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Original Article

The Psychological Determinants of Self-Medication among the Elderly: An Explanation Based on the Health Belief Model

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A B S T R A C T

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Introduction: Self-medication is one of the problems in the treatment cycle of patients. Aging is associated with increased drug use and adverse effects. The purpose of this study was to assess the factors influencing self-medication among the elderly referring to urban health centers in Khorramabad, Iran, based on the Health Belief Model (HBM) in 2016-2017.

Methods: This cross-sectional study was conducted on 137 elderly individuals over 60 in Khorramabad. The participants were selected using the multistage sampling method. Data collection instruments included a questionnaire designed based on the HBM and a self-medication checklist. The data were analyzed using the SPSS software, descriptive statistical tests, Pearson correlation coefficient, and linear regression.

Results: Among the constructs of the HBM, perceived severity alone could predict 31 percent of the self-medication behaviors, and perceived severity plus barriers could predict 40 percent of the self-medication behaviors. The overall prevalence of self-medication among the elderly was 39.4%. The most common reason for self-medication was previous experiences with self-medications (59.8%). Additionally, there were significant relationships among the constructs of HBM with the favorable practice of the elderly regarding self-medication ($p < 0.001$).

Conclusion: The results indicated that perceived severity and barriers play a more crucial role in the development of self-care behaviors regarding self-medication among the elderly.

Keywords: Aged, Health Belief Model, Self-Medication

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Introduction

Based on the estimations of the United Nations, the population of the elderly of the world will increase from 350 million in 1975 to 1100 million in 2025, most of them living in the developing countries (1). Various studies emphasize the fact that the costs of treatment and the amount of medicines used increase with age. Additionally, chronic diseases, which mostly afflict the elderly, lead to pain, disability, decline in the quality of life, and increased need for and use of medications. Moreover, the occurrence of the side effects of drugs increases with age (2-4). Self-medication, which is defined as the use of drugs without the advice, recommendation, prescription, diagnosis, and supervision of physicians, or the use of any drugs without consultation with the health care staff, and based on the self-diagnosis of diseases and their symptoms, is common among people(5). Different studies have reported different figures and statistics regarding the prevalence of self-medication in Iran. This prevalence has been reported during 2007-2014 as 57.7 % among the elderly of Tehran (6), 31 % among the elderly of Zarrandieh (7), and 77.6 % among the elderly of Gonabad (8).

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Furthermore, every Iranian consumes 339 pharmaceutical products annually, which is higher than the global standards (9). The most frequently used medicines taken via self-medication include painkillers, eye drops, and antibiotics (10). Unfortunately, most people view medicines as safe and curative, while medical texts present drugs as a double-edged blade, one edge of which targets the pathogenic agents, and, due to lack of knowledge regarding their proper use, the other edge endangers human life (11). Many factors encourage people to self-medicate, including: costs of visiting a doctor, problems with insurance, easy availability of medications, satisfaction with the results of self-medication, disregarding the importance of the disease, access to previously prescribed medicines, lack of knowledge, cultural, social, and economic factors, etc. (12, 13).

One of the groups, which might resort to self-medication due to higher rates of being afflicted with diseases, is the elderly (14). Biochemical, physiological, and pharmacokinetic changes in the elderly can lead to overuse or incorrect use of medicines. On the other hand, the sensitivity of body tissues to medicines increases with age (15). This issue adds to the importance of the arbitrary use of drugs or self-medication, especially since the availability of drugs to this age group, which is rapidly growing in number according to the available statistics, increases (8).

As has been mentioned, the arbitrary use of drugs or self-medication is one of the social and health problems that societies face. On the other hand, given the growing extent of the phenomenon of self-medication in societies, and the direct role of individuals in the selection and use of medications, it is essential to identify factors affecting behavior change to achieve proper health behaviors, so that individuals can have long and relatively healthy and active lives. For this purpose, researchers have used models to identify factors affecting behavior change and modification (16). One of these models is the health belief model (HBM), which is an accurate and important model that tries to predict health-related behaviors based on a belief model (17).

