

RESEARCH ARTICLE

Development of an Instrument based on the Protection Motivation Theory to Measure Factors Influencing Women's Intention to First Pap Test Practice

Laleh Hassani¹, Tahereh Dehdari^{1*}, Ebrahim Hajizadeh², Davoud Shojaeizadeh³, Mehrandokht Abedini⁴, Saharnaz Nedjat⁵

Abstract

Background: Given that there are many Iranian women who have never had a Pap smear, this study was designed to develop and validate a measurement tool based on the Protection Motivation Theory to assess factors influencing the Iranian women's intention to perform first Pap testing. **Materials and Methods:** In this psychometric research, to determine the Content Validity Index (CVI) and the Content Validity Ratio (CVR), a panel of experts (n=10) reviewed scale items. Reliability was estimated through the Intraclass Correlation Coefficient (n=30) and internal consistency (n=240). Also, factor analysis (exploratory and conformity) was performed on the data of the sample women who had never had a Pap smear test (n=240). **Results:** A 26-item questionnaire was developed. The CVI and CVR scores of the scale were 0.89 and 0.90, respectively. Exploratory factor analysis loaded a 26-item with seven factors questionnaire (perceived vulnerability and severity, fear, response costs, response efficacy, self-efficacy, and protection motivation (or intention)) that jointly accounted for 72.76% of the observed variance. Confirmatory factor analysis indicated a good fit for the data. Internal consistency (range 0.70-0.93) and test-retest reliability (range 0.72-0.96) of sub-scales were acceptable. **Conclusions:** This study showed that the designed instrument was a valid and reliable tool for measuring the factors influencing the women's intention to perform their first Pap testing.

Keywords: Protection motivation theory - Pap smear - measurement tool - intention - Iran

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Introduction

Cervical cancer is the second prevalent malignant cancer among women in the world (Parkin & Bray, 2006). The Papanicolaou (Pap) smear is essential for early detection and timely treatment of cervical cancer, and reducing the progress of the disease and its mortality in women (Blackman et al., 1999). Annual Pap smear is recommended for sexually active females (Fink, 1988). Despite the advantages of the Pap smear, there are many women who have never had a Pap smear or have never received it at regular intervals (Kim et al., 1999). In Iran, only 27.1% of the women 18 years and older have reported receiving at least one Pap smear in their life (Rezaie-Chamani et al, 2012). This rate is low as compared to other Asian countries such as Phillipine, China, Japan, Vietnam, India, and Korea (Lu et al., 2012).

The intention of an individual to perform any behavior is the most important determinant of the behavior (Rimer

and Glanz, 2005). In the Protection Motivation Theory (PMT), it is assumed that protection motivation (i.e. the individual's intention to perform a behavior) results from the two appraisal processes and is a positive function of severity, vulnerability, self-efficacy, and response efficacy, and a negative function of the rewards associated with maladaptive responses and the response costs of the adaptive behavior.

Reasons for not ever attending a Pap smear are different with failing to it continue in further. Evidence has shown that women with previous Pap smear experiences are more likely to repeat it in the future (Abdullah et al., 2001; Fernandez, and Chen, 2003; Gu et al, 2012; Hou). It seems that these women are more health-conscious and believe in the advantages of the Pap test (Abdullah et al., 2001).

In the past studies was surveyed factor influencing to receive future screening (secondary and subsequent Pap smear) (Gu et al., 2012). To our knowledge, little is

¹Department of Health Education and Health Promotion, Faculty of Health, Iran University of Medical Sciences, ²Department of Biostatistics, Faculty of Medical Sciences, Tarbiat Modares University, ³Department of Health Education and Health Promotion, ⁴Department of Epidemiology, Faculty of Health, Tehran University of Medical Sciences, ⁵Department of Family Health, Ministry of Health and Medical Education, Tehran, Iran *For correspondence: dehdari.t@iums.ac.ir, dehdarit@yahoo.com

known about motivations and personal potential variables that contribute to women's intention to have their first Pap smear test done (Twinn and Cheng, 2000; Austin et al., 2002). Understanding these factors may result in designing tailored educational interventions and an increase in the number of women having the Pap test. It is crucial to have new theory-based measurement tools with good reliability and validity to know reasons preventing women from having their first Pap smear testing. Since PMT is a useful guide to explain screening behaviors (e.g. cervical screening) (Abdullah et al., 2001), it was considered as the theoretical framework for developing the measurement tool.

Given the necessity of developing a valid instrument to examine the factors influencing the women's intention to perform first Pap smear practice, the present study was designed to develop and validate an instrument to measure PMT variables associated with the women's intention to perform first Pap smear.

