Assessment of self-medication of the elderly in urban care homes by using health belief model

Mahmood Karimy[1], Ali Montazeri[2], Ali Reza Khoshdel[3], Jalil Kuhpayehzadeh[4], Hamid Baradaran[4], Mohammad Reza Rohani[5], Kazem Rezai[5]

Journal of Research & Health
Social Development & Health Promotion Research Center
Vol. 4, No.3, Atumun 2014
Pages: 803-810
Original Article

1. **Correspondence to**: Assistant Professor of Public Health Department, Saveh University of Medical Sciences, Saveh, Iran
Tel/Fax: +98 864 5226936
Email: karimymahmood@yahoo.com
2. Professor of Mental Health Research Department, Mother and Child Health Research Centre, Iranian Institute for Health Sciences Research, ACECR, Tehran, Iran
3. Associate Professor of Community Medicine Department, Army University of Medical Sciences, Tehran, Iran
4. Associate Professor of Community Medicine Department, Iran University of Medical Sciences, Tehran, Iran
5. Physician and Researcher of Public Health Department, Faculty of Health, Saveh University of Medical Sciences, Saveh, Iran

Received: 6 Aug 2012
Accepted: 24 Jul 2013

How to cite this article: Karimy M, Montazeri A, Khoshdel AR, Kuhpayehzadeh J, Baradaran H, Rohani MR, Rezai K. Assessment of self-medication of the elderly in urban care homes by using health belief model. *J Research Health*2014; 4(3): 803-810.

Abstract
Self-medication is a common health issue throughout the world, especially in developing countries that have a greater level of drug-resistance. The present study was conducted with the aim to evaluate self-medication in the elderly using constructs of health belief model (HBM). In this study, 180 elderly were randomly selected from 4 urban care centers. Data were collected using a researcher-made questionnaire based on HBM and self-medication, and analyzed by using SPSS and Chi-square and logistic regression tests. The results revealed that 99.4% of the elderly kept medicine in their homes, and used them in common cases of high blood pressure, cold, and muscular and joint aches. Self-medication in the elderly was found significantly related to history of chronic diseases, knowledge, self-efficacy, benefits, barriers, and perceived intensity. According to the present study results, use of HBM is recommended to design educational programs aiming to change behaviors and reduce habitual self-medication.

Keywords: Elderly, Health, Self-Medication

Introduction
Today, because of increased age and elevated life expectancy, population aging cannot be stopped, but through appropriate care methods, disorders and disabilities in elderly can be prevented or postponed, to enable taking advantage of long and healthy life that has always been the aim and wish of humans [1]. In old age, chronic diseases that mainly affect the elderly, lead to pain, incapacity, and falling quality of life, and increase reliance on medication [2,3]. A study conducted by the British National Health Institute indicated that more than 86% of the elderly have at least one medical prescription, and 36% have more than 4 prescriptions [4,5]. Moreover, aging involves physiological changes in various systems of the body that affect their function. For instance, the liver that is responsible for metabolizing many endogenous substances, such as bilirubin, or exogenous, like medicinal compounds, becomes smaller and loses weight with aging. With this weight loss, liver blood flow and microsomes