The aim of this model is to help with the identification and comprehension of factors affecting behaviors and the determination of mechanisms of action of these factors. This model also offers suggestions about how to influence these factors under different circumstances (18). This model primarily focuses on the prevention of diseases and the adoption of behaviors that can help prevent the chain of illnesses and diseases. It is among the most accurate and important models used to determine the relationship between health beliefs and behavior. A review study has shown that beliefs such as the high costs of health care, lack of adequate time to see a physician, and the length of time people have to wait to see a specialist, etc. are associated with self-medication (19). The efficacy of the HBM in describing and predicting preventive health behaviors has been confirmed in various studies (18, 20). Moreover, this model has been used in studies by Karimi et al. (19) and Sharifirad et al. (8), conducted on the elderly and its efficacy in predicting factors affecting self-medication in this age group has been confirmed.

In this study, it was attempted to analyze the dimensions of this model before planning the training, because identifying these factors and studying them can help planners to design more effective programs based on the HBM and can help them design more accurate programs by emphasizing research findings and the constructs that play a role in the prediction of behavior, so that they will be able to encourage the elderly to take appropriate actions in avoiding self-medication and arbitrary use of drugs. The constructs of the HBM include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action (20). Based on this model, a person should believe that he/she is susceptible to a phenomenon like self-medication (perceived susceptibility), understand the severity of this danger and the serious consequences and complications that it will lead to in his/her life (perceived severity), and as a result, comprehend the benefits of changing his/her behavior (perceived benefits), and be able to overcome deterrent factors such as costs (perceived barriers). Given the fact that the arbitrary use of drugs (self-medication) is a serious health and behavioral problem (21). The present study was conducted in order to evaluate the factors affecting self-medication and determine its prevalence among the elderly individuals living in Khorramabad using the HBM.

Methods

Procedure and sampling

This cross-sectional study was conducted on elderly individuals referring to the health and treatment centers of Khorramabad, Iran.

The sample size was calculated using the following formula as 145 individuals:

$$n = \frac{Z^2 P(1-P)}{d^2}$$

Given the above formula, this figure was obtained based on a confidence coefficient of 95%, a self-medication prevalence rate of 57% among the elderly as reported by previous studies(7), and an precision level of 0.08.

In this formula, Z is the 95% confidence interval, which equals 1.96, P is the prevalence rate of self-medication, and d is the precision level.

The multistage random sampling method was used in this study, such that, in order to increase the social and economic coverage of the studied population, first the area of Khorramabad was divided into the five sections (strata) of north, south, center, east, and west. In each geographical area (stratum), there were some urban health and treatment center (cluster heads). Among the cluster heads or the existing centers in each area, one center was randomly selected, amounting to 5 centers in all of the city. Next, in each

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of the selected centers, first the number of people older than 60 was estimated. In proportion to the number of male and female elderly individuals whose families were under the coverage of the services of each center, the quota of each center from the final total sample was calculated. Finally, sampling and participant enrollment was randomly conducted until the quota limit for each center was reached.

The inclusion criteria were: being older than 60, residing in Khorramabad, being mentally healthy, and not being an invalid, i.e. being able to perform routine and daily activities without being dependent on others (i.e. the participants must be psychologically reasonable and sensible and despite having chronic conditions, they must not be bed-ridden). The exclusion criteria included suffering from neurological defects, death, emigration, and unwillingness to participate in the study.

Instruments

The data collection instrument was a questionnaire consisting of the following parts: Part one included the demographic characteristics of the elderly, such as age, gender, marital status, educational attainment level, income, and health insurance status.

Part two of the instrument included ten 4-choice questions about the knowledge of the elderly regarding self-medication (e.g. "In which group is the arbitrary use of medications more dangerous?"). A correct answer received a score of 1 and an incorrect one received a score of 0.

Part three included five items related to perceived susceptibility (e.g. "I may self-medicate when I am sick."), five items on perceived severity (e.g. "I think self-medication can lead to death in some cases."), five items regarding perceived benefits (e.g. "In my opinion, by refraining from self-medication, it is possible to stay safe from its adverse effects."), and four items on perceived barriers (e.g. "I can't afford visiting a doctor."). Overall, there were 19 questions on a 5 point Likert scale. The "Strongly agree" option received a score of 4, the "Agree" option received a score of 3, The "Neither agree nor disagree" option received a score of 2, the "Disagree" option received a score of 1, and the "Strongly disagree" option received a score of 0.

