

Predictors of Adoption of Preventive Behaviors of Premenstrual Syndrome Based on Health Belief Model among Female Teenagers

Running Title: Predictors of Prevention of PMS based on Health Belief Model

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Abstract

Background and Objective (s): Premenstrual syndrome (PMS) refers to a group of physical, behavioral, and mood symptoms that appear about a week or two before menstruation begins. Given the prevalence of this syndrome among adolescents and young women, this study was performed with the aim of determining the predictors of adoption of preventive behaviors of PMS using the Health Belief Model (HBM) among female teenagers.

Materials and Methods: This cross-sectional-analytical study was conducted among 240 pre-university girl students of Tehran, Iran in 2016. The sampling was performed using multi-stage random sampling. The data collection tool was a demographic information, a valid and reliable questionnaire available including PMS preventive behaviors and all constructs of HBM. The data were collected and then entered into SPSS software version 16 and analyzed using Pearson correlation coefficient, multiple regression tests and descriptive statistics.

Results: The participated students obtained 38.5% of the score for the adoption of preventive behaviors of PMS. The three constructs of perceived barriers, perceived susceptibility and self-efficacy were predictors of adoption of preventive behaviors of PMS. Overall, these constructs were able to predict 32.6% of the behavioral changes.

Conclusion: According to the results of this study, in the design and implementation of educational interventions should emphasize the constructs of perceived susceptibility, perceived barriers and self-efficacy as the most important predictors of adoption of preventive behaviors of PMS among Female Teenagers.

Key words: female teenagers; health belief model; prevention; premenstrual syndrome

Introduction

Menstrual problems are one of the main causes of illness in women, so that more than one third of women experience abnormal menstrual

problems [1]. One of these problems is premenstrual syndrome (PMS) and includes physical, emotional and psychological symptoms that begin in many women of childbearing age several days before menstruation and will be resolved with starting menstruation or the first few days the

bleeding [2,3]. More than 150 signs have been attributed to PMS. Symptoms include breast tenderness, headache, low back pain, fatigue, tension and anxiety, unexplained anger or irritability, depression, varying degrees of edema, changes in sexual desire, bloating, joint and muscle pain, lack of energy, change in appetite, thirst, Periods of crying, difficulty concentrating, aggression and suicidal ideation [4]. Many researchers consider PMS as one of the most common psychosomatic diseases that significantly disrupts women's lives [5,6]. This syndrome causes communication disruption, disruptions to normal activities, inactivity, non-Motivation, and reduced accuracy in doing things and if the severity of its symptoms is high, it affects one's lifestyle, comfort, and health [2].

It is not possible to determine the prevalence of this syndrome due to the variety of forms of its symptoms. However, the incidence of this syndrome in different communities is estimated at between 5 and 95% [7]. The prevalence of the syndrome worldwide is also estimated at 48% in a meta-analysis study in 2013 [8]. Menstrual disorders, including PMS, are also common in adolescents and young women. These disorders are often a source of anxiety for these patients and their families [9]. In study by Ahmadi et al, 37% [10] and in study by Bakhshani et al, 83.1% of female students had PMS [11].

PMS is a major problem among adolescents and is highly prevalent among adolescent girls [10]. Adolescents are the assets of the future and addressing adolescent health is one of the priority health and prevention medicine programs in the world [12]. Adolescence is a vital step in establishing a healthy lifestyle and developing healthy behaviors [13].

Experts use a variety of models to predict and identify factors that affect performance. One of the models used in health education is the Health Belief Model (HBM). This model is based on the idea of whether or not people change their behaviors with the belief that a health threat exists [14]. This model focuses on secondary prevention as disease control, whereby the model performs a health function when one understands the sensitivity, severity, and health value of the operation [15]. According to this model, to adopt PMS preventive behaviors, individuals should first feel at risk of PMS or exposure to its symptoms (perceived susceptibility); then understand the depth of this risk and the seriousness of its various effects on their physical, social, psychological and economic dimensions (perceived severity); with positive symptoms they receive from their surroundings or indoors environment (Cues to action); believe the usefulness and applicability of PMS prevention program (Perceived benefits); the deterrents find it less costly than the benefits (perceived barriers) and feel sufficient and adequacy to overcome the barriers to behavior (self-efficacy) to finally adopt PMS preventive behaviors [9,15]. The effectiveness of the HBM on promotion preventive behaviors has been documented in various studies and on various topics and diseases such as cervical cancer [16], menstrual pain severity reduction [14], and mammography screening [17].

