



## Original Article

# Psychometric Properties of a Protection Motivation Theory-based Questionnaire to Assess Self-Medication in a Sample of Elderly Iranians

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## ABSTRACT

### Article history

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**Introduction:** The existence of standard tools is one of the basic needs of scientists of healthy behavior for predicting health-related behaviors. The aim of the present study was to design a psychometrically sound instrument to measure the protection motivation theory constructs regarding self-medication for elderly Iranians.

**Methods:** The study was conducted in spring 2016. The sample consisted of 196 Iranians between the ages of 60 and 74. The study took place in Ahvaz, Iran. The instrument included perceived susceptibility, severity, response costs, response efficacy, self-efficacy, rewards, and fear constructs. The qualitative component of the study, which consisted of interviews with experts and a systematic review of the literature, provided the data to write the items for the instrument, followed by determining the content validity. Principal components analysis with Oblique rotation was performed to extract correlated constructs. The Kaiser-Meyer-Olkin (KMO) and Bartlett's tests were performed to examine the suitability of the data for factor analysis. Cronbach's coefficient alpha was used to estimate the internal consistency of the scales.

**Results:** The KMO test statistic of 0.90 revealed the sampling adequacy for doing factor analysis and Bartlett's test of sphericity was significant ( $p < 0.001$ ). Seven constructs were extracted based on Eigenvalues of  $\geq 1.00$  and factor loadings of  $\geq 0.40$ . Cronbach's  $\alpha$  for the constructs, namely, perceived susceptibility, severity, response costs, response efficacy, self-efficacy, rewards and fear were 0.84, 0.86, 0.81, 0.82, 0.88, 0.89, and 0.85, respectively. The seven constructs accounted for 69.41% of the variation.

**Conclusion:** The developed scales for measuring the protection motivation theory constructs regarding self-medication have acceptable psychometric properties among elderly Iranians.

**Keywords:** Psychometrics, Self-Medication, Protection Motivation Theory, Aged

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### Introduction

Self-medication in the elderly needs a special attention as this group of people are more at risk,

compared with other age groups (1). The elderly may self-medicate due above average affliction with

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diseases; thus, sustaining medication-related complications; additionally, biochemical, physiological, and pharmacokinetic changes in the elderly may result in overdose or inappropriate use of medications (2). This makes paying careful attention to self-medication quite important as there are a number of medications available to the elderly (1).

Self-medication can lead to different complications such as the risk of reuse, abuse and long-term use of the medication, possible delay in the treatment of a serious disease, the hiding of the symptoms of a serious disease, and interference with other medications used by the individual (3). Various studies have explored the necessity of intervention and education for the reduction of self-medication. Specifically, there are studies focusing on the significant role of education in the improvement of the elderly health (4).

The behavioral science experts' knowledge of the factors impacting the prediction of self-medication can be instrumental in designing appropriate and effective preventive behavioral interventions (5, 6). The Protection Motivation Theory (PMT) was proposed by Rogers in 1975 to explain the effects of the fear of a significant event on the behavior. The PMT assumes that the adoption of a recommended healthy behavior (protective behavior) against a health risk is a direct behavior from the individual's motivation for protecting him/herself (7). According to the PMT, the environmental and personal factors are combined to propose a potential health threat, consisting of two cognitive processes, namely, coping appraisal and threat appraisal (8). The fear appeal theory has been used in different domains of healthy behaviors such as self-medication, substance abuse, and cancer screening behaviors (9-12).

Researchers have suggested that the shortage of high quality measuring instruments is one of the main obstacles in conducting appropriate studies and that resolving it is needed for the research to move forward. In short, if the instruments have appropriate psychometric properties, more robust research investigation will be possible (5). Additionally, the more theoretical support the health-based educational programs have, the more effective they will be in changing behaviors (6). Therefore, considering the importance of the issue, the aim of the present study was to examine the psychometric properties of the scales for measuring PMT constructs regarding self-medication, in a sample of 60- to 74-year-old Iranians.

## Methods

### Sampling

The participants were Iranians, between the ages of 60 and 74, residing in the city of Ahvaz. The study employed a 49-item questionnaire to measure protection motivation theory constructs regarding self-medication and principal components analysis was done to examine the construct validity of the questionnaire. The recommended sample size for factor analysis is 3 to 10 subjects per questionnaire

item (13). Thus, 196 subjects were selected by cluster random sampling from the urban areas of Ahvaz city and voluntarily agreed to participate in the study. Private interviews were conducted to collect the data. Those who were not able to answer the questions did not enter the study. Demographic characteristics of participants are presented in table 1.