Materials and Methods

Study design

This psychometric research was conducted between July 2012 and December 2013 in Tehran, Iran.

Instrument development

Item generation; Several steps were followed for item generation procedures: 1) A review of the related literature; 2) Three focus group discussions were conducted with 30 women to explain their reasons for not receiving the Pap test. Women were recruited from primary health care clinics affiliated to Tehran University of Medical Sciences and never had a cervical screening; and 3) Interview with a panel of experts (Ten expert in health education, obstetrics, and gynecology) about the reasons and limitations of the Pap test in women. A 45-item instrument with 7 sub-scales (including perceived vulnerability, perceived severity, fear, response costs, response efficacy, self-efficacy, and intention) was generated and consequently, qualitative face and content validity of the items were evaluated (Table 1).

Face validity; A group of women (n=30) were asked to reflect on the clarity simplicity, and readability of the items of the instrument (face validity). According to the participants' opinions, the ambiguous questions were revised and some minor wording errors were corrected.

Content validity; Content validity of the instrument was evaluated quantitatively. The Content Validity Ratio (CVR) and the Content Validity Index (CVI) were calculated based on the experts' opinions. The expert panel was asked to judge the necessity and relevance of the scale items. Items with a CVR score of 0.62 and more (Lawshe, 1975) were selected. The CVI score of .80 (Polit and Beck, 2004) and above was considered satisfactory. Finally, 16 scale items were removed. The CVI and CVR of the total scale was 0.89 and 0.90, respectively in this study. The pre-final version of the instrument contained 29 items including 3 items on intention, 3 items on perceived vulnerability, 4 items on perceived severity, 3 items on

fear, 5 items on response costs, 4 items on response efficacy, and 7 items on self-efficacy.

Construct validity; The construct validity of the scale was determined by Exploratory (EFA) and Confirmatory Factor Analysis (CFA). To calculate EFA and CFA, a sample of 240 women who were referred to 30 primary health care clinics affiliated to Tehran University of Medical Sciences was selected by the stratified random sampling method. The participants completed the questionnaire. Selection criteria were as follows: 1) not having the diagnosis of cervical cancer; 2) being married or sexually active; 3) negative history of the Pap test in the past; 4) negative history of full uterus hysterectomy; and 5) ability to read and write in Farsi. The study was approved by the ethics committee. All women were informed about the study objectives and a written consent was obtained.

EFA; Using the principal component analysis with varimax rotation an EFA was performed to determine the construct validity of the scale. The Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO) were utilized to determine the appropriateness of the sample for factor analysis. Eigenvalues more than 1 and scree plot were utilized for choosing the number of factors. Factor loadings of 0.4 or above were considered acceptable (Nunnally and Bernstein, 1994).

CFA; In this part of analysis, the data of 240 samples were used for evaluating the model fitness. All various fit indices including relative Chi-square (χ^2/df), Comparative Fit Index (CFI), Incremental Fit Index (IFI), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) were used (Mueller, 1996). Relative Chi-square is obtained by division of chi-square to degrees of freedom and its recommended reference value is less than 3 for accepting the fitness of the model (Munro, 2005). The values of CFI, IFI, NFI, and NNFI could range from 0 and 1 and values closer to 1 are indicative of data fitness (Kline, 2010). An RMSEA range from 0.8 to 0.10 shows a mediocre fit and values below 0.8 indicate a good fit (MacCallum, et al., 1996). The acceptable value for SRMR is below 0.10 where values less than 0.8 indicate an adequate fit and values less than 0.5 indicate good fit (Bollen and Long, 1993; Hu and Bentler, 1999).

Reliability; The scale internal consistency (Cronbach's Alpha coefficient) was calculated. Cronbach's Alpha of 0.70 and above was considered acceptable (Cronbach, 1951). In order to determine the stability of the scale (Intraclass Correlation Coefficient), a sub-sample of women (n=30) completed the questionnaire twice with a 2-week interval. The ICC of 0.4 and above was considered satisfactory (Baumgartner and Chung, 2001).

Statistical analysis

Statistical analyses such as mean, standard deviations, and EFA were performed using the SPSS (version 17.0, SPSS, Inc., Chicago, IL, USA) software package and CFA was performed using the LISREL 8.80 for Windows (Joreskog and Sorbom, 2006).

Results

The mean age of the participants in the factor analysis was 38.12 years. Ninthly percent of them did not have a history of cancer in their family. Table 2 shows other demographic characteristics of participants in the factor analysis.