PMS preventive behaviors include behaviors such as using calcium-rich foods such as milk and yogurt, taking multivitamin supplements, doing physical activity, keeping yourself away from stressful situations, and so on [9]. According to the study conducted by the researchers of the present study, despite conducting a study on the effect of educational intervention based on the HBM in promoting the adoption of preventive behaviors of PMS [9], So far, no study has been conducted to investigate predictor structures for adoption of PMS preventive behaviors using this model. Also, the adoption of PMS preventive behaviors among adolescents has not been evaluated so far. Given the prevalence of this syndrome among adolescents and young women [9], this study was performed with the aim of determining the predictors of adoption of preventive behaviors of PMS using the HBM among female teenagers.

Method

This cross-sectional-analytical study was conducted among 240 pre-university girl students of Tehran, Iran, in 2016. The sampling in this study was performed using multi-stage random sampling. First, was prepared a list of all 19 educational districts of Tehran. Then, out of these 19 districts, 4 districts were randomly selected and one high school was randomly selected from each district. In the last stage, one class was randomly selected from each selected high school and their students were included in the study with the inclusion criteria.

Due to the results of a pilot study among 30 students and considering $P=0.2$ for adoption of preventive behaviors of PMS, and also using Cochran's sample size formula and calculating $d=0.05$, the sample size was estimated to be 245 Students, which according to statistical experts and taking into account the 5% probability of sample loss, 255 Students were included in the study.

Inclusion criteria were: full health (no history or known disease), having Menstruation experience, regular menstrual periods for at least a year, do not use hormonal compounds and willingness to participate in the study (by completing the written informed consent form to participate in the study). Incomplete completion of questionnaires and dissatisfaction with continuing to participate in research, were considered as exclusion criteria.

The data collection tool consisted of two sections: 1) Demographic information (age, field of study, marital status, parental education, physical activity per week, birth rank in family and number of family members). 2) A valid and reliable questionnaire available was used to assess the constructs of the HBM and PMS preventive behaviors [9]. This questionnaire included 45 questions to measure perceived severity (5 items with score ranged from 5 to 25), perceived susceptibility (7 items with score ranged from 7 to 35), perceived benefits (6 items with score ranged from 6 to 30), perceived barriers (7 items with score ranged from 7 to 35), cues to action (4 items with score ranged from 4 to 20), perceived self-efficacy (6 items with score ranged from 6 to 30) and PMS preventive behaviors (10 items with score ranged from 10 to 50). How to score the questions related to structures was as follows that all questions on the constructs were scored on a 5-point Likert scale (from strongly disagree = 1 point to strongly agree = 5 points), except for questions about the construct of perceived barriers, where the scale was reversed and the higher score was considered as lower perceived barriers. Also, how to score the questions related to PMS preventive behaviors was as follows that all questions were scored on a 5-point scale (never=1 point, rarely=2 points, sometimes=3 points, often=4 often and always=5 points) [9]. According to the researchers' opinion, the rate of adoption of preventive behaviors was classified into three levels: poor (scoring less than 50% of the total score), moderate (scoring 50-75% of the total score) and good (scoring above 75% of the total score).

