

Instrument Development for Understanding Factors Influencing Mammography Compliance among Iranian Women in Metropolitan Tehran, Iran

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Abstract

Breast cancer is the most widespread cancer among women worldwide. The success of breast cancer screening initiatives depends on the target women and their attitudes. The aim of this study is to develop an instrument for the understanding of women's socio-psychological factors in relation to mammography screening. The study is exploratory in nature and combines three theories. These theories include the health belief model (HBM), theory of reasoned action (TRA) and the social cognitive theory. The purpose of the inquiry is to examine the behavioural and socio-psychological factors inspiring women participation in mammography screening.

A five level Likert scale was employed to discover factors influencing women participation in mammography. Self-administered questionnaire was developed and modified based on previous literatures. A total of 400 women aged 35-69 years, were randomly selected. The study was conducted among female clients of maternity hospitals affiliated to Medical Sciences of Tehran University, Tehran, Iran.

Principal Components Analysis was applied to describe the psychometric evaluation of the instruments measuring self efficacy, beliefs, social influence and barriers. Principle axis factorization generated four factors that accounted for 72% in the variance of psychosocial items.

The reliability of the data and scale was computed with Cronbach's Alpha. The values were 0.993, 0.850, 0.709 and 0.952 for self efficacy, beliefs, social influence and barriers respectively. The alpha values exceeded 0.70 suggested as acceptable inter-item reliability threshold, indicating high correlation among the variables in the data set. Consequently, the sets of items yielded results consistent with the complete instrument.

However, the current study differed from other studies with respects to the number of factors found. In line with the above, questions that load on each factor and the amount of variance accounted for in each factor should be compared in future studies.

Indeed, the findings of the study contributed to the knowledge of the psychometric properties in breast cancer screening instruments, particularly in the utilization of mammography which is needed to asses for other Asian women in future study.

Keywords: Women participation, Mammography screening, Self efficacy, Beliefs, Social influence, Barriers

1. Introduction

Cancer is the third leading cause of death in Iran after coronary heart disease and accidents, according to the national cancer registry. Studies illustrated that breast cancer patients range from 15 to 84 years with those 40-49 being the most common. Iranian women with breast cancer are quite younger (10 years) than their western counterparts and many of them are already in advanced stages of the disease resulting in high mortality (Mousavi, 2007). Findings revealed that the early detection of breast cancer greatly enhances the feasibility of successful treatment. The notion that early detection can save lives each year is not contestable.

The success of breast cancer screening programs depends on the target population and also a function of the women's attitudes. However, there is no national program for breast cancer screening in Iran. Though, some attempts like breast cancer prevention advocacy in health centres, health houses, hospitals, clinics, work places, or NGOs have already been conducted to increase women's awareness of breast cancer prevention techniques. Knowing the reasons underlying women's participation or lack of participation in mammography screening

programs might foster the development of strategies to combat the disease. This study plans to explore the components of several models suitable in the explanation of women's behaviour concerning early breast cancer detection. Behaviour change theories usually describe the level of change among individuals. Therefore, it allows for the implementation of programs that focus on the needs of the populace.

Individual (women) behaviour can be changed, and very much influenced by attitude. Thus, attitudes regarding mammography are used to identify the women stand in terms of changing behaviour and what interventions is needed to direct the next step to sustained behaviour change. According to Lee (2001) five models mostly used in health behaviour are:

1. Health Belief Model (Hock baum, 1958; Rosentock, 1966)
2. Social Cognitive Theory (Bendura, 1977)
3. Theory of Reasoned Action & Theory of Planned Behaviour (Fishben&Ajzen, 1975)
4. Trans theoretical Theory (Prochaska et al, 1993)
5. Health Promotional Model (Pender, 1987)

Similarly, Brailsford, Sykes and Harper (2006) maintain that three of the best known psychological models for health behaviour are Rosenstock and Becker's Health Belief model (1996, 1974), Ajzen's Theory of Planned Behaviour (1988) and Wallston's Multidimensional Health Locus of Control model (1992).