The fourth part included internal and external cues to action. The fifth part included a 14-item checklist regarding the reasons for self-medication, which were answered with "yes" and "no". The results of these two scales are reported using frequency distributions.

The sixth part consisted of a 28-item practice checklist regarding having a history of self-medication with various drugs and diseases during the past six months. In this part, a correct answer received a score of 1 and an incorrect one received a score of 0.

The data collection instrument used in the present study has also been used in studies by Karimi (7) and Sharifirad (8) conducted on the elderly and its validity and reliability have been confirmed. The reliability of this instrument was assessed using Cronbach's alpha in a pilot study conducted on 20 elderly individuals having similar characteristics to the target group, Cronbach's alpha being 0.89 for the knowledge questions, 0.84 for the items related to the dimensions of the HBM, and 0.91 for the questions related to self-medication.

Ethical considerations

This research project was registered at the Research Committee with the registration number 2040, and was reviewed and confirmed by the Ethics Committee of the Lorestan University of Medical Sciences. All participants took part in this study knowingly and voluntarily.

Statistical analysis

The collected data were analyzed using IBM SPSS version 19 and descriptive statistical analysis, Pearson correlation coefficient and stepwise linear regression tests. In stepwise linear regression, the analysis begins with the most important significant variable and other significant variables are added to the model one by one (22).

Results

From 145 individuals calculated as the sample size, 137 individuals participated in the study. The mean age of the elderly was 66.28 ± 7.1 years. 50.2% of the participants were male and 49.8% of the participants were female. An overview of the demographic characteristics of the participants is presented in Table 1.

Table 1. Absolute and relative frequency of the individual characteristics of the participants

Demographic variable		N	%
Age	60-69 years old	103	78
	70 and older	29	22
Gender	Male	67	50.2
	Female	65	49.8
Educational attainment level	Illiterate	83	62.9
	Primary school-junior high school	33	25
	High school-University	16	12.1
Marital status	Single, widow, widower	31	23.5
	Married	101	76.5
Income	Low	51	38.6
	Average	28	21.2
	High and very high	53	40.2
Health insurance status	Insured	89	67.4
	Without insurance	43	32.6

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No significant relationships were found between demographic characteristics, such as age, sex, marital status, educational attainment level, occupation, and insurance status with self-medication ($p > 0.05$).

The mean scores of perceived susceptibility, severity, benefits, barriers, knowledge and practice are presented in Table 2.

Table 2. The mean scores of knowledge, perceived susceptibility, severity, benefits, and barriers, and self-medication practice

Variable	Mean	SD	Score range
Knowledge	4.67	1.88	0-10
Perceived susceptibility	9.30	3.78	0-20
Perceived severity	7.78	2.82	0-16
Perceived benefits	9.64	3.45	0-20
Perceived barriers	13.34	1.99	0-20
Practice	16.94	3.90	0-28

It was shown that the prevalence of self-medication among the elderly was 39.4% (52 individuals). Moreover, there were significant correlations among the constructs of perceived susceptibility ($r = 0.23$, $p = 0.006$), severity ($r = 0.31$, $p < 0.001$), barriers ($r = -0.26$, $p = 0.002$) and benefits ($r = 0.2$, $p = 0.016$) with the practice of the elderly regarding self-medication. A significant correlation was not found between knowledge and the practice of the elderly ($r = 0.1$, $p = 0.235$). (Table 3)

In order to predict the practice of the elderly based on the constructs of the HBM, stepwise linear regression analysis was used. The results of the multiple linear regression analysis indicated that, Perceived severity along was able to predict 31 percent of the variations in behavior. Perceived severity and perceived barriers together were able to 40 percent of the variations in the self-medication behaviors. This analysis showed that as the perceived severity score increased by 1 unit, practice was improved by 43 percent. Additionally, as the perceived barriers score increased by 1 unit, practice declined by 49 percent (Tables 4 and 5).

Regarding the distribution of reasons for self-medication among the elderly, the most frequent reasons included good results obtained from previous self-medications (59.8%), previous experience with the disease (59.1%), disregarding the importance of the disease (37.9%), availability of drugs (36.4%), and high costs of visiting a physician (34.1%).

