analysis was used to explain demographic variables and PMT dimensions. Regression and Fisher's exact test using SPSS software version 22 with a statistical significance at $P < 0.5$ was used for analyzing the data.

The mean age and weight were 30.6 ± 9.0 and 66.1 ± 10.9 in participants. 97.5% were married and 67.5% had a diploma or academic education. Self-efficacy, response efficacy, and perceived sensitivity predicted the desired behavior. Adjusted $R^2 = 0.27$ indicated that this model explained 27% of the behavioral score changes. Therefore, comprehensive planning for intervention, use of PMT and gaining knowledge about the cultural and socioeconomic factors for Uterine Cervical Neoplasms screening seem useful.

Keywords: Uterine Cervical Neoplasms screening, Pap smear, Iranian women, Protection Motivation Theory

Introduction

Uterine Cervical Neoplasms is the fourth most common cancer in women after breast, colorectal, and lung cancer and the seventh most common cancer in general. Also, this cancer is one of the few cancers in the world that could be easily diagnosed in the pre-malignant stage (1, 2). About half a million new cases are diagnosed worldwide each year, of which about 90% of Uterine Cervical Neoplasms occur in low-income and middle-income countries. The conducted studies state a very high incidence of cancer of the cervix uteri in Iran which shows the importance of this cancer in Iranian women. The annual incidence of cancers in Iran is about 70000 cases, and the associated mortality rate is around 30000 people. Due to increased life expectancy, it is projected that the incidence rate will increase substantially in the coming decades (3, 4). This cancer is usually diagnosed too late and can be fatal due to the lack of significant symptoms and, lack of organized screening (5) and HPV vaccination program (2). Also, only 4% of women in developing countries participate in Pap smear screening programs, compared to 91% in developed countries (6). Given that the precancerous stage of uterine cervical neoplasm is long and the survival rate of patients, if treated at this stage, is almost 100%, therefore screening is essential in the initial diagnosis of this disease (7).

Research shows that women face many cultural, emotional, functional, social, religious, geographic, and economic barriers regarding accessing services for Pap testing. The reasons behind not recommending this test can be factors such as lack of knowledge about the necessity of the test, lack of a doctor's recommendation, stress, a feeling of shame during the test, high costs, low age, old age, haste, unethical behavior of health workers, disregard for patient privacy, fear of a positive test result and aggressiveness of follow-up methods if the test is positive (8, 9). Based on

the studies in Iran and other countries, Uterine Cervical Neoplasms treatment strategies at the first level of the health system consist of identifying and removing cultural and social barriers and projecting correct beliefs and attitudes about cervix cancer and the adoption of health behaviors and health education through planned and targeted health communication. Generally, healthy behavior theories can help us to identify the factors involved in protective behaviors in order to plan health promotion programs (10). The Protection Motivation Theory (PMT), which was first introduced by Rogers in 1975 (figure 1), has been widely used as a framework to predict protective behaviors (11-13). PMT assumes that adopting a protective behavior against health threats is dependent on personal motivation for self-protection (14, 15).

Protection motivation theory is a widely used framework to understand responses that provoke individuals from a potential threat. These triggers include fear messages that encourage individuals to take protective measures or to refrain from activities that might harm themselves or others. This theory falls within the expectancy-value theories that posit attitudes or beliefs will lead to subsequent behaviors. PMT posits that individuals evaluate potential response through a threat appraisal and coping appraisal process. The threat appraisal process includes assessing the severity of the threat and the likelihood (i.e., vulnerability) of the threat happening. The coping appraisal process includes consideration of the efficacy of the response, how difficult the response is to carry out (e.g., response cost), and the perceived self-efficacy of enacting the coping response. If the threat appraisal is stronger than the coping appraisal then a maladaptive response follows. This can include denial, minimizing the threat, or ignoring it. If the coping response, which includes belief in response efficacy and perceived self-efficacy, is stronger, protection motivation is achieved. (16-18). This theory has been applied in a few studies. For instance, Fry

