Application of the Health Action Process Approach Model in Predicting Mammography among Iranian Women

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Abstract

Background: This aim of this study was examining the application of the Health Action Process Approach Model (HAPA) in predicting diagnostic mammography among women over 40 years old in Iran.

Methods: This was a cross-sectional study that was performed on four hundred women over 40 years old in health centers in Tehran between May to September 2017. The multi-stage cluster sampling were selected for sample research. The instrument was designed on based literature review about Health Action Process Approach (HAPA). Data were collected by self-report questionnaires and analyzed using statistical tests, t-test, correlation regression analysis. The predictors of diagnostic mammography were determined by the structures of the HAPA model.

Results: The result regression analysis showed the diagnostic mammography behavior prediction rate, using the structures of the HAPA model was generally 60%.

Conclusions: This study showed the effectiveness of the HAPA to predict diagnostic mammography in women over 40 years old. So, it seems examining mammography behavior and individuals' beliefs about breast cancer based on HAPA model is important in order to development of training programs and effectiveness interventions for breast cancer prevention.

Background

Breast cancer is one of the most prevalent disease with high incidence in recent years. It is an important health problem across the word, especially in Iran (1, 2) and the latest national databases showed the age-standardized rate for breast cancer is 33.21 per 100,000 (2). In study of Akbari and et al (3) the means of age morbidity in Iranian women is 5 years earlier compared to women from developed countries and the fifth leading cause of death from cancer disease is breast cancer in Iran (14.2% of death) (2). The early detection strategies for breast cancer in women, include performing clinical examination and mammography. The most effective screening method for breast cancer among asymptomatic women is mammography (4). The researches have shown mammography decreases the rate of deaths from breast cancer about 20–30% in women 40 years and older (5). It seems factors such as lack of participation in the breast cancer screening programs, late presentation for diagnosis and treatment, insufficient diagnostic and treatment facilities are causing high mortality rate in these regions. In order to effective breast cancer screening programs in decreasing the mortality rate, It has to capture both high participation and detection rate of breast lesions (6).

The results of previous literature showed despite the possible advantages of mammography screening for breast cancer prevention, there is a low level of implementation and ethnic and familial variations in breast cancer screening among women (less than 1–44%) (7, 8). Since the mammography can be a very early diagnosis of breast cancer, allows on time treatment and it can enhance women’s chance of survival and promoting their quality of life (9).

Various studies have shown that suitable educational intervention can be a predisposing factor for mammography practice, and can increase the level of women's knowledge, attiudes and practice about breast cancer and early detection. In health education; using theories of health behavior to interventions is recommended (10) because they can lead to effective health education programs. In fact, the models offer a framework for understanding how people learn and how they practice and why people practice as they provide (11). The health action process approach (HAPA) is a universal theory was developed for assessing the health promoting behaviors in 1992, especially those pertaining to breast cancer. This theory has two phase change behavior that may make different social cognitive predictors (12). According to the views of Schwazer the HAPA has two layers: a continuum and stage layer. The HAPA model suggested a difference between pre-intentional motivation processes that leads to a behavioral intention and post- intentional volition process the leads to the real health behavior. There are different patterns of social-cognitive predictors in this model (Fig. 1). In the first motivation phase assumed to be a person extend an intention to act, and this phase risk perception is seen as a distal antecedent. They are important during the motivation phase when a person balances the advantages and disadvantages (pros and cons) of certain behavioral outcomes. In addition, one needs to task self-efficacy that it is the belief's individual about one's ability to perform a behavior. Task self-efficacy in adapting with positive outcome expectancies significantly contribute to the formation of an intention. This structure is intended to pre-intender category. After organizing an intention has entered the volitional phase. In this phase, a person has 'good intention' to be transformed into detailed instructions on how to accomplish the desired practice. The post- intentional phase included planning, action control, recovery self-efficacy.The HAPA model provides a better behavior prediction and reflects a causal mechanism of behavior change (13). Therefore, this paper aims to report application of the HAPA model in predicting diagnostic mammography among women over 40 years old in Iran.