The results showed that the most important external cues to action in the studied population included physicians (42.4%), recommendations of family, friends, and acquaintances (40.2%), television (10.6%), books and booklets (6.8%), Moreover, the most important internal cue to action was fear of the adverse effects of arbitrary use of medications (71.2%).

Discussion

This study was carried out to assess the factors influencing self-medication among the elderly in Khorramabad, Iran. The results of the multiple regression analysis suggested that, from among the constructs of the HBM, perceived severity and perceived barriers were good predictors of the self-medication behaviors of the elderly. Similar to the present study, the results of regression analysis in a study by Vahedian Shahroudi et al. (23), which used the HBM to predict osteoporosis preventive behaviors, showed that perceived barriers could predict the behaviors related to calcium intake. In other studies, perceived severity has been identified as the most important factor predicting behavior (24). Generally, in a meta-analytic study by Carpenter examining 18 studies, it was suggested that the construct of perceived barriers is an important factor in predicting the prevention of unhealthy behaviors in the HBM (25). Specifically, a systematic meta-analysis of self-medication in Iran has shown that barriers like the costs of health care, lack of adequate time to see a physician, and the length of time people have to wait to see a specialist physician were the most common reasons for drug abuse. According to this systematic review, these reasons were barriers that prevented individuals from seeing a doctor (21). Therefore, it can be said that perceived barriers is a factor that predicts self-medication behaviors well.

An analysis of the reasons for self-medication mentioned by the elderly in this study indicates that perceived barriers such as low economic status and lack of access to physicians are among the factors affecting self-medication. In line with the present study, studies by Baghiani Moghadam and Ehrampoush in Yazd, Iran (26), and in a systematic review study by Shaghaghi et al. (27) reported that lack of access to physicians and high costs of visiting doctors were among the most important barriers to the proper use of medications. There were significant relationships among perceived benefits and barriers with practice. It seems that if the elderly notice that the proper use of medications can reduce side effects and accelerate recovery, this can enhance perceived benefits.

Parallel with the current study, a study by Khosravi et al. conducted on the students of the Arak University of Medical Sciences regarding the use of ecstasy based on the HBM showed that there was a positive correlation between perceived susceptibility regarding the use of these pills and the practice of the individuals. That is, as the individuals become more aware of the side effects of these pills, their use of them is reduced (28). In the study by Karimi et al. (19) too, there was a reverse and significant relationship between perceived susceptibility and the arbitrary use of drugs. In other words, the less susceptible the elderly felt themselves to be, the higher the rates of self-medication among them.

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Table 3. Pearson correlation coefficient among the constructs of the health belief model

Variable	Knowledge	Perceived susceptibility	Perceived severity	Perceived benefits	Perceived barriers
Perceived susceptibility	0.007				
Perceived severity	0.041	0.211*			
Perceived benefits	0.125	0.55	0.558*		
Perceived barriers	0.105	0.327**	0.055	-0.126	
Practice	0.104	0.237**	0.316**	0.209*	-0.261**

****P < 0.001**

Table 4. The steps of multivariate regression analysis in predicting the practice of the elderly

Step	Source of change	Non-standard coefficients		Standard coefficients	t-value	P
		B	SE	Beta		
1	**Constant value**	10.31	0.94	-	10.93	< 0.001
	Perceived severity	0.43	0.11	0.316	3.80	< 0.001
2	**Constant value**	16.72	2.30	-	7.2	< 0.001
	Perceived severity	0.41	0.11	0.303	3.75	< 0.001
	Perceived barriers	-0.49	0.162	-0.24	-3.03	0.003

Table 5. The regression coefficients of predicting the practice of the elderly given the scores of the constructs of perceived severity and barriers as divided into steps

Criterion variable	Predictor variables	Correlation (R)	Coefficient of determination (R^2)	Adjusted coefficient of determination (Adjusted R^2)
The construct of the health belief model	Perceived severity	0.316	0.100	0.093
	Perceived severity and perceived barriers	0.400	0.160	0.147

This issue has been expressed by the elderly among the reasons for self-medication with expressions like "previous recoveries with self-medication" and "the harmlessness of the drugs".

It is essential that this issue be addressed by radio and television programs and by other media. The relationship between perceived threat and the avoidance of self-medication has been confirmed in the study by Shamsi et al. (29).