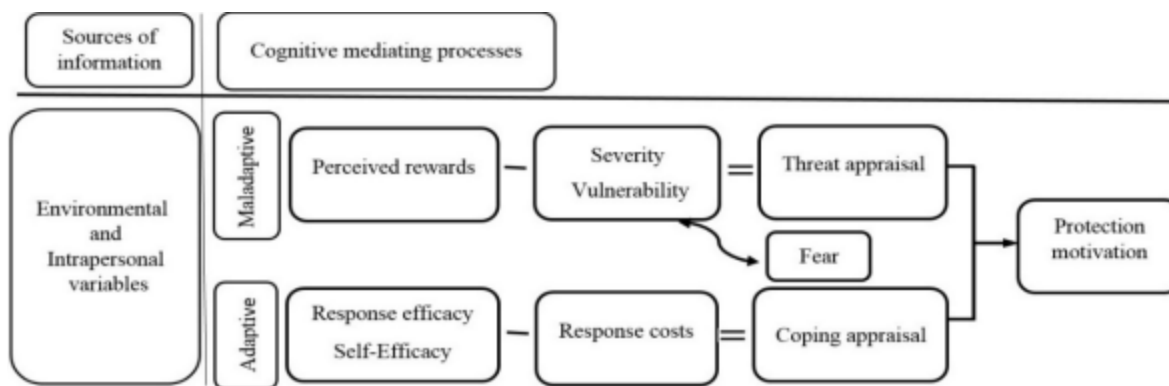


Figure 1. Theory of protection motivation (21)

and Prentice-Dunn indicated that developing interventions based on PMT could encourage women to perform breast self-examination (19). The effect of this theory is confirmed on encouraging women to take Pap smear tests (20). This study aimed to evaluate factors associated with the utilization of cervical neoplasm screening services based on the Protection Motivation Theory in Iranian womens.

Materials and Methods

Study Design and Sampling

In this study, considering the nature of the subject and in order to achieve the goals, a cross-sectional research method was chosen . The statistical population in this study consisted of womens referring to the health centers of Torbat Heydarieh City (Khorasan Razavi province, Iran, 2023) who had active health records, and the research samples included 200 people. After approving the plan and obtaining permission from the ethical committee, first a list of all the health centers in Torbat Heydarieh City was obtained from the city health center. Then, sampling was done in two stages as a multi-stage cluster sampling; in this way, 2 centers were randomly selected from the comprehensive health centers of Torbat Heydarieh City, then the samples were included in the study through available sampling and proportional to the population of each center. Inclusion criteria were: (a) having an active health record at the health center. (b) age of 15-

60 years, and (c) having a sexual partner in the previous 6 months. Exclusion criteria were: (a) being pregnant, and (b) having history of uterine cervical neoplasm.

Data Collection Tool

The data collection tool used in this study was a self-administered questionnaire that included demographic characteristics and PMT-specific sections adapted from existing literature. Which included 6 items on self-efficacy, 4 items on Perceived severity, 4 items on perceived sensitivity, 4 items on response cost, and 3 items on response efficacy, 4 items on fear and 4 items on behavior assessment. Participants in the study answered these constructs on a three-point Likert scale, ('Agree' = 3, 'No idea' = 2, 'Disagree' = 1). Also, the construct of behavior was determined based on a three-point Likert scale ('Always' = 4, 'Very Often' = 3 'Sometimes' = 2, 'Rarely' = 1, 'Never' = 0. According to the correctness of the answers, five to one scores were scored for each response.

To evaluate the content validity rate (CVR) and content validity index (CVI), the questionnaire was edited by a panel of 10 experts (including 6 health education and health promotion specialists, 2 epidemiologists, and 2 physicians in the field of infectious diseases). CVR and CVI were obtained at 0.81 and 0.79 respectively and confirmed. The questionnaire's internal consistency was measured using Cronbach's α in a pilot study tested with 15

women's referred to health centers (Cronbach's $\alpha = 0.8$).

Statistical analysis

The Kolmogorov-Smirnov test was used to evaluate the normality of the data. Descriptive analysis was used to explain demographic variables and PMT dimensions. Regression and the Fisher Exact test using SPSS software version 22 with a statistical significance at $P < .05$ were used for analyzing the data.

Results

In this study, 200 women (15 to 60 years old) were evaluated. The mean age and weigh were 30.6 ± 9.0 and 66.1 ± 10.9 . The marriage rate was 97.5% and 67.5% had diploma or academic education. Among the participants, 78.5% were occupatated as housewife and 21.5% had other occupations. Also 97.5% of participants did not have any family history of uterine or cervices cancer. The lower and upper age of first mensuration were 9 and 17 year (median=13) and mean age of first pregnancy was 22.0 ± 4.7 (min 13, max 38) years (Table 1). Table 2 presents the average score of the components of the protection motivation model. According to the mean scores, the constructs of motivation theory, and self-efficacy with an average of 12.83 ± 2.81 had the highest score among the structures.