Also, some researchers used the theories mentioned above to discover women participation in mammography utilization. The scholars believed that psychological variables were important in the determination of women's participation in an intervention (Brailsford, Sykes & Harper, 2006). The health belief model (HBM) has been employed by many researchers and authors in the investigation of women's behaviour to the utilization of mammography (Miller & Champion, 1997; Thomas, Fox, Leak, & Roetzheim, 1996). Kim (2002) combined the health belief model (HBM), and the Theory of Reasoned Action (TRA) to elaborate women's participation in mammography screening in Korea. In another study, self-efficacy and supportive social influences were found to be strongly associated to mammography intent or prior mammography use (Allen et al, 1998).

In addition, reviews on health-related behaviour has showed that individuals will generally not attempt to search for diagnosis, prevention, or treatment for a condition unless they possess minimal levels of relevant health motivation and information. Furthermore, these individuals must be potentially vulnerable, aware about the seriousness of their situation and convinced of the efficacy of health intervention (Becker, 1975). Randomized trials comparing mammography with non mammography screening found that women might benefit 15% relative risk reduction in mortality from mammography (Gotzsche, 2006).

Early diagnosis of breast cancer can reduce mortality rate and can promote women's quality of life and well being. Women's attitudes need to be changed to ensure the early detection of breast cancer. To make this change happen, the understanding of women's health beliefs and attitudes to this specific health issue is important. Thus, the main objective of this paper is to develop an instrument that can be used to explore factors influencing Iranian women's breast cancer screening behaviours in providing valuable information to healthcare providers, researchers, and public health educators.

This study attempts to understand women's attitude and the barriers which determine compliance with mammography among Iranian women in the city of Tehran on the basis of health belief model, theory of reasoned action and social cognitive theory.

Insert Figure 1 Here

2. Methodology

2.1 Study population

This cross-sectional study was carried out among female clients of maternity hospitals affiliated to Medical Sciences of Tehran University, in Tehran, Iran. A total population of 400 women aged 35 to 69 years was surveyed. Random sampling technique was employed to maximize heterogeneity and the inclusion of various ages, educational level, and economic background. Trained data collectors executed the face to face interview with women in the waiting area of the gynecology wards of four participating hospitals in Tehran. The study excluded women who had been examined for breast cancer disease.

2.2 Development of the instrument

The main instrument in this research is the questionnaire because it is an inexpensive way to gather data from a large number of respondents. The questionnaire was constructed, and the items developed is measured based on

the 5 points-Likert scale. This data collection tool was easy to construct, administer and suitable for the respondents to understand and response. After the selection of proper instrument for the study, it was adapted and modified by the researcher through literature review, and followed by revision for content and face validity by an expert panel, comprising of three social scientist with specialty in community development, two specialized doctors in surgery, oncologist, a radiologist with specialty in breast cancer diagnosis, two family medicine physicians, two epidemiologist and a professor with specialty in public health.

The process of modifying the questionnaire was time-consuming. There are several questionnaires developed by other authors, these researchers used the components of some theories to draw a framework. The questionnaire included the following components used in assessing factors that influence mammography utilization: (a) The health belief model which measures perceived barriers (b) The theory of reasoned action that measures beliefs and social influences, (c) The social cognitive theory that measures self efficacy. The knowledge of the target population and selected demographic variables as determinants were equally considered. Most of the questions for the instruments were modified from previous literatures such as Montano et al (1997); Kim.Rn (2002) and Lee- Lin et al (2008) which illustrated high credibility. A number of questions developed in this research were to address important concepts which were not addressed in previous studies. The health belief model, the theory of reasoned action, and the social cognitive theory components were measured on a 5 point Likert scale from 1 to 5 (1="Strongly disagree" 2="Disagree" 3="Moderate" 4="Agree" 5="Strongly agree").

The questionnaires were translated by three translators fluent in both English and Persian. They were all experienced health care professionals who have been working for many years. Each item was evaluated, and the translation was cross-checked for consistency. The researcher evaluated the linguistic and cultural accuracy of the translation assisted by expert panels, particularly an expert translator.