EFA

In this study, the KMO was 0.82 and the Bartlett's test of sphericity was significant ($=3911.78$, $df=406$, $p<0.0001$) showing that the data were good for factor analysis. The first analysis showed a 7-factor structure for the questionnaire with 3 items loading unexpectedly

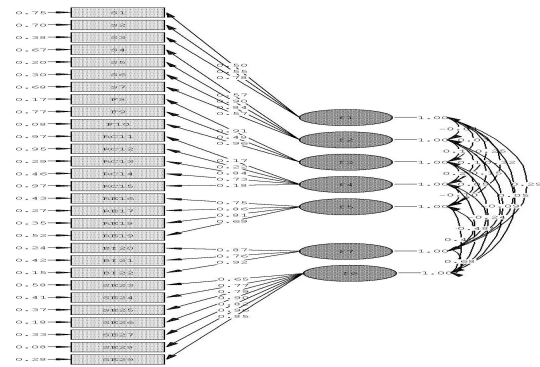


Figure 1. Seven-factor Model for the Instrument Obtained from Confirmatory Factory Analysis (n=240)

Table 1. Items of 45-Item Instrument to Measure PMT in Relation to Factors Influencing the Women's Intention to First Pap test Practice

Constructs	Initial items	Coding used for analyses
Perceived sensitivity (or vulnerability)	<ol style="list-style-type: none"> 1. I do not have any problems in my reproduction organ, so it is impossible to have cervical cancer. 2. I worry about having cervical cancer. 3. In my relatives, no one has cervical cancer and neither do I. 4. There is a zero possibility for me to have cervical cancer. 5. Unless God desires, I will not have cervical cancer. 6. Only women beyond fifty years old will have cervical cancer. 	6 items on a 5-point scale (1=strongly disagree to 5=strongly agree).
Perceived Severity	<ol style="list-style-type: none"> 1. Cervical cancer imposes high expenditure on me and my family. 2. If I have cervical cancer, my life will change. 3. Cervical cancer limits me from having sex with my husband. 4. If I have cervical cancer, I will die in five years. 5. I have not seen anybody dies because of cervical cancer. 6. If I take cervical cancer, I will not be able to do my daily activities. 7. Cervical cancer can be easily treated. 8. I'm afraid of thinking about cervical cancer. 9. When thinking about cervical cancer, I have a fast heartbeat. 10. The problems caused by cervical cancer remain for a long time. 	10 items on a 5-point scale (1=strongly disagree to 5=strongly agree).
Fear	<ol style="list-style-type: none"> 1. I fear that the Pap test confirms my cancer. 2. I am afraid of the examination pain. 3. I fear that Pap smear confirms a problem in my reproduction organ. 	3 items on a 5-point scale (1=strongly agree to 5=strongly disagree).
Response Costs	<ol style="list-style-type: none"> 1. The Pap test is not pleasant for me. 2. I am ashamed to have the Pap test. 3. As the Pap test requires repetition, it is hard for me to do it several times. 4. Because I think this test is done by males, I will not do it. 5. The Pap test poses a lot of financial problems on me. 6. I have not received any training for the Pap test by the health staff. 7. There are few centers that do the Pap test. 	7 items on a 5-point scale (1=strongly agree to 5=strongly disagree).
Response Efficacy	<ol style="list-style-type: none"> 1. The Pap test is effective in preventing cervical cancer. 2. The Pap test helps with early diagnosis of the disease. 3. The Pap test prevents the spread of cervical cancer. 4. Early diagnosis using the Pap test saves the patient's life. 5. Only in case I have done the Pap test, I can use some contraception devices such as IUD. 6. Upon receiving a negative result on the Pap test, I will be certain about the health of my reproduction organ. 7. After the Pap test, the health practitioner will confirm me. 	7 items on a 5-point scale (1=strongly disagree to 5=strongly agree).
Self-efficacy	<ol style="list-style-type: none"> 1. I will take the Pap test. 2. I have the Pap test even if I do not have enough money. 3. I have the Pap test even if it is painful. 4. I have the Pap test despite being shameful. 5. I have the Pap test even if I am busy. 6. I have the Pap test even if my relatives refrain from it. 7. I would repeat the Pap test in the coming years, even if its result is negative. 8. I can save myself from cervical cancer through having the Pap test. 9. Even if I lose my husband's support, I still do the Pap test. 	9 items on a 5-point scale (1=completely unconfident to 5=completely confident).
Intention	<ol style="list-style-type: none"> 1. I want to have the Pap test. 2. I intend to have the Pap test. 3. I plan to have the Pap test. 	3 items on a 5-point scale (1=strongly disagree to 5=strongly agree).

and irrelevant to the loaded construct. Thus, the 3 items were deleted from the analysis and a final 26-item scale loaded on 7 distinct constructs that commonly accounted for 72.76% of the observed variance. The range of factor loading of each item is shown in Table 3.