In assessing the status of preventive and healthy behaviors, 83% of participants with diploma or academic education had more preventive behavior for Uterine Cervical Neoplasms ($p=0.005$). The demographic characteristics of the participants according to the status of performing Pap smear test are described in Table 3.

linear regression analysis was used to evaluate the effect of each model construct on the behavior. The behavior was the dependent variable, while other constructs were the independent variables. As shown in Table 4, self-efficacy, response efficacy, and perceived sensitivity predicted the desired behavior.

Adjusted $R^2=0.27$ indicates that this model explains 27% of the behavioral score changes.

Discussion

This study aimed to investigate the factors affecting Uterine Cervical Neoplasms screening based on the PMT in women referred to health centers in Torbat Heydariyeh City. Descriptive result showed that 60% of participants aged lower or equal 30 year, and 97.5% of them were married (all were Muslims and having only one partner). This factor can explain the lower incidence of uterine cervical neoplasm in women, because having the multiple sexual partners is an strong factors for incidence of this type of cancer (22, 23). Self-efficacy was the strongest predictor of these behaviors, followed by response efficacy. It seems that individuals with a higher level of self-efficacy perceive themselves to be capable of achievements; therefore, they show a tendency for preventive behavior of Uterine Cervical Neoplasms. Both response efficacy and self-efficacy are subsumed under coping appraisal in the PMT. The response efficacy refers to the effectiveness of coping responses in reducing threats. Generally, self-efficacy involves the individual's perceived capability of showing a coping response. The regression coefficients showed that higher levels of self-efficacy and response efficacy can increase motivation to prevent Uterine Cervical Neoplasms. These findings are consistent with previous studies that have also adopted PMT as a theoretical framework (11, 24, 25). Altogether, 44.5% of participant had a history of performing Pap smear test, and this was more common in participant with upper level of self-efficacy skill and preventive behaviors. Also, upper level of self-efficacy and preventive behavior were related to higher level of education. According to the same results, socio-demographic factors, awareness, self-efficacy, previous experiences related to Uterine Cervical Neoplasms screening in Asian women (26, 27) are associated with higher level of screening. Therefore compliance

Table 1. Demographic characteristics of the participants.

Variable	groups	Frequency	Percent
Age	≤30	121	60.5
	≥31	79	39.5
Marital status	Divorced	5	2.5
	Married	195	97.5
Level of education	Middle/ high school	65	32.5
	Diploma/ academic	135	67.5
Number of pregnancies	≤1	102	51.5
	>1	96	48.5
family history of cervix cancer	Yes	5	2.5
	No	195	97.5
first menstruation age	≤13	105	52.5
	≥14	95	47.5
Age of first pregnancy	≤22	108	58.1
	>22	78	41.9
underlying disease	Yes	13	6.5
	No	187	93.5
History of performing Pap smear test	Yes	89	44.5
	No	111	55.5

Table 2. Mean and standard deviation of the constructs of protection motivation theory.

Variables	Mean	standard deviation(SD)
self-efficacy	12.83	2.81
Response cost	8.19	2.49
fear	9.12	2.36
perceived sensitivity	9.84	2.10
perceived severity	10.8	2.13
behavior	11.74	0.89

Table 3. characterize of participants related to performing pap smear test.

Variable	n%	History of performing pap smear test n%		Sig*	
		Yes	No		
level of education	Elementary / high school	65(32.5)	23 (25.8)	42 (37.8)	0.005
	Diploma/ academic	135 (67.5)	66 (74.2)	69 (62.2)	
Total		200	89 (100)	111 (100)	
Number of pregnancies	≤1	102 (51.5)	44 (49.4)	58 (53.2)	0.59
	>1	96 (48.5)	45 (50.6)	51 (46.8)	
Total		200	89 (100)	109 (100)	
Age of first menstruation	≤13	105 (52.5)	47 (52.8)	58 (52.3)	0.93
	>14	95 (47.5)	42 (47.2)	53 (47.7)	
Total		200	89 (100)	111 (100)	
Age	≤ 30	121 (60.5)	51 (57.3)	70 (63.1)	0.40
	>30	79 (39.5)	38 (42.7)	41 (36.9)	
Total		200	89 (100)	111 (100)	
Employment status	Housewife	157 (78.5)	66 (74.2)	91 (82.0)	0.10
	Others	43 (21.5)	23 (25.8)	20 (18.0)	
Total		200	89 (100)	111 (100)	

Fisher Exact test*

Table 4. Linear regression analysis of the predictors of behavior in the women based on the model constructs

(Constant)	B	Std. Deviation	Beta	t	Sig	Adjusted R Square
self-efficacy	.008	0.023	0.019	0.268	0.001	0.27
Response cost	0.09	0.026	0.186	2.56	0.2	
Response efficacy	0.038	0.027	0.088	1.26	0.01	
fear	0.06	0.027	0.138	1.90	0.6	
perceived sensitivity	0.057	0.032	0.134	1.84	0.03	
perceived severity	0.029	0.032	0.015	0.189	0.85	

with Uterine Cervical Neoplasms screening among Iranian women can be enhanced by providing appropriate educational programs (26, 29). Review studies indicate that the incidence of Uterine Cervical Neoplasms increase is associated with low educational level, lack of access to care, and with expansion of screening and vaccination programs and acceptability, a reductions in Uterine Cervical Neoplasms incidence and related mortality may be achieved (30, 31). However vaccination programs are not offered routinely in Iranian women.