3. Analysis

The two key concepts in the authenticity of scientific research are validity and reliability. Reliability and validity ensured the internal consistency and content validity of the instruments. The ready-to- be used questionnaire was tested. Test-retest methods which ask one question to the same person at intervals of two to four weeks were carried out. Reliability testing was conducted on a convenience sample of 31 women aged 35 or older. Hence, 31 convenient samples were chosen to conduct the pilot test.

The results indicated the sufficient factor ability of the statements. In order to determine the reliability of the instruments, Cronbach Alpha value was checked against the items constructed in the questionnaire. Correlations between the items of each construct were also examined. In this case, high correlations are desirable to establish convergent validity. According to Garson (2009), the dimensions should have a Cronbach alpha of at least .70 to establish reliability of the constructs. Based on the pilot study, the Cronbach's alpha values of the items in the questionnaires ranged from 0.72 to 0.96

The lack of standardized tests to measure a number of constructs related to the attitude toward mammography utilization required the development of scales using Principal Components Analysis (PCA) and Common Factor Analysis (FA). The Principal Components Analysis (PCA) is a technique for maximally summarizing the information included in a number of variables of a data set into a smaller set of linear combinations (Pallant, 2001). Although it cannot reflect any underlying process (Cudeck, 2000), in the present research, PCA was performed first for exploratory purposes, i.e. to identify the likely number of factors. The Exploratory Factor Analysis was used to determine, in brief and the fundamental influences on the set of observed variables. The nature of four variables was counted by examining the extent to which each observed variable was associated with an underlying dimension, or factor (Tabachnick & Fidell, 2001). The factors explained the data through reduced number of concepts that returned the original set of variables which were used for further statistical analyses (Hair et al., 1995) later.

4. Results

The data was analyzed based on the questionnaires gathered from 400 women in gynecology ward of four participating hospitals collected from July through October, 2009, in Tehran, Iran. The respondents (women) who had undergone mammogram test in the past two years were evaluated as participants and those with no history of having a mammogram were classified as a non participant group. Initial quantitative analysis began with descriptive analysis, including frequency distributions for variables of interest, accuracy of data input, and missing values. Data analysis was conducted on a total of 400 respondents without any missing values.

Chi-square (χ^2) test uncovered all demographic variables between two groups. Participants and non participants were significantly different (p -value<0.01). The present research program attempted to balance increased model

fit and content validity. To further ensure the adequacy of the measurement model, Kline (1998) noted that correlations between the constructs should be examined to ensure they were not very high. In this research, the Cronbach's alpha coefficient provided a measure of reliability and convergent validity. The reliability coefficient of the actual study is shown in table 4.

The Principal Components Analysis was applied to describe the psychometric evaluation of the instrument measuring self efficacy, beliefs, social influence and barriers for construct validity. According to Hutcheson et al (1999), researcher use factor loadings to understand the factor structure of the data in exploratory factor analysis. Principle axis factoring analysis generated a four-factor that accounted for 72% of the variance in psychosocial items. A factor loading greater than 0.35 was stated as loading threshold using the rule of maintaining factors with Eigen values greater than 1.0 (Gibbons, Clark, Cavanaugh, & Davis, 1985). Barlett Sphericity test was statistically significant, $\chi^2(595) = 19502.704$, $p = .000$, the variables were highly correlated to one another. Thus, the data was appropriate to conduct factor analysis. Kaiser-Meyer-Olkin measure of sampling adequacy was 0.949. Therefore, there was evidence for overall measurement of sampling sufficiency, fulfilling the requirement of at least 0.60 (Hutcheson, Graeme & Nick Sofroniou, 1999). On the factor analysis, the researcher found Questions 6, 7, and 10 related to belief, loaded on two factors such as, belief and barriers, though it had greater factor loading on belief, from the other questions in the analysis. Based on the responses from the 400 women and based on the wording of the questions loaded on each factor, the researcher proposed that factors 1, 2, 3, and 4 assessed self efficacy, belief, social influence and barriers in the current research. The most dominant factor influencing women's attitude or behaviour towards mammography screening is self efficacy with the highest variance (35.02%) compared to other variables such as belief (17.76%), social influence (13.28%), and barriers (5.98%).