CFA

The 26-item questionnaire was examined for confirmatory factor analysis. The relative chi-square (χ^2/df) was 1.73, indicating the fitness of the model ($p < 0.0001$). All comparative indices of the model including CFI, IFI, and NNFI were 0.9 and above (0.96, 0.96, 0.93 and 0.96, respectively) except for NFI (0.85), indicating the goodness of fit for the data. The RMSEA of the model was 0.5. The SRMR was less than 0.08 (0.06) confirming an acceptable fit for the model. The results of

Table 2. Demographic Characteristics of the Participants in the Factor Analysis (n=240)

Variables	n	%	Mean±SD
Age	≤35	99	41.3%
	>35	141	58.7%
Age at marriage			20.56 (4.62)
No. of pregnancies			2.00 (1.28)
No. of deliveries			2.04 (1.06)
Occupational status	Self-employed	5	2.1%
	Employee	16	6.7%
	Housewife	213	88.8%
Educational level	Illiterate	6	2.5%
	≤12 th (grade)	200	47.9%
	>12 th (grade)	34	14.2%

Table 3. Results of the Rotated Factor Loading analysis (n=240)

Items number	Factors						
	1	2	3	4	5	6	7
PSen1	I do not have any problems in my reproduction organ, so it is impossible to have cervical cancer.						0.794
PSen2	I worry about having cervical cancer.						0.725
PSen3	Among my relatives, no one has cervical cancer and neither do I.						0.715
PSev1	Cervical cancer imposes high expenditure on me and my family.			0.729			
PSev2	If I have cervical cancer, my life will change.			0.871			
PSev3	Cervical cancer limits me from having sex with my husband.			0.869			
PSev4	If I have cervical cancer, I will die in five years.			0.655			
F1	I fear that the Pap test confirms my cancer.			0.889			
F2	I am afraid of the examination pain.			0.606			
F3	I fear that Pap smear confirms a problem in my reproduction organ.			0.914			
RC1	The Pap test is not pleasant for me.						0.847
RC2	I am ashamed to have the Pap test						0.857
RE1	The Pap test is effective in preventing cervical cancer.		0.799				
RE2	The Pap test helps with early diagnosis of the disease.		0.827				
RE3	The Pap test prevents the spread of cervical cancer.		0.849				
RE4	Early diagnosis using the Pap test saves the patient's life.		0.771				
SE1	I will take have the Pap.						0.729
SE2	I have the Pap test even if I do not have enough money.						0.808
SE3	I have the Pap test even if it is painful.						0.803
SE4	I have the Pap test despite being shameful.						0.88
SE5	I have the Pap test even if I am busy.						0.836
SE6	I have the Pap test even if my relatives refrain from it.						0.922
SE7	I would repeat the Pap test in the coming years, even if its result is negative.						0.853
I 1	I want to have the Pap test.					0.684	
I 2	I intend to have the Pap test.					0.809	
I 3	I plan to have the Pap test.					0.704	
Eigen values (%)							7.37
Explained Variance (%)							28.37
Cumulative Variance (%)							28.37
							3.05
							2.3
							2
							1.65
							1.32
							1.2
							8.85
							7.7
							6.36
							5.08
							4.61
							48.98
							56.69
							63.06
							68.15
							72.76

CFA are presented in Figure 1.

Reliability

Cronbach's alpha (range, 0.70-0.93) and ICC (range, 0.72-0.96) of final version of the developed scale were acceptable. Cronbach's α coefficient (n=240) and ICC of subscales (n=30) are presented in Table 4.

Discussion

In this study a 26-item scale with seven factors included perceived vulnerability and severity, fear, response costs, response efficacy, self-efficacy, and behavioral intention was developed. Our found that these seven variables mentioned above would affect on intention of Iranian women for performing first Pap testing. The results showed that developed instrument was a valid and reliable tool to detect these factors. There are a number of developed instruments for assessing such factors influence

Table 4. Cronbach's Alpha (n=240) and ICC (n=30) for PMT Subscales

Subscales	No. of items	Statement average (±SD)	Cronbach's Alpha	ICC (n=30)
Perceived sensitivity	3	3.59 (1.00)	0.70	0.94
Perceived severity	4	3.95 (0.94)	0.79	0.94
Fear	3	2.27 (1.35)	0.80	0.96
Response costs	2	3.00 (1.49)	0.76	0.96
Response efficacy	4	4.49 (0.57)	0.85	0.79
Self-efficacy	7	4.56 (0.57)	0.93	0.72
Intention	3	4.50 (0.65)	0.88	0.71