Content validity (CVR and CVI) was used to ensure the scientific validity of the instrument. To determine CVR and CVI, the questionnaire was given to 10 of professors and experts in the fields of health education, midwifery and reproductive health and their ideas were considered in modifying or deleting the questions. Accordingly, reliability was calculated in the pilot study (which was conducted on 30 students) and the following results were finally obtained: perceived susceptibility (CVR=0.99, CVI=0.99, Cronbach's alpha=0.92), perceived severity (CVR=0.97, CVI=0.90, Cronbach's alpha=0.89), perceived barriers (CVR=0.97, CVI=0.89, Cronbach's alpha=0.87), perceived benefits (CVR=0.94, CVI=0.87, Cronbach's alpha=0.98), perceived self-efficacy (CVR=0.97, CVI=0.91, Cronbach's alpha=0.97), Cues to action (CVR=0.95, CVI=0.90, Cronbach's alpha=0.92) and behavior (CVR=0.98, CVI=0.89, Cronbach's alpha=0.91). Also, to determine the reliability, the retest method and ICC index were used and the questionnaires were completed by the same students after two weeks. In

this questionnaire, the value of the index was 0.996 (P<0.001), which indicates its high repeatability [9].

Questionnaires were completed as self-reports and within 30 minutes. All participants were asked to answer the questions honestly. They were assured that the information in the questionnaire will be used confidentially. Questionnaires were also completed at the students' school classrooms. Data were first collected and then entered into SPSS software version 16 and analyzed using Pearson correlation coefficient, multiple regression tests and descriptive statistics. Also, the significance level in this study was considered less than 0.05.

Results

After completing the questionnaires, 15 cases were excluded due to incomplete completion and the final analysis was performed on 240 Students (rate of response: 94.2%). The mean and standard deviation of the age of the participating students was 17.29±1.31 years. 12.5% (30 Students) were studying mathematics field, and 97.5% (234 Students) were single. Only 12.5% (30 Students) reported exercising daily, 24.2% (58 Students) stated that their parents' degree is a diploma. Only 5% (12 Students) reported having 6 or more family members, 41% (98 Students) reporting being the first child of the family.

Table 1 shows the scores obtained from constructs of the HBM and the adoption of preventive behaviors of PMS in the participants. The results of this table show that students participating in this study scored lower on

perceived susceptibility and perceived severity than the other constructs in this model. Also, perceived barriers and perceived benefits constructs had the highest score among the variables in this study. Also, the mean and standard deviation of the score for adoption of preventive behaviors of PMS among all participating students was 19.25±0.63 and in other words, the participating students had earned 38.50% of score of adoption of PMS preventive behaviors.

Table 2 shows that there was a significant and direct correlation between all constructs of HBM and the highest correlation was observed between self-efficacy and perceived benefits (r=0.677) and perceived severity and perceived susceptibility (r=0.623). The results also reflected that adoption of PMS preventive behaviors in students was a significant correlation with perceived barriers (r=- 0.289), perceived susceptibility (r=0.414), and self-efficacy (r=0.381) (P<0.05).

Table 3 reflects the results of multiple regression analysis to determine Predictive Structures for adoption of preventive behaviors of PMS and the predictive value of behavior by these constructs in the HBM. The results of this table show that constructs of HBM could predict a total of 32.6% of adoption of preventive behaviors of PMS. Among the studied constructs, perceived barriers, perceived susceptibility, and self-efficacy significantly predicted behavior and among these structures, the structure of perceived barriers were the strongest predictors of behavior; while perceived severity, Cues to action, and perceived benefits were not significant predictors to adoption behavior.

Structures and Behavior	N=240		Acquired score range
	Mean	standard deviation	
Perceived susceptibility	14.88	0.56	7-35
Perceived Severity	12.03	0.69	5-25
Perceived Benefits	15.54	0.59	6-30
Perceived Barriers	20.86	0.62	7-35
Perceived Self-efficacy	15.00	0.58	6-30
Cues to action	10.34	0.72	4-20
preventive behaviors	19.25	0.63	0-50

Table 1: Mean score and standard deviation of HBM Structures and adoption of preventive behaviors of PMS among the studied students

Variables	Perceived susceptibility	Perceived severity	Perceived barriers	Perceived benefits	Self-efficacy	Cues to action	Preventive behaviors
Perceived susceptibility	1						
Perceived severity	0.623*	1					
Perceived barriers	0.188*	0.489*	1				
Perceived benefits	0.495*	0.581*	0.379*	1			
Self-efficacy	0.563*	0.548*	0.424*	0.677*	1		
Cues to	0.258*	0.346*	0.389*	0.499*	0.324*	1	
Preventive behaviors	0.414*	0.318	-0.289*	0.315	0.381*	0.297	1

* Significant correlation was less than 0.05.