The limitations of this study include the statistical population which were womens referring to urban health centers, which limits generalizability. Self-reporting was another limitation of the study.

Conclusion

The results of this study indicate that self-efficacy, response efficacy, and perceived sensitivity predicted the desired behavior and this model explained 27% of the behavioral score changes. Therefore comprehensive planning for intervention and use of PMT and gaining knowledge about the cultural and socioeconomic factors for Uterine Cervical Neoplasms screening seems useful.

Ethical approval

All ethical considerations were confirmed by the given instructions of Torbat Heydariyeh University of Medical Sciences (IR.THUMS.REC.1397.011) and obtaining

written consent to participate in the study from the participants.

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References

1. Firozi-Niyaki M, Barari AR, Abbassi-Dalooi A. The effect of endurance training and taxol consumption on cyclooxygenase-2 and prostaglandin E2 levels in the liver tissue of mice with Uterine Cervical Neoplasms. *KAUMS Journal (FEYZ)*. 2018;22(5):517-24.
2. Cohen PA, Jhingran A, Oaknin A, Denny L. Uterine Cervical Neoplasms. *The Lancet*. 2019;393(10167):169-82.
3. Alireza S, Mehdi N, Ali M, Alireza M, Reza M, Parkin D. Cancer occurrence in Iran in 2002, an international perspective. *Asian Pacific journal of cancer prevention*. 2005;6(3):359.
4. Mohebi S, Sharifirad G, Gharlipour Z, Kamran A. The study of pap smear conduction and its related factors based on the Health Belief Model in Women Referring to Health Care Centers in Qom During 2014. *Journal of Education and Community Health*. 2016;2(4):25-33.
5. Shafiq V, Galandari M. Knowledge about Pap smear test, Uterine Cervical Neoplasms and human papillomavirus among women referred to Gynecology Clinic of Tonekabon Shahid Rajaei Hospital in 2016. *Medical Science Journal of Islamic Azad University-Tehran Medical Branch*. 2017;27(4):294-300.
6. Shahvaroughi Farahani N, Eskandari H, Borjali A. Investigating the Personality subtypes of women

with advanced breast and endometrial cancers and breast and endometrial cancers survivors: A qualitative study. *Razi Journal of Medical Sciences*. 2018;25(6):52-62.

7. Marth C, Landoni F, Mahner S, McCormack M, Gonzalez-Martin A, Colombo N. Uterine Cervical Neoplasms: ESMO Clinical Practice Guidelines for diagnosis, treatment, and follow-up. *Annals of Oncology*. 2017;28:iv72-iv83.

8. Bahmani A, Rahmani K, Ahmadian F, Alizadeh Z, Akhtar B. Explanation of pap smear preventive behavior among women based on health belief model: a qualitative study. *Iranian Journal of Health Education and Health Promotion*. 2017;5(1):5-14.

9. Bennett KF, Waller J, Chorley AJ, Ferrer RA, Haddrell JB, Marlow LA. Barriers to cervical screening and interest in self-sampling among women who actively decline screening. *Journal of medical screening*. 2018;25(4):211-7.

10. Chrysostomou AC, Stylianou DC, Constantinidou A, Kostrikis LG. Uterine Cervical Neoplasms screening programs in Europe: the transition towards HPV vaccination and population-based HPV testing. *Viruses*. 2018;10(12):729.

11. Ezati Rad R, Mohseni S, Kamalzadeh Takhti H, Hassani Azad M, Shahabi N, Aghamolaei T, et al. Application of the protection motivation theory for predicting COVID-19 preventive behaviors in Hormozgan, Iran: a cross-sectional study. *BMC Public Health*. 2021;21:1-11.

12. Sommestad T, Karlzén H, Hallberg J. A meta-analysis of studies on protection motivation theory and information security behavior. *International Journal of Information Security and Privacy (IJISP)*. 2015;9(1):26-46.

