



Development of the Persian Hypertension Self-Management Questionnaire

Fatemeh Keyghobadi Khajeh¹, Mohammad Zakaria Pezeshki², Saeideh Ghaffarifar^{3,*}, Gholamreza Faridaalae⁴

¹Department of Community Medicine, Tabriz University of Medical Sciences, Tabriz, IR Iran

²Social Determinants of Health Research Center, Department of Community and Family Medicine, Tabriz Medical School, Tabriz University of Medical Sciences, Tabriz, IR Iran

³Medical Education Research Center, Health Management and Safety Promotion Research Institute, Tabriz University of Medical Sciences, Tabriz, IR Iran

⁴Department of Health, Maragheh University of Medical Sciences, Maragheh, IR Iran

ARTICLE INFO

Article Type:
 Research Article

Article History:
 Received: 7 Aug 2018
 Revised: 18 Jan 2019
 Accepted: 23 Jan 2019

Keywords:
 Self-Management
 Questionnaire
 Hypertension

ABSTRACT

Background: Hypertension results in severe health problems and intensifies the risk of stroke, heart and kidney diseases, and death. Having a valid and reliable questionnaire for self-management of hypertension is very important.

Objectives: This study aimed to evaluate the psychometric properties of the Persian hypertension self-management questionnaire.

Methods: This psychometric exploratory research was conducted in Tabriz in 2017. In this exploratory research, the Persian version of diabetic patients' self-management questionnaire, which had proper psychometric properties, was modified in order to assess hypertensive patients' self-management. The face and content validity of the Persian hypertension self-management questionnaire was evaluated. Content Validity Ratio (CVR), Content Validity Index (CVI), and Impact Score (IS) of the questionnaire were calculated by participation of 49 hypertensive patients and 14 experts. Cronbach's alpha coefficient and Intra-class Correlation Coefficient (ICC) were considered to assess the reliability of the questionnaire.

Results: The questionnaire's overall CVI, CVR, and IS were 0.82, 0.63, and 4.41, respectively. Additionally, the CVIs of all questions were over 0.62. Moreover, the internal consistency of the questionnaire was approved by Cronbach's alpha = 0.882 and its ICC was 0.94.

Conclusion: The study findings revealed that the Persian hypertension self-management questionnaire had optimal psychometric properties. Hence, application of this questionnaire by physicians and health educators can be helpful in establishing evidence-based self-management support programs for hypertensive patients.

1. Background

Hypertension is one of the most prevalent chronic diseases. The number of individuals with hypertension that was 600 million in 1998 hit 1 billion in 2008, which equaled 40% of individuals over 25 years old (1, 2). Hypertension is a risk factor for diseases, such as coronary heart disease, brain stroke, heart and kidney failure, peripheral arterial disease, decreased cognitive function, and increased incidence of dementia. Likewise, controlling hypotension has a linear relationship with a decrease in the complications of these

diseases (3, 4). Hypertension causes 7.6 million early deaths in a year, 80% of which occur in low- to middle-income countries where residents have limited available healthcare resources, too little knowledge about hypertension, and poor control of hypertension (2, 5, 6). Motivating patients to change their lifestyles plays a pivotal role in controlling hypertension. Thus, the most careful physicians can control hypertension only when their patients are encouraged enough to change their lifestyles (7).

Self-management is a dynamic and practical process performed by patients. It consists of a number of specific measures taken to achieve the objectives of disease management (8). Self-management points to individuals'

*Corresponding author: Saeideh Ghaffarifar, Medical Education Research Center, Health Management and Safety Promotion Research Institute, Tabriz University of Medical Sciences, Tabriz, Iran, Celphone: +98-9146677876, Email: sa.ghaffarifar@gmail.com.

Archives of SID

capabilities in controlling symptoms, seeking for proper therapies, considering physical consequences and psychosocial effects, and controlling inevitable changes in their lifestyles. Self-management is a strategy through which individuals can maintain their behaviors, develop a positive behavior and/or skill, or dismiss an inappropriate behavior (8).