Table 2: Pearson Correlation Coefficient Matrix of Constructs of HBM and Adoption of PMS preventive behaviors

Constructs	β	95% CI B	SE	R	R ²	F	P-value
The total regression model			0.328	0.571	0.326	28.358	0.001
Perceived susceptibility	0.216	(0.076-0.355)	0.071				0.005
Perceived Severity	0.195	(-1.588-1.978)	0.91				0.115

Perceived Barriers	0.289	(0.159-1.582)	0.066				0.001
Perceived Benefits	0.255	(1.607-2.117)	0.95				0.085
Self-efficacy	0.184	(-1.175- 1.685)	0.73				0.008
Cues to action	0.126	(-1.500- 1.752)	0.83				0.057

Table 3: Multiple Regression Analysis: Predictive Structures of Adoption of PMS preventive behaviors based on HBM

Discussion:

Present study was performed with the aim of determining the predictors of adoption of preventive behaviors of PMS using the HBM among pre-university girl students in Tehran. In this study, the level of adoption of preventive behaviors of PMS among participating students were poor. These results were in agreement with the results of the study Panahi and colleagues [18] and Gharlipour and colleagues [19], but it was inconsistent with the results of the study Panahi and colleagues [20], Peyman and colleagues [21] and Farshbaf Khalili and colleagues [22], in which the adoption of preventive behaviors was moderately reported. Among the possible reasons for this discrepancy can be point out the differences in age of the research units as well as the differences in the topic of prevention.

In the present study, it was found that there was a significant and direct correlation between all the structures of HBM and the highest correlation was between self-efficacy and perceived benefits and perceived susceptibility and perceived severity, respectively. The significant correlation between the constructs of model in this study indicates that the sum of these constructs together can form an individual's attitude toward adopt of PMS preventive behaviors. Also, regarding the significant correlation between self-efficacy and perceived benefits and perceived susceptibility and perceived severity, it can be said that the more knowledge and information people have about health and medical issues, the higher their perceived susceptibility and perceived severity, because perceived susceptibility and perceived severity are somewhat dependent on people's knowledge and have a strong relationship with each other. On the other hand, increasing the perceived severity can indirectly reduce the perceived barriers. At the same time, the less perceived barriers, the greater the perceived benefits [15]. On the other hand, perceived barriers and self-efficacy are interrelated so that if perceived barriers are low, self-efficacy in regarding to preventive behaviors will increase [15]. Therefore, reducing perceived barriers increases self-efficacy and perceived benefits. Given the above explanations, it seems that the easiest way to reduce perceived barriers and consequently increase self-efficacy and perceived benefits is to raise students' knowledge. For this purpose, first the needs assessment should be done and then using different teaching methods and materials and according to the cultural conditions of the students, they should be educated.

The results of this part of the study were consistent with the results of the study Panahi and colleagues [23] and Borujeni and colleagues [24], but it did not agree with the results of Namdar and colleagues [16]. The possible reason for this discrepancy may be the difference between the subject under study (cervical cancer) and the target group (married women aged 20 to 65) in this study compared to the present study [16].

The results also showed that adoption of PMS preventive behaviors in students was significantly correlated with perceived susceptibility structures, perceived barriers and self-efficacy. These results are also in agreement with the results of the study by Panahi et al. [23] and Borujeni et al. [24]. Given the correlation between perceived susceptibility, perceived barriers, and self-efficacy with adoption of PMS preventive behaviors, it can be concluded that any intervention to reduce perceived barriers and increase perceived susceptibility and self-efficacy may also influence the adoption of PMS preventive behaviors.