13. Rogers RW. A protection motivation theory of fear appeals and attitude change. *The journal of psychology*. 1975;91(1):93-114.

14. Hosseini Zijoud SS, Rahaei Z, Hekmatimoghaddam S, Zarei S, Sadeghian HA. Effect of education based on the protection motivation theory on the promotion of protective behaviors in medical laboratories' staff in Yazd, Iran. *International Archives of Health Sciences*. 2023;10(4):171-6.

15. Malmir S, Barati M, Jeihooni AK, Bashirian S, Hazavehei SMM. Effect of an educational intervention based on protection motivation theory on preventing Uterine Cervical Neoplasms among marginalized women in west Iran. *Asian Pacific journal of cancer prevention: APJCP*. 2018;19(3):755.

16. Changizi M, Cheraghiyan B, Mohamadian H, Ghorbani Kalkhajeh S, Maghsoudi F, Salmanzadeh S. Effect of Applying Protection Motivation Theory

in COVID-19 Information Channels on Preventive Behaviors in Southwest Iran. *Health Education and Health Promotion*. 2023;11(2):325-31.

17. Yeom M, Stewart F, Stewart A. The impact of social distancing on community case count in the United States: Testing the efficacy of protection motivation theory during early stages of the COVID-19 pandemic. *Risk, Hazards & Crisis in Public Policy*. 2021;12(3):303-27.

18. Norman P, Boer H, Seydel ER, Mullan B. Protection motivation theory. Predicting and changing health behavior: Research and practice with social cognition models. 2015;3:70-106.

19. Fry RB, Prentice-Dunn S. Effects of a psychosocial intervention on breast self-examination attitudes and behaviors. *Health education research*. 2006;21(2):287-95.

20. Dehdari T, Hassani L, Hajizadeh E, Shojaeizadeh D, Nedjat S, Abedini M. Effects of an educational intervention based on the protection motivation theory and implementation intentions on first and second pap test practice in Iran. *Asian Pacific Journal of Cancer Prevention*. 2014;15(17):7257-61.

21. Petty JTCRE. social psychophysiology: A new look. *Advances in Experimental Social Psychology*. 1989:39.

22. Ghebre RG, Grover S, Xu MJ, Chuang LT, Simonds H. Uterine Cervical Neoplasms control in HIV-infected women: past, present and future. *Gynecologic oncology reports*. 2017;21:101-8.

23. Renschmidt C, Kaufmann AM, Hagemann I, Vartazarova E, Wichmann O, Deleré Y. Risk factors for cervical human papillomavirus infection and high-grade intraepithelial lesion in women aged 20 to 31 years in Germany. *International Journal of Gynecologic Cancer*. 2013;23(3).

24. Rippetoe PA, Rogers RW. Effects of components of protection-motivation theory on adaptive and maladaptive coping with a health threat. *Journal of personality and social psychology*. 1987;52(3):596.

25. Milne S, Sheeran P, Orbell S. Prediction and intervention in health-related behavior: A meta-analytic review of protection motivation theory. *Journal of Applied Social Psychology*. 2000;30(1):106-43.

26. Salehiniya H, Momenimovahed S, Allahqoli L, Momenimovahed Z, Alkatout I. Factors related to Uterine Cervical Neoplasms screening among Asian women. *European review for medical and pharmacological sciences= Revue européenne pour les sciences médicales et pharmacologiques= Rivista europea per le scienze mediche e farmacologiche*. 2021;25(19):6109-22.

27. Chua B, Ma V, Asjes C, Lim A, Mohseni M, Wee HL. Barriers to and facilitators of Uterine Cervical Neoplasms screening among women in Southeast Asia: a systematic review. *International journal of environmental research and public health*. 2021;18(9):4586.

28. Seow A, Huang J, Straughan PT. Effects of social support, regular physician and health-related attitudes on Uterine Cervical Neoplasms screening in an Asian population. *Cancer Causes & Control*. 2000;11:223-30.

29. Hassani L, Dehdari T, Hajizadeh E, Shojaeizadeh D, Abedini M, Nedjat S. Development

of an instrument based on the protection motivation theory to measure factors influencing women's intention to first pap test practice. *Asian Pacific Journal of Cancer Prevention*. 2014;15(3):1227-32.

30. Buskwofie A, David-West G, Clare CA. A review of Uterine Cervical Neoplasms: incidence and disparities. *Journal of the National Medical Association*. 2020;112(2):229-32.

31. Sabeena S, Ravishankar N, Kalpana M. Implementation strategies of Uterine Cervical Neoplasms screening in South Asia: A systematic review. *International Journal of Gynecology & Obstetrics*. 2024.