Method

This was a cross-sectional study that was performed on four hundred women over 40 years old in health centers in Tehran between May to September 2017. The participants were registered women 40 years and older in urban health centers. In total, 410 questionnaires were distributed, but the final sample consisted of 400 women (response rate = 97.56%). The sampling method was the multi-stage cluster. In the first step, three health networks (North, East, Shemiranat) were randomly selected from 10 health networks at Shahid Beheshti University of Medical Sciences of Iran (SBMUS). Next, for each network were randomly selected five urban health centers). Then, 400 women over 40 years old were randomly selected according to the inclusion and exclusion criteria in this study. The subjects informed regarding the risks and benefits of the study, and completed consent form. The instrument was included a demographic information and self-reported questionnaire based on structures of HAPA in mammography behavior. It was consisted 48 items using a 5-point Likert-type response scale anchored by 1, definitely disagree, and 5, definitely agree where higher scores indicate the better status of responder in that scale toward mammography. Items specifically devised to assess mammography related perception (Table 1).

Table 1
Description of scales and psychometric properties

Variable	Sample items and scale	No. Items and alpha
Risk perception	participants were asked to estimate the chance of facing breast cancer, for instance, 'My chances of getting breast cancer in the next five years are great'(27).	5;α = 0.83
Outcome expectancies	outcome expectancies were measured by six items based on Ajzen's recommendations(28) and the participants' feedback. They were requested to assess the statement, 'Having a mammogram every year will give me a feeling of control over my health'(29).	6;α= (α = 0.79)
Task self-efficacy	It was measured based on Schwarzer's recommendations(15).The following principle was applied: 'How sure are you that you can overcome the following obstacles? I can start a mammography even…'	12;α = 0.84
Action and coping planning	Action planning was appraised recommendation by Schwarzer et al(14) "I already have concrete plans (when/where/how/with whom) to Mammography." Participants scored if they had made plans in detail about (a)'what to do if their plans go under a trouble for doing a mammogram',(b)'How to face the defeats in their plans for mammography',(c)'how to stick with their aims, even under circumstances'(d)'what to do if their plans on how we answered your opponents in mammography.'	4;α = 0.80 4;α = 0.75
Intention	For the assessment of intention to follow a mammogram, five items adapted from Ajzen(28) and Stephanie M. Smith et al (29) were applied: (1)'I never had a mammogram in the last two years and I also don't intend to do a mammogram in the next year.(2)'I never had a mammogram in the last two years and I intend to do a mammogram in the next year.'(3)'I have done mammography at least once in the past two years, but I do not intend to do mammogram in the next year; (4)'I have done mammography at least once in the past two years, I intend to do mammogram in the year.(5)'I have done mammography at least twice in the past two years, I intend to do mammogram in the next year.	5;α = 0.85
Maintenance self-efficacy	The confidence of the individuals regarding their ability to undergo mammography even if they were blocked by some barriers was measured(30, 31). The participants' convictions were measured to see if they could recover by themselves after failing in mammography behavior(14).	6;α = 0.80
Recovery self-efficacy	The participants' convictions were measured to see if they could recover by themselves after failing in mammography behavior. The women were asked to respond to the following statement regarding their confidence about the ability to return to mammography even after quitting this behavior."I am sure can resume mammography, even if I have left it for two years.'	2;α = 0.84

Variable	Sample items and scale	No. Items and alpha
Action control	Action control was determined facets of comparative self-monitoring (items a and b), notice of the standards (items c and d): (1)'I consistently monitored myself whether I underwent mammography frequent enough' and (2)'I consistently monitored when, where, and for how long I underwent mammography.	2;α = 0.79
Mammography behavior	Mammography behavior was specified in a two-step process. a) Women asked if they had ever mammography (Yes = 1, No = 0). b) Do you have any mammogram during the past year? (Yes = 1, No = 0).'	2; α = 0.80

First, we were assessed the association between HAPA constructs and mammography behavior using Pearson correlation. The regression model simultaneously used in the analysis eight HAPA constructs. In this analytical model, the standardized regression coefficients were reported with type-1 error set at $p < 0.05$ level (two-sided). Data analyses by using the Statistical Package for Social Science ($SPSS_{20}$).