Evidence has indicated that hypertension self-management interventions led to a more significant decrease in Blood Pressure (BP) in comparison to office-based standard care (8). Self-management also yielded significant benefits in patients' clinical outcomes (9). Overall, self-management has been considered to be a cost-effective option in treatment of hypertension. Unfortunately, Iranian healthcare providers do not receive enough training on self-management, while some credible evidence has demonstrated that the combination of self-management with group field works led to an improvement in controlling hypertension (10, 11).

Up to now, there have been quite a few studies on the role of self-management in improving the complications of chronic diseases, such as diabetes and heart failure. However, to the best of our knowledge, no studies have been conducted in Iran to evaluate hypertensive patients' self-management status, which can be the basis for self-management support programs in the health system.

According to what was mentioned above, it is essential to evaluate the self-management status of hypertensive patients with a valid and reliable questionnaire. Up to now, no questionnaires have been validated to assess the self-management status of hypertensive patients.

2. Objectives

The present study aims to modify the Persian version of diabetic patients self-management questionnaire, which has proper psychometric properties, to assess hypertensive patients' self-management. The validity and reliability of the hypertension self-management questionnaire will be explored in this study, too. Hypertension self-management questionnaire can be used in needs assessment and interventional studies.

3. Patients and Methods

3.1. Design and Setting

This exploratory research was conducted in Tabriz, Iran in 2017.

3.2. Preparing the Questionnaire

The Persian version of diabetic patients self-management questionnaire, which had proper psychometric properties (12), was modified to assess hypertensive patients self-management. No translation was carried out in the current study. Diabetes self-management questionnaire consisted of 40 items. The original questionnaire had certain constructs, so that it was not necessary to assess its construct validity. Learning from the literature and expert medical scholars, the questionnaire was modified to be used for patients with hypertension.

3.3. Data Collection

Any ambiguities in the meanings and forms of the questions were identified and resolved with the help of ten patients

suffering from hypertension. In order to determine the face and content validity of the questionnaire, it was emailed to 14 specialists, including eight community medicine specialists and six PhD experts in Health Education, from different cities in Iran. The specialists' responses were collected in three weeks. It should be noted that all 14 experts completed the questionnaires (response rate = 100%). Both qualitative and quantitative methods were employed to assess the validity of the questionnaire. In the qualitative method, the experts were requested to comment on the appropriateness of grammatical structures, vocabulary usage, questions' positions, and order and scoring scale of the items. In the quantitative method, Content Validity Ratio (CVR) and Content Validity Index (CVI) of the items and the whole questionnaire were calculated. Impact Score (IS) was also employed to evaluate the face validity of the questionnaire. To determine CVR in accordance with Lawsheh's method [12], the specialists were requested to evaluate each item based on a three-point scale ("necessary", "helpful but unnecessary", and "unnecessary"). Then, CVR was calculated through the following formula (13):

$$CVR = \frac{Ne - N/2}{N/2}$$

Where N and Ne represented the total number of specialists and the specialists who selected 'necessary', respectively.

The CVR calculated using the above formula was compared to the corresponding amount from Lawsheh's Table (13) and the decision was made accordingly. Since the 14 specialists completed the questionnaires, any score over 0.51 was considered to be acceptable for approving the content validity of each question.

In order to determine CVI, simplicity (completely simple, simple, somewhat complex, complex), specificity or relevance (irrelevant, somewhat relevant, relevant, completely relevant), and clarity (completely clear, clear, somewhat clear, unclear) of the items were separately scrutinized based on a four-point Likert scale. CVI was calculated by the following formula (14):

$$CVI = \frac{\text{The number of specialists who assigned scores 3 and 4 to the items}}{N}$$

Accordingly, CVI over 0.79 indicated acceptable content validity (14, 15) In case the CVI was under 0.79, the question was modified or removed (14, 15). The final decision to remove or maintain each question has been presented in Table 1.