enzyme activities that play an essential role in metabolism gradually reduce. Therefore, with aging, medication that should pass through and be metabolized in the liver is less removed from plasma, and naturally, incidence of side-effects (perhaps due to prolonged exposure) is observed in the elderly [6,7]. Furthermore, with aging, a persistent decline in renal function is created, which decreases filtration of blood in nephrones. Consequently, drugs that are mainly excreted by the kidneys have longer half-life and greater side-effects in old age [7,8]. An important community health issue that can create major problems for the individual and the community in many cases is self-medication [9]. Self-medication is considered the most common form of self-care, and it involves obtaining and using one or more medicines without consulting doctor's opinion or diagnoses and without prescription or medical supervision, and includes use of herbal and synthetic medicines [10]. Self-medication is a common health issue throughout the world, especially in developing countries, where there is higher level of antibiotic-induced drug resistance [11]. Studies have shown that besides prescribed medications, many people directly visit pharmacies and purchase and use medicines according to their own diagnosis, which is often wrong, to prevent and treat diseases, or to strengthen themselves. Accordingly, almost half medicines used are unnecessary [12]. Statistics on the rates of self-medication in different parts of the country have reported different results, so that the rate is reported 63% in Tabriz, 36% in Babol, and 83% in Qazvin. The rate was 77.6% among Gonabad's elderly, 58% in Tehran [11]. This problem is also observed in other parts of the world, so that prevalence of self-medication was 42% in California [13], and 70% in Nepal [14]. Given the increasing access to a wide variety of medications in the community, effective factors in self-medication behavior need to be identified. To this end, researchers have used theories and models to identify factors that affect and change behaviors. One of these models, used in health education, is Health Belief Model (HBM) [13]. HBM was one of the first models that used behavioral science theories in the area of health to solve health problems. This model was first used by a group of psychologists in 1950 to help explain why people did not use health services. The formal health belief model was presented, after introduction of the initial model in 1966 by Rosen Stoke. This model mainly focuses on prevention of diseases and behaviors adopted to avoid a chain of disease and illness [14]. It has been used in different kinds of studies and health behaviors, and considers behavior a function of individual's knowledge and attitude [15]. Given its constituents, the model has been developed on the idea that makes people understand a threat to health (self-medication) and leads them toward healthy behaviors [16]. Considering the fact that self-medication is a behavioral-health problem, the present study was conducted with the aim to assess HBM constructs in relation to self-medication behavior of the elderly in Zarandieh.

Method

The cross-sectional study was conducted in 2011 on 180 people over 60 years of age in urban centers in Zarandieh, Iran. In this study, multi-stage sampling method was used, and in the first stage, all urban clinics (4 in total) entered the study. In each clinic, simple random sampling was carried out. Given accuracy of 6% and confidence interval of 95%, sample size was estimated at 165, which was raised to 180 to increase accuracy. Considering the gender ratio of people over 60 years of age in Zarandieh, where 52% were female and 48% were male, 95 women and 85 men were selected for participation in study. Study inclusion criteria involved people over 60 years of age, resident in the city, physically and mentally healthy, with active medical records at the health center. Study exclusion criteria were disinterest and unwillingness to take part in the study.

Data were collected using a questionnaire that contained the following parts:

Part 1: Demographic details of the elderly (10 questions), part 2: medication and self-medication complications knowledge (12 questions), part 3: perceived sensitivity and intensity toward self-medication (12 questions), self-efficacy (8 questions), instructions (2 questions), and check-list of personal function in relation to self-medication in the past 3 months (10 questions).

Scoring in the HBM constructs section was in the form of 5-option Likert scale, with a range of scores for each question from 0 to 4, so that totally agree scored 4 marks, agreed 3, no comment 2, disagree 1, and totally disagree 0. In the section on knowledge, correct answers scored 1 and wrong answers scored 0, and total score for this section varied from 0 to 12. For better understanding of the relationship between knowledge and self-medication, people's level of knowledge was conventionally divided into poor knowledge (less than 4), moderate knowledge (4-7), and good knowledge (above 7). In the performance check-list section, scoring was calculated according to how many diseases the elderly had attempted self-medication for, and overall score in this section varied from 0 to 10. Validity of questionnaire was assessed using content and construct validity method, so that questionnaire was prepared according to HBM and reliable scientific resources, and reviewed by leading professors of health education, elderly and internal medicine, and ambiguities and problems were resolved according to their comments, and thus, content validity was confirmed. Construct validity was carried out using exploratory and confirmatory factor analysis. In exploratory factor analysis, data analysis results of 0.94 in Keiser Miralkin test, which is considered adequate sampling and significance in Cruet Bartlett test $P<0.001$ showed suitability of data for factor analysis. In confirmatory factor analysis, fitness indices of over 0.9 confirmed alignment between data and model. To assess reliability of knowledge and function questions, retest method with 10 days interval was used on 20 elderly people with similar demographic details to target population. Correlation coefficients were found 0.89 and 0.77, respectively. In the HBM constructs section, Cronbach's alpha of 82% showed internal consistency of constructs. Chi-square test was used to find the relationship between variables and self-medication. Next, logistic regression test was used to find the most influential factor. Ethical considerations were observed through optional participation, explanation of study objectives, and anonymity of questionnaires.