The findings of this paper are consistent with some previous researches. Shirazi (2006), Brailey (1986), and Edgar et al. (1984) noted that there was a significant and positive relationship between performing breast self exam and self-efficacy. Likewise, Straughan and Seow (2000) documented that self efficacy was positively correlated with attendance of breast screening exercise. In addition, with respect to prevention of disease, self efficacy is the strongest predictor of breast cancer preventive behaviour (Wallace, 2002).

5. Conclusion

This paper offered a conceptual framework for the enhancement of women's behaviour toward breast cancer screening. It focused on four constructs influencing women behaviour regarding mammography screening such as self efficacy, belief, social influence, and barriers.

Data analysis was carried out using SPSS version 13. Descriptive and inferential statistics were used to outline the information about the sample socio-demographics. Statistical significance was determined at the level .05. The assessment of frequency distribution for each variable, confirmed that the data set had no problems with skewness and kurtosis. Internal consistency reliability analysis was also performed. Finally, a factor analysis using principle axis factoring with varimax rotation was set to further the evaluation regarding psychosocial aspects of the research framework. The results revealed the acceptable levels of internal consistency reliability, content validity and construct validity (factor analysis) of the instrument, which are consistent with previous studies in the literature. Thus, the data assures a large-scale administration of the instrument to determine women's attitude and psychosocial aspects toward mammography utilization. However, the differences between this research finding and those of other studies were the number of factors found. In line with the above, questions loaded on each factor and the amount of variance accounted for by each factor should be compared in future studies (Lee-Lin, 2008). This is because the sample size and demographic attributes of respondents are important to factor analysis.

This research with its focus on factors influencing mammography screening seeking behaviour by the women can change health professional's idea in the promotion of sustained breast cancer prevention programs. The findings obtained in this study could be implemented to increase the screening rate, by incorporating a theoretical-based intervention for Iranian women. Self- efficacy is the most influencing psychological factor that encouraged women seeking and participating in mammography screening activity. With regards to this, therefore, individualistic approach could be used for future interventions to increase mammography utilizations. All in all, the findings of this research contribute to the knowledge of the psychometric aspect aimed at understanding the Iranian women behaviour in breast cancer screening program, particularly the utilization of mammography.

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Table 1. Demographic Characteristics of the Respondent

n=400							
		Participation				χ^2	P
		Non-participant		participant			
		n=314(78.5%)		n=86(21.5%)			
		n	%	n	%		
Age	-40	76	24.2%	20	23.3%	26.809	.001
	41-45	69	22.0%	35	40.7%		
	46-50	58	18.5%	23	26.7%		
	>51	111	35.4%	8	9.3%		
Education	Primary school	124	39.5%	4	4.7%	67.26	.001
	diploma	69	22.0%	11	12.8%		
	Graduate	81	25.8%	61	70.9%		
	postgraduate	40	12.7%	10	11.6%		
Marital	Married	215	68.5%	59	68.6%	9.65	.008
	Widow	69	22.0%	10	11.6%		
	Single	30	9.6%	17	19.8%		
Occupation	Full time Employee	89	28.3%	58	67.4%	48.58	.001
	Part Time	58	18.5%	14	16.3%		
	Employee						
	Unemployed or Housewife	167	53.2%	14	16.3%		
Income	low	111	35.4%	3	3.5%	33.67	.001
	middle	173	55.1%	70	81.4%		
	high	30	9.6%	13	15.1%		
Insurance	public	229	72.9%	77	89.5%	25.24	.001
	private	15	4.8%	9	10.5%		
	uninsured	70	22.3%	-	-		

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.949
Bartlett's Test of Sphericity	Approx. Chi-Square	19502.704
	df	595
	Sig.	.000

Table 3. Rotated Component Matrix (Principal Component Analysis)

	Components and variances			
	Self efficacy Variance 35.02%	Beliefs Variance 17.76%	Social influence variance 13.28%	Barriers variance 5.98%
I am confident I will participate in regular mammograms.	.899			
I am confident I will participate in regular mammograms irresponsibly of painful procedure.	.911			
I am confident I will participate in regular mammograms without recommendation from a doctor.	.908			
I am confident I will participate in regular mammograms irrespective of time constraints	.909			
I am confident I will participate in regular mammograms even if it is expensive.	.896			
Learn me whether I have cancer.		.830		
Allow me to live longer		.851		
Be important to my family		.844		
Mean making time for my health is important		.820		
Mean having a mammogram is part of good overall health care		.822		
Expose me too many X- rays		.708		
Cause pain.		.670		
Help me feel in charge of my health		.558		
Give me a sense of control over my health		.767		