To assess the face validity of the questions, all 14 specialists were requested to determine the degree of appropriateness and congruence of the items based on a 5-point Likert scale with the following options: completely appropriate (5 points), appropriate (4 points), somewhat appropriate (3 points), a little appropriate (2 points), and not appropriate at all (1 point). Then, the scores were calculated by the following formula:

$$\text{Impact Score} = \text{Frequency (\%)} \times \text{Importance}$$

To confirm the face validity of each item, its IS had to be above 1.5. Thus, the questions with IS over 1.5 were acceptable in terms of face validity.

Table 1. The Content and Face Validity of Each of the Final Items of the Hypertension Self-Management Questionnaire

Number	Items	CVI	CVR	Impact Score	Decision
1	I consume enough fruits and vegetables (3 to 5 courses everyday)	0.93	0.86	4.88	Adopted
2	In order to evade some complications, I control my blood pressure.	0.66	0.57	4.56	Modified
3	Despite having hypertension, I take part in social activities.	0.69	0.57	4	Modified
4	When choosing a specific type of food, I consider its effects on hypertension.	0.98	0.86	4.93	Adopted
5	Due to hypertension, I have opted for a healthy lifestyle.	0.69	0.86	4.71	Modified
6	I control my weight appropriately and effectively.	0.78	1	4.84	Adopted
7	In order to control my blood pressure, I control the types of food I consume at home and out of home.	0.90	0.69	4.75	Adopted
8	I do sports because of blood pressure.	0.95	0.83	4.69	Adopted
9	I have succeeded to incorporate some activities required for successful control of blood pressure into my daily life.	0.60	0.50	4.23	Omitted
10	If there is a change in my blood pressure status, I change my routine activities concerning hypertension (for instance dose of medications, diets, etc.).	0.76	0.67	4.64	Modified
11	I know why my blood pressure fluctuates.	0.78	0.27	4	Omitted
12	I can diagnose the symptoms and signs indicating a decrease or increase in my blood pressure level.	0.88	0.83	4.64	Adopted
13	I take appropriate measures in response to signs indicating a decrease or increase in my blood pressure level.	0.78	0.83	4.64	Modified
14	I notice the signs indicating a decrease or increase in blood pressure level.	0.93	0.57	4.22	Modified
15	I use my experiences to make decisions on controlling my disease.	0.75	0.07	4.08	Omitted
16	I can remove the signs and reactions concerning the decrease in blood pressure level in my body.	0.62	0.07	4.7	Omitted
17	I notice the conditions and issues that can affect blood pressure level.	0.74	0.51	3.72	Modified
18	I can comfortably talk with healthcare centers staff or physicians about the possibility of changing the prescribed therapy schedule.	0.78	0.57	4.5	Modified
19	I can comfortably recommend healthcare centers staff or physicians to make changes in my prescribed therapy schedule.	0.83	0.50	4	Modified
20	I can comfortably ask my questions from healthcare centers staff or physicians.	0.93	0.38	4.31	Omitted
21	I collaborate with healthcare centers staff or physicians in order to find out the causes of inappropriate control of my disease.	0.88	0.63	4.57	Modified
22	I can comfortably talk with healthcare centers staff or physicians about abnormal range of blood pressure.	0.74	0.33	4.05	Modified
23	I comfortably ask my doctor questions regarding the resources and centers that offer hypertension care procedures.	0.76	0.54	4.22	Modified
24	I ask others to help in case I have hypertension.	0.74	0.38	3.94	Omitted
25	In order to control my blood pressure, I ask others (friends, family, neighbor, and other patients) for help.	0.78	0.38	4.14	Modified
26	I accept others' (relatives, friends, neighbors) views and beliefs about controlling blood pressure.	0.88	0.54	4.14	Adopted
27	If I notice signs indicating an increase in my blood pressure level, I measure it or refer to my doctor.	0.88	0.85	4.58	Adopted and changed into two questions
28	When I am sick, I myself control my own blood pressure or ask my doctor to do it.	0.62	0.38	4.08	Omitted
29	When you notice the signs of drop in your blood pressure, do you measure it yourself or do you visit your doctor?	0.74	0.54	4.12	Modified
30	I consume the prescribed dose of medicines.	0.98	1	4.72	Adopted
31	I take my medicines at the recommended time.	0.98	1	4.79	Adopted
32	Every 1-3 months, I visit my doctor for a checkup or examination.	1	1	4.59	Adopted
33	Have you quit smoking? Or are you trying to quit smoking?	0.98	0.87	4	Adopted and changed into two questions.
34	I consume low salt and low fat foods.	0.88	0.85	4.71	Adopted and changed into two questions.
35	I measure my blood pressure level on a regular basis.	0.93	1	4.73	Adopted