Results

Participants' mean age was 66.2 ± 4.9 years, 47% were male, 53% were female, 36% were illiterate and 64% were literate. Table 1 presents pattern of self-medication and demographic details, together with their significance. The prevalence of self-medication among participants was 31%, and among women (33%) the prevalence was greater than men (29%). Chi-square test showed an insignificant relationship between gender and self-medication. The highest prevalence of self-medication (15%) was observed among those with low level of knowledge, and in terms of education, the highest prevalence of self-medication (28%) was found among illiterate people. Significant relationships between self-medication and knowledge, history of chronic diseases, and education level were observed in the elderly ($P<0.001$). The highest prevalence of self-medication was found in age group 60-64 years (18%). In this study, chi-square test showed insignificant relationships between self-medication and age, marital status, and occupation (Table 1).

Logistic regression test was performed to find which of the following factors were related to self-medication in the elderly: occupation, marital status, history of specific diseases, education, knowledge, sensitivity, intensity, benefits, and perceived barriers. The results showed significant relationships of elderly self-medication with chronic diseases (3.45), knowledge (1.28), perceived intensity (1.26), benefits (2.46), and perceived barriers (1.86) (Table 2).

Table 1 *The pattern of self-medication based on age, sex, education, knowledge, disease history*

		Self-medication status				P-value
		Yes		No		
		N	%	N	%	
Age	60-64	32	18	51	28	0.18
	65-69	14	8	42	23	
	≤70	11	6	30	17	
Gender	Male	52	29	33	18	0.89
	Female	59	33	36	20	
Education	Literate	50	28	64	36	0.001
	Illiterate	10	5	56	31	
knowledge	Weak	27	15	30	17	0.001
	Average	18	10	62	34	
	Good	11	6	32	18	
History of chronic diseases	Yes	49	27	15	8	0.001
	No	11	6	105	59	

Table2 *Analysis of factors associated with self-medication in the elderly*

	Odds Ratio	Confidence Interval 95%	P-value
History of chronic diseases	3.45	2.21-5.89	0.001
knowledge	1.28	1.14-1.42	0.001
Perceived severity	1.26	1.21-1.32	0.001
Perceived benefits	2.46	1.38-4.87	0.04
Perceived barriers	1.86	1.02-3.38	0.001
Self-efficacy	1.35	1.16-2.29	0.01

The most common diseases for which the elderly attempted self-medication, in order of importance included: high blood pressure (25%), cold (25%), and muscular and joint pains (21%). Almost all (99.4%) of the elderly kept medicines in their homes. Tables 3 and 4 show internal and external cues for self-medication in participating elderly. As external cues, the most important included: family and friends (39.5%), doctor and medical personnel (34.5%), and the media (15.5%), and the most important internal cues included: general good health (33.5%), healthier feeling in absence of self-medication (29%), and fear of side-effects (22.5%).

Table 3 *Distribution of external cues to action*

	Female		Male		P-value
	N	%	N	%	
Radio or TV	16	17	12	14	0.450
Journal, Magazine, newspaper	7	7	9	11	0.617
Family, friends	37	39	34	40	0.722
Physician, health personnel	34	36	28	33	0.446
Book or booklet	1	1	2	2	0.564

Table 4 *Distribution of internal cues to action*

	Female		Male		P-value
	N	%	N	%	
Fear of side effects self medication	22	23	19	22	0.63
Lack of belief in self medication	14	15	13	15	0.84
If I do not self-medication stay healthy	27	28	25	30	0.78
Good healthy	32	34	28	33	0.60