**Table 1. Demographic profile of participants**

| Variables              |                  | N   | %     |
|------------------------|------------------|-----|-------|
| <b>Age group</b>       | 60-65            | 113 | 57.65 |
|                        | 66-70            | 55  | 28.06 |
|                        | 71-75            | 28  | 14.28 |
| <b>Gender</b>          | Male             | 56  | 28.57 |
|                        | Female           | 140 | 71.42 |
| <b>Education level</b> | Illiterate       | 33  | 16.83 |
|                        | Primary school   | 59  | 30.10 |
|                        | Secondary school | 41  | 20.91 |
|                        | High school      | 39  | 19.89 |
| <b>Marital Status</b>  | Academic         | 24  | 12.24 |
|                        | Single           | 8   | 4.08  |
|                        | Married          | 123 | 62.75 |
|                        | Widow            | 65  | 33.16 |

### Procedures

#### 1. Preparation and extraction of the items related to protection motivation theory constructs

Perceived susceptibility, severity, response costs, response efficacy, self-efficacy, rewards, and fear were the desired constructs. The first author conducted detailed semi-structured individual interviews with 29 eligible 60- to 74-year-old individuals, as well as their caregivers (children and family members, nurses and health center experts) if needed. Those who were interviewed in this step were not included in the subsequent phases of the study. The audio-tapes of interviews were transcribed and content-analyzed. In addition, a systematic review of the literature was conducted. The interview and literature review results were synthesized. Seven subscales of perceived susceptibility of self-medication threats, perceived severity of self-medication threats, perceived response costs of self-medication avoidance, perceived response efficacy about self-medication avoidance, perceived self-efficacy of self-medication avoidance, perceived rewards of self-medication and perceived fear of self-medication threats were developed. A 5-point Likert-type scaling was adopted.

#### 2. Content validity

A panel of experts, which consisted of ten experts in the fields of ageing health, pharmacy, health education and promotion, and health care management, was formed. The experts' views on the difficulty, proportionality, and ambiguity of the items were used to modify the items. Item impact was taken into consideration in examining its appropriateness.

On the basis of the Lawshe's quantitative approach to content validity and the number of the experts that was 10, the minimum value determined for the content validity ratio was 0.62 and the minimum value

determined for the content validity index was 0.79 (14). In this section, the experts were asked to explore the questionnaire in terms of item necessity and item omission, subscales' total scores, as well as each item's clarity, conciseness and cultural adaptation.

### 3. Reliability

Internal consistency (Cronbach's alpha) was used for determining the reliability coefficient. According to texts, a Cronbach's alpha equal to or higher than 0.70 is considered as acceptable for new scales (15), which was met in the present study. Items with corrected item-total correlation (CITC) of less than 0.40 were omitted from the initial questionnaire.

### 4. Construct validity

A principal components analysis, with Oblique rotation, was performed to extract correlated constructs. The suitability of the data was assessed by the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. A scree plot was used to identify the number of the components. Factors with Eigenvalue  $\geq 1.00$  and items with factor loading  $\geq 0.40$  were maintained.

### Ethical considerations

The institutional review board in Shahid Sadoughi University of Medical Sciences, Yazd, Iran, approved the study protocol (IR.SSU.SPH.REC.1395.40). Moreover, the interviews were conducted in the places recommended by the participants, which included the participants' homes, health centers, parks, and mosques. At the beginning of the interview, the procedures were explained, confidentiality was assured, and consent was obtained. Permission to audio-tape the interviews also were obtained.

## Results

None of the original 49 items was omitted in the content validity process. The feedback from the panel of experts was used to make minor editorial changes.

### Internal consistency

There were 10 items with less than 0.40 CITC, which were omitted. As can be seen in Table 2, estimates of the reliability, as computed by Cronbach's coefficient alpha, for the seven constructs were greater than 0.80, attesting to the internal consistency of the measures.

### Construct validation

The 39 items were factor analyzed. The KMO test, which is the efficiency index of the sampling, was measured at 0.90. Bartlett's test was statistically significant ( $p < 0.001$ ), suggesting that the data were appropriate for factor analysis. Based on Eigenvalues

of  $\geq 1.00$  and factor loadings of  $\geq 0.40$ , seven factors were extracted, accounting for 69.41% of the variation. Results are shown in Table 3.