After the validation process, some questions were deleted, some were modified, and the remaining questions were retained. In addition, a few questions were added to the questionnaire based on the experts' comments.

Cronbach's alpha coefficient and Intra-class Correlation Coefficient (ICC) were considered to assess the reliability of the questionnaire. To do so, the questionnaire was given to 40 patients with hypertension. After two weeks, the same

Archives of SID

patients were asked to fill out the questionnaires again. The questionnaires were completed by 39 patients (97.5%) in both stages (1 dropout).

3.4. Inclusion and Exclusion Criteria

Patients with hypertension without accelerated or malignant hypertension who were above 30 years old and were referred to health centers in Tabriz were included in this study. The exclusion criteria were proven secondary hypertension and presence of cognitive problems, including dementia and Alzheimer's disease. In case the patients were illiterate, two trained questioners explained the questions to the patients and completed the questionnaires. Kappa

coefficient was calculated to explore the agreement between the two different questioners.

3.5. Data Analysis

The study data were analyzed using descriptive and analytical statistics via the SPSS statistical software, version 21.

Ethical considerations: This research was approved by the Ethics Committee of Tabriz University of Medical Sciences (code: IR.TBZMED.REC.1396.467). Written informed consents were obtained from all experts and patients. They were also reassured about the confidentiality of their information.

Table 2. The Kappa Coefficient* for Each of the Items of the Hypertension Self-Management Questionnaire

Number	Questions	Kappa Coefficient
Self-integration		
1	I consume enough fruits and vegetables (3-5 courses every day).	0.880
2	I consume low fat foods.	0.525
3	I consume low salt foods.	0.838
4	In order to control my blood pressure, I control the types of food I consume at home.	0.628
5	In order to control my blood pressure, I control the types of food I consume out of home.	0.827
6	When selecting any type of food, I consider its effects on blood pressure.	0.630
7	Due to having hypertension, I have opted for a healthier lifestyle (avoiding sitting for a long time).	0.810
8	I control my weight.	0.580
9	I am trying to quit smoking so as to control my blood pressure.	1
10	I have quit smoking so as to control my blood pressure.	0.644
11	In order to control my blood pressure, I do sports.	0.650
12	When I am nervous, I resort to some ways like speaking with my friends or family to get rid of my stress.	0.706
13	Despite having hypertension, I take part in social activities (like public walking).	0.960
Self-regulation		
14	If I feel an increase or decrease in my blood pressure level, I take the routine measures concerning blood pressure (for instance, dose of my medicines, diet, etc.).	0.650
15	I can understand the signs and symptoms of any decrease or increase in my blood pressure level.	0.730
16	I take the recommendations of physicians or medical centers staff about treating any decrease or increase in blood pressure for granted.	0.770
17	I take any sign of a decrease or increase in blood pressure to be important.	0.752
18	I take any cause that may affect blood pressure level to be important.	0.378
19	I control my blood pressure level in order to evade its complications	0.760
Interaction with health professionals and significant others		
20	I talk with medical centers staff or my doctor about changing the prescribed treatment schedule.	0.690
21	I talk with medical centers personnel or my doctor about the possibility of changing the prescribed treatment schedule.	0.638
22	I comfortably make recommendations to medical centers personnel or my doctor to change my treatment schedule.	0.693
23	I ask my doctor questions about the centers that provide blood pressure care procedures.	0.787
24	I ask others (friends, family, neighbor, and other patients) to guide me in controlling blood pressure.	0.721
25	I take others' (relatives, friends, neighbors) views and beliefs about controlling blood pressure for granted.	0.795
Self-monitoring		
26	I measure my blood pressure on a regular basis.	0.662
27	If I feel a decrease or increase in my blood pressure level, I measure it.	0.786
28	When there is a decrease or increase in my blood pressure level, I visit my doctor.	0.733
29	Every 1-3 months, I visit my doctor for a checkup or examination.	0.690
Adherence to the recommended regimen		
30	I consume the prescribed doses of medicines.	0.798
31	I have quit drinking so as to control my blood pressure.	0
32	I take my medicines at the recommended time.	0.720