Discussion

In the present study, the main focus in assessment of self-medication in elderly was on the use of health belief model. Every effort of experts in various health areas such as health tutors, psychologists, nutritionists, and nurses is focused on changing people's health behaviors. For effective implementation of interventions and right judgment on measuring impacts of these interventions, people's roles in health behaviors should be determined [17]. In this study, the highest prevalence of self-medication was in the 60-64 years age group, even though the difference between age groups was statistically insignificant. Absence of relationship between self-medication and age was also observed in Sahebi et al. study in Tabriz [18]. However, in studies by Shamsi in Arak [15] and Abbassi in Ilam [19], self-medication was significantly related to age group. Perhaps, the reason for absence of a relationship between self-medication and age group could be attributed to studying a specific age group (over 60 years) and their close age range and also similarity in their characteristics. In this study, the difference between sexes was insignificant in terms of self-medication, which disagrees with studies that found opposite results [19,20]. In the present study, the prevalence of self-medication was higher in illiterate participants, and there was a significant difference between illiterate and literate people in terms of self-medication. A possible reason for this could be that literate people think that they can obtain necessary information from brochures, and therefore they can use medication without consulting doctors. This concurs with results obtained in studies conducted in Arak [13], Qazvin [21] and Lam in Spain [22]. In the present study, the most common diseases for which the elderly used self-medication were high blood pressure, cold, and muscular and joint aches. In studies by Tavakoli in Tehran [23] and Moghadamnia in Babol [24], cold and respiratory diseases were the most common illnesses for self-medication. In the present study, 99.4% of the elderly kept medicines in their homes, which is higher compared to studies in Arak (56%), Gonabad (85%), Khozestan (88%), and Qazvin (87%) [9,11,12,21]. Keeping medicines at home increases chances of self-medication, and also increases problems associated with correct storage, expiry date, correct consumption, and easy access of others. In the present study, a significant relationship existed between level of knowledge and self-medication, and the prevalence of self-medication in people with poor knowledge was twice as much in people with good level of knowledge. According to McDonald et al., there are many potential barriers (cognitive, physical, and behavioral) in successful relationship between the elderly and doctors. A study by Jackson in United States showed that visiting the elderly, doctors often behave with inattention, rash and indifference. They are also inclined to speak loudly, have a masterly manner and treat the elderly as if they were children [25]. Thus old people receive less information about medication use and treatment of their disease, and attempt self-medication according to friend's recommendations and their own previous experience. This was evident in external cues to self-medication in this study. The relationship between level of knowledge and self-medication is also observed in studies by Sharifi-Rad in Gonabad [11], Ziaee in

Tehran [12], Sahebi in Tabriz [18], and Shamsi in Arak [9]. The present study results indicate that chronic diseases increase chances of self-medication in elderly people by as much as 3.5 times those without any particular diseases, with a significant difference between these two groups. It seems availability of medication, together with having chronic diseases (such as: high blood pressure etc., in elderly, and many years of experience with these diseases and their symptoms has led to relative familiarity with them) are the most important motivational causes of self-medication in the aged. According to researchers' opinion, use of medication in various forms, as a way of dealing with the disease, has long been an issue [13]. Given high prescription rates by Iranian doctors (3.5 drug items on average) [9], increasing people's access to various medication is witnessed, and has led to indiscriminate use of medications in the country [11]. The study results also show a significant relationship between self-medication and perceived barriers, which next to chronic diseases are the most important predictor of self-medication. Various studies have shown that perceived barriers are the strongest aspect of expression or anticipation of protective behaviors of health [26]. In studies by Huntton in rural Benin and Matson in Kenya, perceived barriers were the strongest predictors of behavior [27]. In Shamsi's study in Arak, through participation in educational classes and reducing perceived barriers, self-medication was less attempted by pregnant mothers [15]. A study by Karimi also showed reduction in perceived barriers and increased breast self-examination rates [16]. Accordingly, it seems perceived barriers are among the most important factors involved in self-medication in the elderly, and its high levels further tempts the elderly toward self-medication, which should be taken into consideration in designing interventions. In this study, perceived benefits from correct use of medication and perceived intensity in relation to severity and complications of self-medication were found to be related to self-medication, and were among predictors of self-medication. Baghiani-Moghadam in Yazd [10], Asefzadeh in Qazvin [21], and Shamsi in Arak [15] showed that relative improvement due to previous self-medication (perceived benefits), considering the disease safe and unimportant (low perceived intensity) were influencing factors in self-medication. In a study by Bond et al. [28], perceived benefits were related to accepting treatment program. In Sharifi-Rad et al.'s study, there was a significant relationship between perceived benefits and intensity and self-medication [11]. In a study by Aghamolaee on diabetic patients, within HBM framework, perceived sensitivity and intensity was effective in predicting and change of patients' behaviors [28]. This finding can be utilized in educational planning. In this study, perceived self-efficacy was a significant predictor of self-medication behavior. Self-efficacy refers to the depth of individual's confidence in his personal performance [15]. In studies on the relationship between self-efficacy and health behaviors, self-efficacy significantly affected health behaviors, with more than 50% health behaviors variance in some studies [16]. In studies by Sharifi-Rad in Iran [11], Lynn in Taiwan [29], and Adige in Ghana [30], in line with the present study results, self-efficacy was a significant predictor of behavior. Future studies should contain strategies to increase self-efficacy and perceived benefits and reduce perceived barriers to prevent self-medication. In this study, there was no difference between sexes in terms of internal and external cues to action, and doctors, medical personnel, family, friends, and general good health were the most important cues to action. This finding agreed with findings in studies by Ziaee in Tehran [12], and Shamsi in Arak [15]. Cues to action are internal and external events that can activate a person's readiness for action, and trigger an observable behavior [15].