The scree plot diagram of factors is shown in Figure 1.

## Discussion

The study aimed to determine the psychometric properties of the protection motivation theory based questionnaire in a sample of elderly Iranians. The analysis of the data attested to the internal consistency and construct validation of the instrument. It must be noted that people's responses to questionnaire could have been impacted by other factors. For example, individuals' perception regarding being at the risk of complications due to self-medication may impact their other beliefs such as fear of self-medication or even perceived self-efficacy of lack of self-medication. Another factor that should be considered in designing a questionnaire is the scaling. For example, many researchers employ a 5-point Likert-type scaling, ranging from the lowest to the highest which may result in the skewness of the data (16). We utilized a 5-point scaling and recommend the exploration of other scaling types in the Iranian society.

It is recommended to design questionnaires that are compatible with the behaviors and culture of the given society (17). Our results showed the constructs explained 69.41% of the variation in hypothetical model. Also, perceived severity of the self-medication problems and perceived response efficacy of using medication through visiting a physician and receiving a prescription predicted a higher percentage of the variance, respectively. Additionally, the uncorrelated constructs had high Cronbach's alpha coefficients, suggesting that each had internal consistency in measuring a unique subject.

Having valid and reliable tools is necessary for effective interventions and designing and evaluating theory-based programs for health promotion (18). On the other hand, regarding health promotion intervention programs, it should be pointed out that comprehensive health education programs need emphasis on psychological factors that mediate and predict behaviors (19, 20). This in turn shows the necessity of a standard and local tool in any society for educational designers. The finding of the present study show that the questionnaire presented for measuring PMT constructs regarding self-medication, has appropriate reliability and validity for the elderly Iranians.

## Conclusion

The findings of the present study show that the newly developed instrument has appropriate psychometric properties and may be used in the research on determining self-medication predictors based on protection motivation theory among Farsi/Persian speaking elderly people.

**Table 2. PMT constructs, numbers of items, Cronbach's  $\alpha$  and sample items of the constructs**

| Variable  | Item/items deleted with CITC < 0.4 | Number of Items | Cronbach's $\alpha$ | Sample item  |
|---|------------------------------------|-----------------|---------------------|--|
| Perceived susceptibility of self-medication threats         | 1                                  | 5               | 0.84                | Self-medication results in physical complications in my body   |
| Perceived severity of self-medication threats               | 2                                  | 8               | 0.86                | Self-medication leads to my death  |
| Perceived response costs of self-medication avoidance       | 1                                  | 4               | 0.81                | If I don't self-medicate, I should continuously refer to the medical system                                      |
| Perceived response efficacy about self-medication avoidance | 1                                  | 8               | 0.82                | Medications through visiting a physician and receiving a prescription results in reduction of side effects in me |
| Perceived self-efficacy of self-medication avoidance        | 3                                  | 5               | 0.88                | I can visit a physician for preventing self-medication even if my time is wasted                                 |
| Perceived rewards of self-medication                        | 1                                  | 5               | 0.89                | If I do self-medication, I pay less money  |
| Perceived fear of self-medication threats                   | 1                                  | 4               | 0.85                | I am concerned about being afflicted with the complications of self-medication                                   |