Results

The women's age range was 40–65 years with a mean age of 45.6 years (SD = 5.45 years). The educational background of 37.2% women was less than high school. The majority (88%) women were married. Overall, 20% of the participants had positive history breast cancer in the family. The other characteristics of participants are displayed in Table 2 and Table 3 shows mean ± SD of HAPA structure. The result of Pearson correlation indicated there is no significant correlation between people's age, risk perception, outcome expectancies, action control, coping planning, maintenance self-efficacy and recovery self-efficacy; However, Pearson correlation coefficient showed a significant correlation between the means of people's age and task self-efficacy ($r = 0.17$, $p < 0.01$) and this variable and action planning ($r = 0.16$, $p < 0.01$). In order to examine the structures of HAPA in mammography behavior used Pearson correlated. The finding showed there was a significant and strong correlation between action and coping planning ($r = 0.75$, $p < 0.01$). Also, there was significant correlation between action planning ($r = 0.33$, $p < 0.01$) and coping planning ($r = 0.25$, $p < 0.01$) and mammography behavior (Table 4).

Table 2
The demographic of women participating in the study (n = 400)

Demographic	No.	%
Age group (years)	N = 400	
40–44	214	53.5
45–49	103	25.8
50–54	52	13
55–59	11	2.7
60 and above	20	5
BMI		
18.5–24	146	36.5
25-29.9	169	42.3
≥ 30	85	21.2
Education Background		
Less than high school	149	37.3
High school/trade	117	29.3
More than high school	134	33.4
Occupation		
Housewife	368	92
Employed	32	8
Marital Status		
Single	48	12
Married	352	88

Table 3
The mean ± SD structures of health action process approach (HAPA)

Variable	(Mean ± SD)
Risk perception	15.5 ± 4.3
Outcome expectancies	16.7 ± 7.1
Task self-efficacy	21.11 ± 3.15
Action planning	4.17 ± 1.4
Coping planning	3.4 ± 1.37
Action control	3.2 ± 1.6
Maintenance self-efficacy	13.3 ± 3.18
Recovery self-efficacy	2 ± 0.05
Mammography behavior	0.29 ± 0.58

Table 4
The correlation matrix of the structures of (HAPA) in the mammography behavior of participants

Variable	1	2	3	4	5	6	7	8	9
1. Risk perception	1								
2. Task self-efficacy	r = 0.04	1							
3. Outcome expectancies	**r = 0.34	r = 0.06	1						
4. Action control	r = 0.01	r = 0.04	r = 0.01	1					
5. Action planning	**r = 0.13	r = 0.07	**r = 0.32	r = 0.02	1				
6. Coping planning	**r = 0.14	r = 0.04	**r = 0.18	r = 0.02	**r = 0.75	1			
7. Maintenance self-efficacy	**r = 0.12	r = 0.10	**r = 0.25	r = 0.72	**r = 0.41	**r = 0.31	1		
8. Recovery self-efficacy	r = 0.05	r = 0.10	r = 0.07	r = 0.03	r = 0.06	r = 0.01	r = 0.07	1	
9.Mammography behavior	**r = 0.2	**r = 0.2	r = 0. 1	r = 0. 06	**r = 0.33	**r = 0.25	r = 0. 6	r = 0.02	1
** p < 0.01									

The regression analysis showed the structures of HAPA_ risk perception, outcome expectancies, task self-efficacy, action control, action planning, recovery self-efficacy_ were predictors of mammography behavior. The estimated regression analysis indicated that HAPA model accounted for 60% of the variance in mammography behavior (Table 5).