Among limitations in this study, lack of participation of the elderly in rural health centers, self-reporting mode of self-medication behavior and cross-sectional design can be cited.

Conclusion

Considering the high prevalence of self-medication among the elderly, the importance of medicinal interventions and unknown side-effects, particularly in old age, and also effectiveness of constructs of HBM in predicting self-medication behavior, design and implementation of educational interventions using HBM constructs are recommended, in order to elevate level of knowledge and change health beliefs to prevent self-medication behaviors, along with monitoring programs to prevent sales of medicines without prescription and reduce prescription items.

Acknowledgements

Authors wish to express their gratitude to all participating elderly and their families for their cooperation in this study.

Contributions

Study design: MK, AM, HB, JK
Data collection and analysis: KR, MR, AK
Manuscript preparation: MK

Conflict of Interest

"The authors declare that they have no competing interests."

References

1. Pourreza A, Mirmohammad KM, Pouraga B. Disease and costs patterns in hospitalized elderly services covered by health insurance organizations. *Iranian Journal of Ageing*2007; 2(4):252-62. [In Persian]

2. Brownie S. Why are elderly individuals at risk of nutritional deficiency? *Int J Nurs Pract*2006; 12(2):110-18.

3. Habibisula A, Nikpour S, Seyedolshohadai M, Haghani H. Health promotion behaviors and quality of life's among elderly people. A cross-sectional survey. *Journal of Ardebil university of Medical Sciences*2008; 8(1):29-36. [In Persian]

4. Liu XZ, Yan D. Ageing and hearing loss. *J Pathol*2007; 211 (2): 188-97 .

5. Rana AMM, Wahlin A, Lundborg CS. Impact of health education on health related quality of life among elderly persons: results from a community-based intervention study in Bangladesh. *Health Promot Int*2009; 24(1):36-45.

6. karimy M, Heidarnia AR, Ghofranipour GH. Factors influencing self-medication among elderly. *Arak Medical University Journal*2011; 14(58): 1-11. [In Persian]

7. Mousavi N, Ghasemi S. Health Guide for Old age. Tehran: Trainers and saints association; 200685-90 :. [In Persian]

8. Asghari GhR. Old age disease. Tehran: welfare organization; 2005: 125-55. [In Persian]

9. Shamsi M, Tajik R, Mohammad Beigi A.The survey of prevalence self-medication and factors effected in women's of Arak. *Journal of Quarterly nursing and midwife Hamedan University of Medical sciences*2008; 29(1):29-34. [In Persian]

10. Baghianimoghadam MH, Ehrampoush MH. Evaluation of attitude and practice of students of Yazd university of medical science to self-medication. *Journal of Zahedan university of medical science*2006;2(8):111-19. [In Persian]

11. Shrifirad GR, Mohebbi S, Motalebi M,et al. The prevalence and effective modifiable factors of self-medication based on the health belief model among elderly adults in Gonabad in 2009. *Journal of Health System Research*2012; 7(4): 1-10. [In Persian]

12. Ziyai T, Ozgoli G, Yaghmai F, Akbarzadeh AR. Survey of knowledge and attitude women in pregnancy referring in health center Shahid Beheshty University of Medical sciences. *J Sci Nursing and midwifery Shahid Beheshty*2009; 18(62):35-42. [In Persian]

13. Matano RA, Wanat SF, Westrup D, Koopman C, Whitsell SD. Prevalence of alcohol and drug use in a highly educated workforce. *J Behav Health Serv Res*2002; 29(1): 30-44.