* Kappa coefficient was calculated to explore the agreement between two different questioners in case of completing the questionnaires for illiterate patients

4. Results of SID

The questionnaires were completed by 14 specialists in community social medicine and health education and were returned to the researcher. Based on the results, 78.5% of the experts and 74.3% of the patients were female. According to the patients' self-reported personal characteristics, their mean age was 56.7 (SD = 10.01) years. The mean response time to the questionnaires was 9.8 minutes.

All validated questions' CVIs were more than 0.62. In addition, the questionnaire's overall CVI, CVR, and IS were 0.82, 0.63, and 4.41, respectively. CVI, CVR, and IS of each item of the hypertension self-management questionnaire have been presented in Table 1.

The internal consistency of the questionnaires was approved by Cronbach's $\alpha = 0.882$. Indeed, its ICC was 0.94 (95% CI = 0.917- 0.960). Kappa coefficient was also calculated for each of the questionnaire's items and the results have been presented in Table 2.

Based on the Kappa coefficient calculations, question 31 was omitted. Among the 35 questions of the Persian version of hypertensive patients' self-management questionnaire, 11 questions were adopted with no changes, three questions were adopted and divided into two different questions, 14 questions were modified, and seven questions were omitted because they did not have acceptable content validity. Eventually, the final valid and reliable hypertension self-management questionnaire was developed with 31 questions responded via a five-point Likert scale with the following options: never, occasionally, very often, always, and not at all.

5. Discussion

In this exploratory research, the Persian version of diabetic patients' self-management questionnaire, which had proper psychometric properties, was modified in order to assess hypertensive patients' self-management. According to the findings, hypertension self-management questionnaire had satisfactory psychometric properties. Hence, healthcare providers in all Persian speaking countries can use this valid and reliable questionnaire in conducting educational interventions, educating patients, and examining the results of their interventions.

Based on the literature review looking for any hypertension self-management questionnaires in both English and Persian in credible available electronic databases, there was no hypertension self-management questionnaire available up to the time of conducting this study. In addition, self-management status of Iranian patients with hypertension had not been reported yet. Thus, in order to examine the patients' hypertension self-management status, it was necessary to develop a valid and reliable questionnaire.

In a study by McMannus et al., the non-pharmacological section of the British national hypertension guideline was taught to the patients. Then, the effects of self-management training on the patients' hypertension were evaluated. However, they did not provide the instrument used for evaluation of the participating patients' self-management status (16).

As mentioned above, there is no available hypertension self-management questionnaire. Hence, the present

questionnaire whose validity and reliability were verified could be employed to evaluate self-management status in patients with hypertension. This valid and reliable hypertension self-management questionnaire might be a good help in tele-monitoring of hypertension by healthcare providers and might increase the cost-effectiveness of the control programs (17). However, it is recommended to determine the weight of each questionnaire item in prediction of self-management behavior among hypertensive patients.

5.1. Conclusion

The results of the present study indicated that the Persian version of hypertension self-management questionnaire had desirable psychometric properties. Hence, application of this questionnaire by physicians and health educators can be helpful in needs assessment and interventional studies.

Acknowledgements

The present study was extracted from a dissertation for obtaining a specialty degree in Community Medicine entitled "Investigating the relationship between social determinants of health and self-management in patients with hypertension", which was approved by Tabriz University of Medical Sciences in 2016 and was conducted in Social Determinants of Health Research Center. The authors would like to appreciate all the specialists and patients who willingly participated in the study. They would also like to express their sincere gratitude to all the staff of the Faculty of Medicine, Social Determinants of Health Research Center, and Health Care Centers in Tabriz who helped carry out the study.