The results of previous studies (26, 30, 31), showed that considering diseases benign and disregarding their importance (low perceived severity) were among the most important factors affecting self-medication.

The most important external cues to action that reduced the levels of self-medication in the studied population were the advice of physicians, and the advice of family members, friends, and acquaintances. Moreover, the most important internal cue to action was fear of developing side effects as a result of the arbitrary use of medications among 71.2% of the participants, which encouraged the participants to make proper use of medications. Shamsi et al. identified the most important external cues to action regarding self-medication as physicians, health-care staff, peers, family members, and acquaintances, and the most important internal cues to action were feeling healthier if self-medication was avoided and fear of the adverse effects of self-medication (16). In a review study conducted to identify the various medications that are misused in the Middle East, it was reported that friends and family members were the main external cue to action for self-medication(5).

The prevalence of self-medication in the studied population was 39.4%. Varying figures for self-medication have been reported in Iran from 12 to 90 percent. (32-35). In short, the results of the present study and the comparison of these results with those of other studies indicate that the arbitrary use of medications and self-medication are serious problems among many segments of the Iranian society (6, 11, 36-38). Of course, this problem has been observed in various parts of the world from 12.7% to 98 percent, too (39-42). These figures indicate the acceptability of self-medication in various societies. However, a

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systematic review have shown that self-medication is more prevalent in the older-than-60 age group. The prevalence of self-medication was higher among individuals 40 years of age and older than among people younger than 40 and this prevalence increased with age (43). Given the physiological characteristics of the bodies of the elderly, especially organs like the kidneys and the liver, which metabolize medicines, this issue is serious and important and deserves special attention (44).

Regarding the distribution of the reasons for self-medication among the elderly, the most frequently mentioned reasons were good results obtained from previous self-medications, previous experience with the disease, disregarding the importance of the disease, availability of medicines, and the high costs of visiting a physician. In line with the present study, the study by Karimi et al. (20) conducted on the elderly population of Zarrandieh, Iran, also reported the availability of drugs, experiences of recovery with previous self-medications, previous experience with the disease, such as chronic conditions like hypertension, and having long experiences with these diseases and their symptoms, which helped the patients obtain relative knowledge about these diseases, as the motivational factors of self-medication in this age group. The reasons mentioned in the present study have also been reported in studies by Sahebi et al. in Tabriz, Iran (45), and a review study by Azimi Aghdashi et al. (21), and also in the study by Sharifirad et al. (8). Therefore, it is essential that this issue receive attention in the training programs for physicians and pharmacists, so that physicians put more effort in educating the elderly about the proper use of medications so that no prescription drugs remain unused, and pharmacies avoid dispensing drugs without prescriptions.

In the present study, headache (77.3%) and the common cold (62.1%) were the most commonly self-medicated conditions. Additionally, painkillers (76.5%), hypertension medicines (59.1%), hypnotic drugs and tranquilizers (52.3%), and antacids (40.9%) were the medicines most frequently used in self-medication. Azimi Aghdashi et al. reported that the most frequently self-medicated conditions were respiratory diseases, the common cold, and headaches. He also reported that the most frequently used medicines by the elderly in self-medication included painkillers, antibiotics, and cold medicines (21).

Conclusion

In the present study, there were significant positive correlations among the constructs of perceived susceptibility, severity, and barriers with the favorable practice of the elderly regarding self-medication, which indicates that it is possible to reduce the prevalence of self-medication by enhancing each of the mentioned constructs. However, there was an inverse relationship between the construct of perceived barriers with favorable practice regarding self-medication, i.e. it is necessary to reduce perceived barriers in order to decrease self-medication. Given the findings of the present study, it is necessary to pay special attention to predictor constructs in designing interventional and training programs in order to enhance the practice of the elderly regarding the proper use of medications.

Study limitations

One of the limitations of the present study was the evaluation of self-medication practice using yes/no options, which does not measure this variable exactly. Therefore, it is recommended that researchers design a more accurate instrument to measure self-medication more exactly in future studies.

Conflict of interest

The authors declare that there is no conflict of interests.

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Authors' contribution

Study design: KB, FB

Data collection and analysis: KB, SHN, FB

Manuscript preparation: FB, MA

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