Feel uncomfortable	.682		
I would seek advice from my doctor or health staff about mammography rather making decision by my decision.		.489	
I would follow my family's advice about my mammography even if I prefer doing something different		.682	
I would follow my friend's advice about my mammography even if I prefer doing something different.		.834	
I would follow mass media and people in the news about doing mammography.		.447	
I would follow awareness program from, public health center NGOs or work place health promotion program about doing mammography		.637	
Cost of mammogram is too much			.671
Too hard to figure out where to go for mammogram.			.773
Lack of transportation to an office to get a mammogram.			.750
No one to stay with children or grand children			.715
Worry the breast X-ray might find cancer.			.543
Doctor /health provider has not advised to do it.			.473
Do not think mammography can save our life			.543
People who perform mammography do not treat patients with respect.			.473
Too many other things going on in our lives.			.526
Worry that mammography might give us cancer.			.651
Do not think we need mammography.			.566
No one we know talks about getting breast cancer			.611

Media and promotional resources about mammograms do not exist in our neighbourhood.				.733
Breast X-ray cannot change our destiny.				.667
It makes me embarrass.				.712

Table 4. Reliability Coefficient of Actual Study

Variables	Cronbach's Alpha	N of Items
Self efficacy	.993	5
Beliefs	.850	10
Social influence	.709	5
Barriers	.952	15

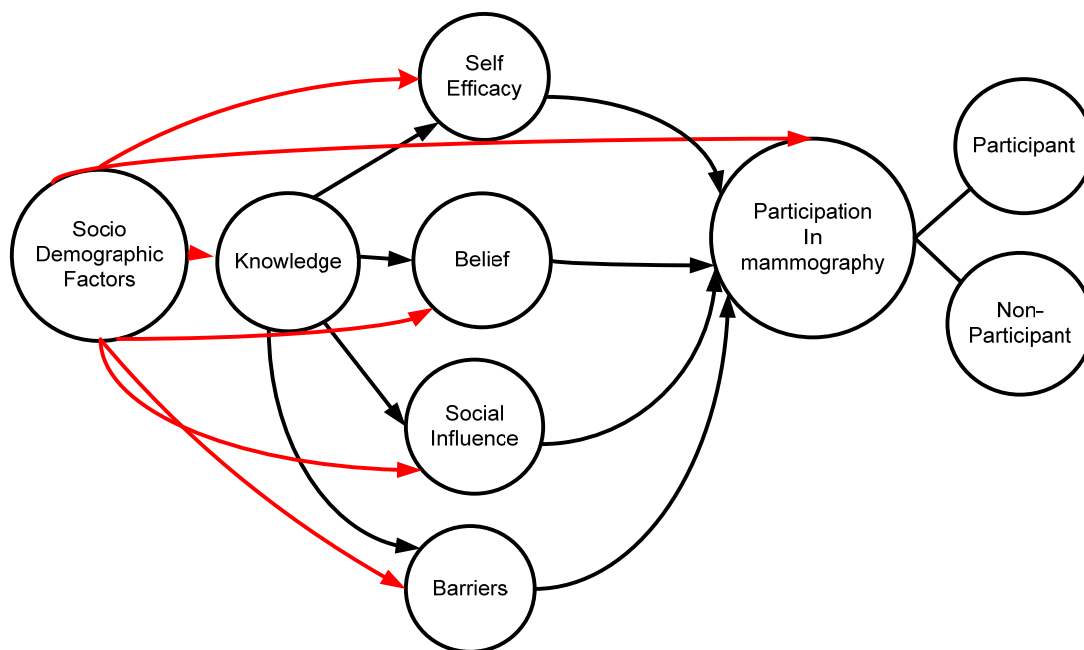
Individual Factors**Psychosocial Factors****Health Behaviour Change**

Figure 1. Conceptual Framework