14. Shankar PR, Partha P, Shenoy N. Self-medication and non-doctor prescription practices in Pokhara valley,Western Nepal: a questionnaire-based study. *BMC Fam Pract*2002 17;3:17.

15. Shamsi M, Baiati A,Tajik R, Mohammad Beigi A. Effect of health education program based on HBM model on preventive behaviors of self-medication in pregnancy mothers in Arak.*Pajoohandeh*, *Journal of Shahidbeheshti University of Medical Science*2009;14(6):324-31. [In Persian]

16. Karimy M,Hasani M,Khorram R ,Ghafari M,Niknami Sh. The effect of education based on of Health Belief Model on Breast Self-Examination in the health volunteers in Zarandieh. *Journal of Zahedan university of Medical science*2008; 10(4):79-87. [In Persian]

17. Sharma M, Romas JA. Theoretical foundations of health and education and health promotion. Jones and

Bartlett publishers, Sudbury: USA; 2008: 1-10.
18. Sahebi L, Seidy A, Amini S, et al. Self-medication status among referring patients to Tabriz pharmacies.*J Fac Pharm Tabriz Uni Med Sci*2009;3(4):174-181. [In Persian]
19. Abbasi N, Abdehzadeh M. Survey of Self-medication in Ilam city. *Journal of Ilam university of Medical science*2003; 12(42-43):35-9. [In Persian]
20. England RJ, Homer JJ, Jasser P, Wild AD. Accuracy of patient self-medication with topical eardrops. J Laryngol Otol2000; 114(1): 24-5.
21. Asefzadeh S, Anbarloyee M, Habibi S. Prevalence of self-medication of patients care in hospital in Quazvin city. *Sci J Uni Med Sci Quazvin*2003; 20(1): 48-52. [In Persian]
22. Jaquier F, Buclin T, Diezi J. Self-medication by adolescence. *Schweiz Med Wochenschr*1998; 128(6):203-7.
23. Tavakkoli R. Influences of educational statues on self-medication: a comparative survey. *Kowsar Med J*1996; 1(1): 43-8. [In Persian]
24. Moghadamnia A, Ghadimi R. Self-medication in common cold in people in 15-45 years in Babol. *Sci J Univ Med Sci Babol*2001; 2(1):26-32. [In Persian]
25. Jackson LD, Duffy BK. Health communication research. Westport, CT: Greenwood, 1998.
26. Sanaei Moghadam E, Sargolzaie N, Karami Sh, et al. Knowledge, attitude and practice regarding blood donation among Sistan and Baloochestan province blood donors about HIV. *Journal of Blood*2009; 6(2):117-23. [In Persian]
27. Houton SH, Carbin H, Henderson NJ. Towards an understanding of barriers to condom use in rural Benin using the HBM: a cross sectional survey: *BMC Public Health*2005; 5(8):53-61.
28. Gahanloo A.SH,Ghofranipour F,Vafaei M ,Kimiagar M,Heidarnia AR,Sobhani AR. Assessment HBM structures along with DBA1C in diabetic patients with optimum and un-favorable diabetes. *Journal of Hormozgan Medical School*2008; 12(1):37-42. [In Persian]
29. Lin PS, Simoni JM, Zemon V. The health belief model, sexual behaviors, and HIV risk among Taiwanese immigrants**.** *AIDS Educ Prev*2005; 17(5): 469-83.
30. Adih WK, Alexander CS. Determinats of condom use to prevent HIV infection among youth in Ghana. *J Adolesc Health*1999; 24(1):63-72.