Table 5
Regression analysis of t HAPA constructs as predictors of mammography behavior

HAPA constructs	Beta	P	R^2
Risk perception	0.84	p < 0.01	%60
Task self-efficacy	0.22	p < 0.01	
Outcome expectancies	0.16	p = 0.01	
Action control	0.2	p = 0.01	
Action planning	0.93	p = 0.03	
Coping planning	0.231	p = 0.6	
Maintenance self-efficacy	0.27	p = 0.132	
Recovery self-efficacy	0.020	p < 0.01	

Discussion

In this study, was applied the health action process approach (HAPA) using the concept of Schwarzer's model (14) to understand mammography behavior among women over 40 years old. There is a little research that used HAPA model to explain mammography behavior in women and it seems this study is the initial research on the application of HAPA in Iranian women and provides new evidence about using behavioral theories in breast cancer research in this country and other developing countries. This current study suggested mammography intention and recent mammography were related to HAPA factors. The finding of our study is consistent with a number of related studies (13–15). According to HAPA theory perceiving greater risk perception and outcome expectancies to health risks, and having more task self-efficacy and action control and action planning, encourage intentions and/or behaviors.

The results showed that 97% of subjects had no information about mammography while 3% of them had appropriate knowledge. In other studies conducted in Iran, there are low levels of knowledge about breast cancer and detection methods (16). In our study, the reason for the lack of knowledge was the low education levels in the most participants. The results showed there was no significant relationship between education levels and mammography practice in contrast, in the study of Doqham and et.al (17) there was a significant relationship between education level and mammography behavior.

The results indicated 93% of participants have not intention for mammography doing and the fear of breast cancer was the most important reason for not having a mammography. In this study, there was the negative and significant association between age and mammography behavior; so that younger women did more mammograms ($r= -0.1$, $p < 0.01$). This finding confirmed by Sadatjediarani and et.al study (18) and study by Victoria Champion (19). It seems younger women had a lower barrier to mammography.

Our findings suggested task self-efficacy, risk perception and outcome expectancies had different predictors and effects.While in the study by Murphy (10) barriers were factors that had different predictors and effects. Overally, understanding of mammography in this study was about 3% which in research of Aminisani and et.al (7) reported 17%. Furthermore, it reported lower in other study (20, 21). In this study, mammography behavior was not higher among women with positive history of breast cancer in family, while other study reported opposite findings (22). Consistent with other studies (23), task self-efficacy was related to individual's motivation to predict mammography and it suggested self-efficacy can be arranged by the care provided to increase women's participation in mammography screening program.

In the current study, risk perception was an effective factor in mammography behavior. This result confirmed in the study by Nichole A.Morman and et.al (24) so that women's risk perception about cancer was significantly associated with more remember of recommendation for breast health care. In other research, risk perception affects the application of early diagnostic methods, personality high risk perception increases the frequency of mammography (25, 26).

The findings indicated mammography behavior is low in women of Tehran, and signalized the need for performing a comprehensive educational intervention and it should be considered as an important priority for health policy makers and providers.

Another barrier for doing mammography is the lack of facilitators, which need to be included in the process of developing breast cancer screening program as the essential and basic foundation. In the present study, some influential factors identified that may help to design and provide an appropriate educational intervention for target women. We recommend more research to identify potential barriers to participating in screening in such areas. Finally, it must be noted that one of the issues concerned with breast cancer detection behavior is the concept of health in different cultures.

There are several limitations of this study. First, as regards the data were gathered by cross-sectional and self-report, in which participants may report practice higher than the real amount. Secondary, applying convenient sampling causes findings of this study not to be generalized to all Iranian women. This study provides why it is believed that determining the effects of the HAPA on mammography must be multi-faceted. Despite these limitations, this study was the first application HAPA as a theoretical framework to predict mammography behavior in Iran.

Conclusion

The findings of this study supported from theory-based interventions to encourage women's breast cancer screening. Lastly, the strength of this research is that it may be used as a guide to examine mammography behavior in women in other countries.

Declarations

Ethics approval and consent to participate

The ethics committee of Tarbiat Modares University has approved it with the clinical trial code IRCT 2017061134472N1. We obtained consent form from all participants.