Pap testing (Linton and Porche, 2010; Luszczynska et al., 2011; Reis et al., 2012), but, to best our knowledge was not developed similar questionnaire with the present study. For example, Linton et al. (Linton and Porche, 2010) developed a questionnaire based on Theory of Planned Behavior variables for determine intention of Pap smear among women in rural Southeast Louisiana. They reported that developed instrument was a valid and reliable tool. Totally, developing these instruments may be assist to educators in developing and evaluating theory-based education interventions regarding Pap testing. It is considering that theoretical frameworks demonstrate a road map for understanding different behavior of individuals (Jackson, 1997; Rimer and Glanz, 2005). They may be assist practitioners recognize why individuals do or do not engage in specific health behaviors (Rimer and Glanz, 2005).

Reliability

Our finding indicated that the developed instrument has good internal consistency and stability by having Cronbach α ranged from 0.70-0.93 and ICC ranged from 0.71 to 0.96, respectively. ICC results indicated that our designed instrument produces constant results from participants at different two times (with a 2-week interval). This results is consistent with Luszczynska et al. (Luszczynska et al., 2011) They was developed a instrument for determine the effectiveness a pros enhancing intervention in intention of women to uptake cervical cancer screening. In their study, Cronbach α for intention, pros and cons regarding Pap testing was 0.85, 0.86 and 0.71, respectively. In line with, Linton et al (2010). reported that test-retest correlation and Cronbach α of their developed sub-scales ranged from 0.510 to 0.889 and 0.585 to 0.889, respectively. They also expressed that according to Munro comment (Munro, 2005) "when investigating the relationship among different aspects of human behavior" a correlation coefficient of 0.50 above is acceptable. In a study by Reis et al. (Reis et al., 2012) estimated Cronbach alpha for five subscales included benefits and barriers of pap smear, seriousness, susceptibility and health motivation was 0.86, 0.82, 0.78, 0.78 and 0.62, respectively.

Construct validity

The data of EFA and CFA analyses affirmed that developed scale has a suitable structure. EFA showed that the 7 factors structure of the designed instrument could jointly account for 72.76% of the variance. CFA indicated that factor structure of this scale was satisfactory as well. It can be argued that obtained good results might be the reason exactly selection of related items to discussed problem. It is considering that 3 items in related to response costs of Pap testing was deleted through factor analysis. Also, KMO equal to 0.82 and significant Bartlett's Test of Sphericity showed that samples were appropriate for the factor analysis. The fitness of the model was shown using relative chi-square equal to 1.73. In line with, Bazarganipour et al. (Bazarganipour et al., 2012). showed that CFA for Iranian version of modified polycystic ovary syndrome health-related quality-of-life

questionnaire (MPCOSQ) was acceptable fit. They also reported that six-factor solutions (included emotional problems, weight, acne, infertility, hirsutism and menstrual difficult) explained 0.64% of the variance observed. This results is in agreement with Naderimagham et al. (2012). and Montazeri et al., (2009).

Content validity

In this study, was used of panel expert opinions for measuring quantitative content validity and evaluated CVI and CVR of designed scale. Rubio et al. (2003) suggested that the experts' opinions are best methods for evaluating content validity. According to literature, a satisfactory CVR and CVI values for 10 expert panels are 0.62 and 0.80. (Lawshe, 1975; Polit and Beck, 2004). In the present study, CVI and CVR of designed scale was 0.89 and 0.90, respectively. In the developed scale by Linton et al. the CVI of scale was 0.84 (Linton and Porche, 2010).

Although the present findings highlight the utility of PMT-guided framework to develop theory-based instrument regarding Pap testing, it had a limitation. Limitation of the present study was data was collected of a sample of women referral to primary health care clinics affiliated to Tehran University of Medical Sciences. It is considering that, these clinics were in low-income areas of Tehran, Iran. This homogeneity of samples may limit the extent to which findings can be generalised to other women residing in high and middle-income areas of Tehran. More researches to utility of this scale in explaining implications of Pap testing within other racial/ethnic groups and geographic areas in Iran are needed.

In conclusion, the study confirmed that the developed scale was a valid and reliable tool for use in the Iranian population. This instrument can help educators explore evidence-based priorities for increasing first Pap testing among women and developing tailored interventions.

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