**Table 3. Findings of the principal components analysis**

| Items               | Factors |      |      |      |      |      |      |
|---------------------|---------|------|------|------|------|------|------|
|                     | 1       | 2    | 3    | 4    | 5    | 6    | 7    |
| Severity.1          | .768    |      |      |      |      |      |      |
| Severity.2          | .850    |      |      |      |      |      |      |
| Severity.3          | .829    |      |      |      |      |      |      |
| Severity.4          | .658    |      |      |      |      |      |      |
| Severity.5          | .786    |      |      |      |      |      |      |
| Severity.6          | .740    |      |      |      |      |      |      |
| Severity.7          | .703    |      |      |      |      |      |      |
| Severity.8          | .700    |      |      |      |      |      |      |
| Susceptibility.1    |         |      |      |      | .697 |      |      |
| Susceptibility.2    |         |      |      |      | .727 |      |      |
| Susceptibility.3    |         |      |      |      | .634 |      |      |
| Susceptibility.4    |         |      |      |      | .750 |      |      |
| Susceptibility.5    |         |      |      |      | .605 |      |      |
| Response Costs.1    |         |      | .922 |      |      |      |      |
| Response Costs.2    |         |      | .896 |      |      |      |      |
| Response Costs.3    |         |      | .846 |      |      |      |      |
| Response Costs.4    |         |      | .807 |      |      |      |      |
| Response Efficacy.1 |         |      |      | .680 |      |      |      |
| Response Efficacy.2 |         |      |      | .759 |      |      |      |
| Response Efficacy.3 |         |      |      | .666 |      |      |      |
| Response Efficacy.4 |         |      |      | .724 |      |      |      |
| Response Efficacy.5 |         |      |      | .780 |      |      |      |
| Response Efficacy.6 |         |      |      | .673 |      |      |      |
| Response Efficacy.7 |         |      |      | .689 |      |      |      |
| Response Efficacy.8 |         |      |      | .710 |      |      |      |
| Self-efficacy.1     |         |      |      |      |      |      | .633 |
| Self-efficacy.2     |         |      |      |      |      |      | .734 |
| Self-efficacy.3     |         |      |      |      |      |      | .738 |
| Self-efficacy.4     |         |      |      |      |      |      | .696 |
| Self-efficacy.5     |         |      |      |      |      |      | .823 |
| Reward.1            |         | .722 |      |      |      |      |      |
| Reward.2            |         | .769 |      |      |      |      |      |
| Reward.3            |         | .748 |      |      |      |      |      |
| Reward.4            |         | .869 |      |      |      |      |      |
| Reward.5            |         | .830 |      |      |      |      |      |
| Fear.1              |         |      |      |      |      | .671 |      |
| Fear.2              |         |      |      |      |      | .685 |      |
| Fear.3              |         |      |      |      |      | .833 |      |
| Fear.4              |         |      |      |      |      | .679 |      |
| Variance (%)        | 33.24   | 8.01 | 7.69 | 7.41 | 5.02 | 4.38 | 3.65 |
| Total Variance      | 69.41   |      |      |      |      |      |      |

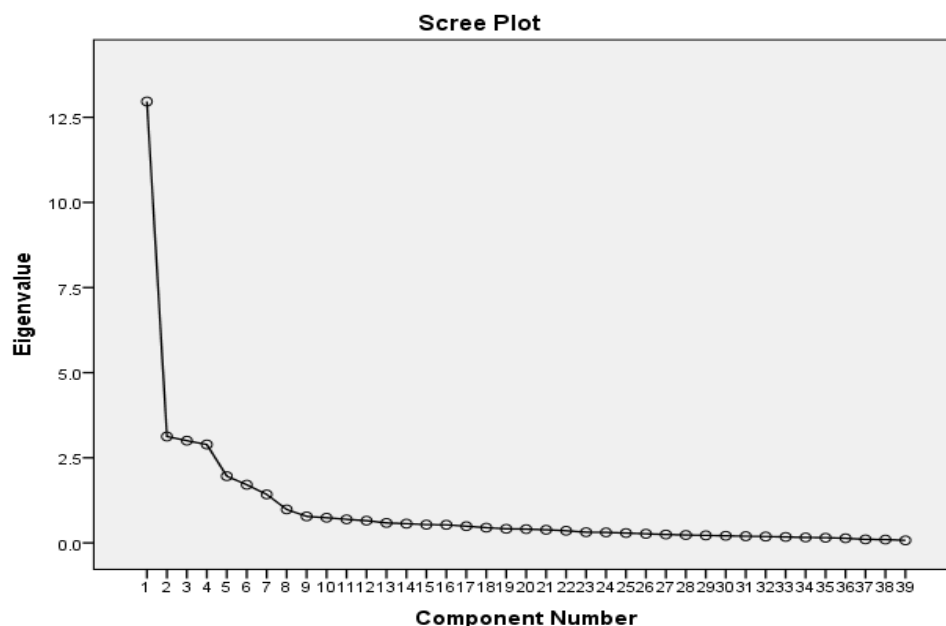


Figure 1. The scree plot of factors

#### Study limitations

Predictive and concurrent validity tests and confirmatory factor analysis were not done in the present study and these are among the limitations of the present study and future studies are recommended to consider them.

#### Conflict of interest

Authors declare that there is no conflict of interest.

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