In the present study, perceived barriers were the strongest predictors of the adoption of preventive behaviors of PMS. These results were in line with the studies of Soleimani and colleagues [25], Namdar and colleagues [16], Tanner Smith & Brown [26], Umeh et al. [27] and Vahedian Shahrudi and colleagues [28], in which perceived barriers were one of the most important factors influencing behavior. The findings of the present study were also inconsistent with the results of studies of others, such as Borujeni and colleagues [24], Panahi and colleagues [23], and Dokht Navabi Rigi and colleagues [29]. It seems that the existence of these discrepancies could be due to differences in target groups and topics under studied, because the target groups in the studies Panahi et al. [23] and Dokht Navabi Rigi et al. [29] were students and in the study of Borujeni et al. [24], were boy students. Also the subjects studied in these three studies include smoking prevention, Prevention of addiction and breast self-examination, all three topics are different from the subject of the this study (PMS prevention).

In this study, perceived susceptibility was another important construct in predicting the adoption of PMS preventive behaviors. Perceived susceptibility was an incentive to vaccinate people against influenza, use sunscreen to prevent skin cancer, or use toothpaste to prevent tooth decay [30], Adoption of addiction Preventive Behaviors and Drug Abuse among Students [23], Pap Smear Conduction among woman [31] as well as mammography behavior among women [32]. These results were also consistent with the results of studies by Panahi and colleagues [23] and Borujeni and colleagues [24]. Also, the results of this section were in contradiction with the results of Namdar and colleagues [16] and Soleimani and colleagues [25]. Possible reasons for this discrepancy between the results of these two studies and the results of the present study are reasons such as differences in target groups, age of them and the subjects studied.

In this study, perceived self-efficacy was another important construct in predicting the adoption of PMS preventive behaviors. Bandura considers self-efficacy as the most important prerequisite for behavior change and the most important predictor of behavior. Bandura defines self-efficacy as one's confidence in one's ability to Successfully perform a behavior and as an important construct other than the HBM, it has been emphasized in other models and theories of Health Education that indicate the crucial importance of this construct for successful health behaviors [23]. The results of this section were consistent with the results of the studies of Borujeni and colleagues [24], Panahi and colleagues [23], Teymouri and Habibi [32], Soleimani and colleagues [25], Teymouri and colleagues [33], Noroozi and colleagues [34], Daneshvar and colleagues [35] and Vahedian Shahrudi and colleagues [28], in which Self-efficacy has been one of the most important predictors of behavior, but it contradicts the results of the study by Tanner Smith and Brown [26]. These differences appear to be due to differences in target groups and topics under investigation because in the study of Tanner Smith and Brown [26], two subjects of Pap smear and mammography were examined simultaneously among women.

Limitations of this study include failure to study the use of different theories and models of Health Education and Promotion to prevent this syndrome, So that no studies found using HBM to predict adoption of PMS preventive behaviors which limits the comparative power of the

findings and emphasizes the need for further studies in this area. Another limitation was that the target group in present study was only pre-university students. Therefore, further studies using this model are recommended among different groups and populations of women (in terms of education, age and residence area). Other limitations were the low number of students participating, the restricted student attendance at school and the classrooms are crowded, the lack of accurate information on the subject under study, and the self-reported data collection.

Conclusion:

Overall, in present study, the level of adoption of preventive behaviors of PMS among participants was poor. Given the correlation between perceived susceptibility, self-efficacy, and perceived barriers with adoption of preventive behaviors of PMS as well as predicting the above variables, appropriate educational interventions should be designed and performed based on the HBM with emphasis on these three effective structures.

Contributing authors

Study design: Rahman Panahi, Peyman Namdar, Mania Khalilipour Darestani, Keyhan Javanmardi; Data Collection and analysis: Mania Khalilipour Darestani, Leila deghankar, leili yekefallah, Mohammad Anbari; Manuscript Preparation: Rahman Panahi, Mania Khalilipour Darestani, peyman Namdar, Leila Dehghankar, Leili Yekefallah Keyhan Javanmardi, Mohammad Anbari.

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