Authors' Contribution

Study concept and design: all authors. Acquisition of data: F K K. Analysis and interpretation of data: M Z P, F K K. Drafting of the manuscript: G F. Critical revision of the manuscript for important intellectual content: all authors. Administrative, technical, and material support: F K K. Study supervision: M Z P, S G.

Funding/Support

This study was supported by Social Determinants of Health Research Center at Tabriz University of Medical Sciences.

Financial Disclosure

The authors have no financial interests related to the material in the manuscript.

References

1. Mann DL, Zipes DP, Libby P, Bonow RO. *Braunwald's Heart Disease E-Book: A Textbook of Cardiovascular Medicine*. Elsevier Health Sciences; 2014.
2. Mills KT, Bundy JD, Kelly TN, Reed JE, Kearney PM, Reynolds K, et al. Global Disparities of Hypertension Prevalence and Control: A Systematic Analysis of Population-Based Studies From 90 Countries. *Circulation*. 2016;**134**(6):441-50.
3. Hansson GK. Inflammation, atherosclerosis, and coronary artery disease. *N Engl J Med*. 2005;**352**(16):1685-95.
4. Heagerty AM. Predicting hypertension complications from small artery structure. *J Hypertens*. 2007;**25**(5):939-40.
5. Ibrahim MM, Damasceno A. Hypertension in developing countries. *Lancet*. 2012;**380**(9841):611-9.

6. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. *Lancet*. 2005;**365**(9455):217-23.
7. Lawes CM, Vander Hoorn S, Rodgers A, International Society of H. Global burden of blood-pressure-related disease, 2001. *Lancet*. 2008;**371**(9623):1513-8.
8. Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions: a review. *Patient Educ Couns*. 2002;**48**(2):177-87.
9. Green BB, Cook AJ, Ralston JD, Fishman PA, Catz SL, Carlson J, et al. Effectiveness of home blood pressure monitoring, Web communication, and pharmacist care on hypertension control: a randomized controlled trial. *JAMA*. 2008;**299**(24):2857-67.
10. Magid DJ, Olson KL, Billups SJ, Wagner NM, Lyons EE, Kroner BA. A pharmacist-led, American Heart Association Heart360 Web-enabled home blood pressure monitoring program. *Circulation: Cardiovascular Quality and Outcomes*. 2013:CIRCOUTCOMES.112.968172.
11. Margolis KL, Asche SE, Bergdall AR, Dehmer SP, Groen SE, Kadmas HM, et al. Effect of home blood pressure telemonitoring and pharmacist management on blood pressure control: a cluster randomized clinical trial. *JAMA*. 2013;**310**(1):46-56.
12. Tahmasebi R, Noroozi A. Cross-cultural validation of the diabetes self-management scale in Iranian patients. *HealthMED*. 2012;**6**(8):2650-7.
13. Lawshe CH. A quantitative approach to content validity I. *Personnel psychology*. 1975;**28**(4):563-75.
14. Polit DF, Beck CT, Owen SV. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Res Nurs Health*. 2007;**30**(4):459-67.
15. Wynd CA, Schmidt B, Schaefer MA. Two quantitative approaches for estimating content validity. *West J Nurs Res*. 2003;**25**(5):508-18.
16. McManus RJ, Mant J, Bray EP, Holder R, Jones MI, Greenfield S, et al. Telemonitoring and self-management in the control of hypertension (TASMINH2): a randomised controlled trial. *Lancet*. 2010;**376**(9736):163-72.
17. Kaambwa B, Bryan S, Jowett S, Mant J, Bray EP, Hobbs FD, et al. Telemonitoring and self-management in the control of hypertension (TASMINH2): a cost-effectiveness analysis. *Eur J Prev Cardiol*. 2014;**21**(12):1517-30.