Consent for publication

All authors give consent to publish information about the article in the journal.

Availability of data and material

The authors confirm that the data supporting the findings of this study are available within the article its supplementary materials.

Competing interests

The authors declare they have no conflicts of interest.

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Author's contributions

FP: conducted the entire study and had full access to all data for analysis. She confirmed the qualifications of women in this study. She was involved in the preparation of the article.

FP: Assisted in writing the article and collecting the data.

MHD: Project consulting

FGH: Monitor the entire study and verify the final manuscript.

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Figures

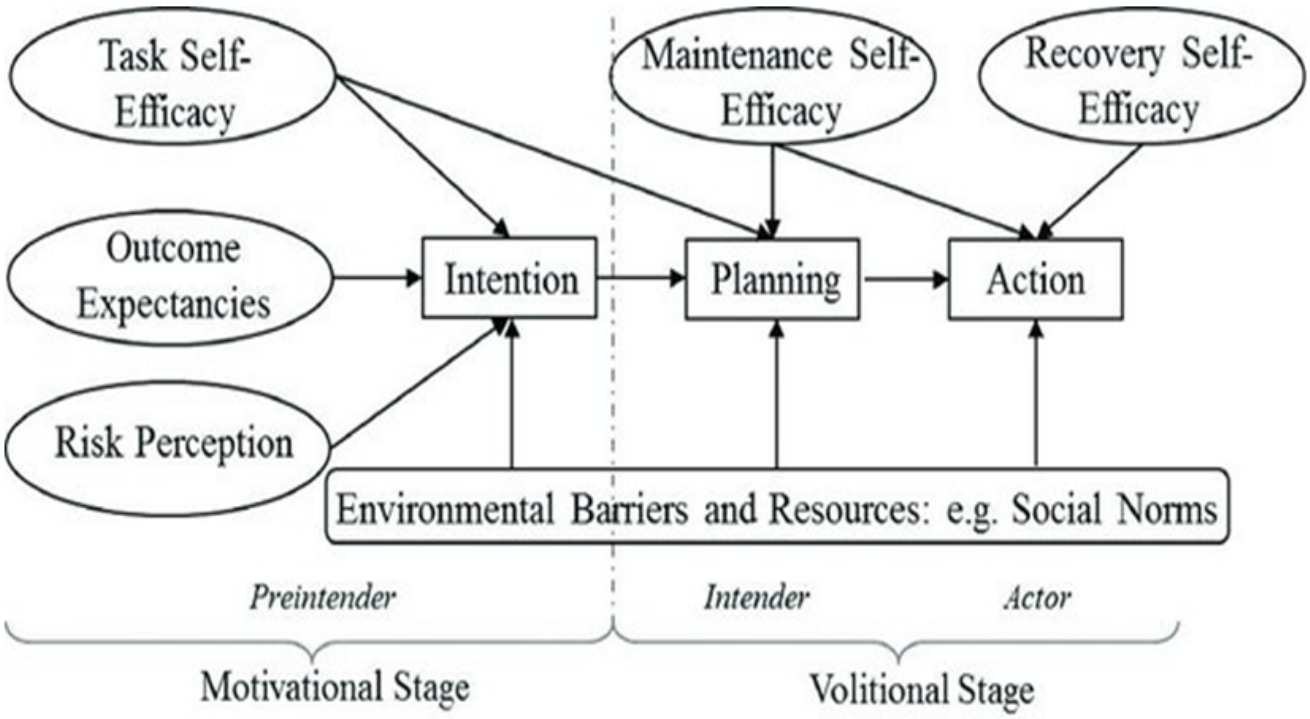

Figure 1

The Diagram of Health Action Process Approach (32). The HAPA framework builds on social cognitive theory (SCT), It is distinguished two stages of behavior change: motivation, and maintenance phase. The basic assumption HAPA is that motivation is a necessary position for behavior change, but goal-setting and action planning are needed for the change to actually occur. The self-efficacy play a key role throughout the process of behavior change.