

## POJ Nursing Practice & Research

### Research Article

# Differences of Self-Management in Controlling Blood Pressure between Patients with Hypertension and Healthy People in Vietnam

Duong Thi To Anh<sup>1,2</sup>, Ya-Wen Shih<sup>2</sup>, Nae-Fang Miao<sup>3</sup>, Yuan-Mei Liao<sup>4</sup>, Yeu-Hui Chuang<sup>2,3</sup>, Hsiu-Ju Chang<sup>2</sup>, Hui-Chuan Huang<sup>3</sup>, Hsiu-Ting Tsai<sup>2,3\*</sup>

<sup>1</sup>School of Nursing, Thai Nguyen Medical College, Thai Nguyen, Vietnam

<sup>2</sup>School of Nursing, College of Nursing, Taipei Medical University, Taipei City, Taiwan

<sup>3</sup>Post-Baccalaureate Program in Nursing, College of Nursing, Taipei Medical University, Taipei City, Taiwan

<sup>4</sup>Institute of Clinical Nursing, School of Nursing, National Yang-Ming University, Taipei City, Taiwan

**\*Corresponding Author:** Hsiu-Ting Tsai, Ph.D., Post-Baccalaureate Program in Nursing, College of Nursing, Taipei Medical University, No. 250, Wu-Xing Street, Taipei 11031, Taiwan, R.O.C, Tel:+886-2-2736-1661 ext.6330; Fax: +886-2-2736-1664; Email: hsiuting@tmu.edu.tw, tsaihsiuting@yahoo.com.tw

The first two authors contributed equally.

**Received Date:** July 19, 2017 **Accepted Date:** July 26, 2017 **Published Date:** August 04, 2017

**Citation:** Duong Thi To Anh, Ya-Wen Shih, Nae-Fang Miao, Yuan-Mei Liao, Yeu-Hui Chuang, Hsiu-Ju Chang, Hui-Chuan Huang, Hsiu-Ting Tsai (2017). Differences of Self-Management in Controlling Blood Pressure between Patients with Hypertension and Healthy People in Vietnam. *POJ Nurs Prac Res* 1(1): 1-8.

### Abstract

**Purpose:** To assess the differences in blood pressure self-management behavior between healthy people and patients with hypertension, and to suggest possible predictors of blood pressure self-management in Vietnam.

**Methods:** A cross-sectional study design was conducted, in a sample of 362 patients with hypertension and 174 healthy people were recruited, using a questionnaire survey.

**Results:** The scores of blood pressure self-management behavior were significantly higher among patients with hypertension compared to healthy people. The living area in rural ( $\beta = -2.32$ ,  $P < 0.0001$ ) and with more than six years duration of hypertension ( $\beta = 1.88$ ,  $P < 0.0001$ ) were the predictors for the score of self-management behavior among patients with hypertension, while in healthy people, the score was significantly predicted by higher knowledge of hypertension ( $\beta = 0.35$ ,  $P < 0.0001$ ) and education on prevention of hypertension ( $\beta = 0.86$ ,  $P = 0.002$ ). The major source for both patients with hypertension and healthy individuals to acquire health- or hypertension-related knowledge was television or radio program.

**Conclusion:** Patients with hypertension presented with higher scores of self-management behavior. The Vietnamese government should provide more health education program in general population. The development of an credible media technology (e.g., television, radio, internet) is a recommendable strategy in disseminating information on the prevention and controlling of hypertension.

**Keywords:** hypertension, self-care, Vietnamese

### Introduction

Hypertension is highly considered one of the most common risk factor leading to global morbidity [1], mortality [2, 3], and negative effects on the physical and psychological conditions for approximately one billion people worldwide [4] and this proportion will increase to about 1.5 billion by 2025 [5]. Like many other developing countries, hypertension in Vietnam has assumed a major public health dilemma [6]. It is the third leading cause of death in hospitals among Vietnamese adults, and the prevalence rate of hypertension is increasing, especially with 41.8 % people reported with prehypertension in Vietnam [7].

Blood pressure control is greatly important to reduce the mobility and mortality of hypertension [6,7]. However, in Vietnam, only 10.7% patients with hypertension achieved targeted hypertension control [6]. One of the most common reasons for poor hypertension control might be a lack of self-management behavior. Self-management behavior has been effectively used in blood pressure control for both patients with hypertension and healthy people particularly the elderly population, who are often exposed to risk factors associated with susceptibility to hypertension [8, 9]. However, Bosworth et al. [10] pointed out that self-management is not easy because people need to make daily decisions which are aggregated for a long time and involves actions such as taking medicine, exercise and responding to hypertension signs and symptoms [10]. Furthermore, there are many factors, such as knowledge about hypertension [11], individual characteristics and social aspect, which could have great effects upon the blood pressure self-management behavior [8]. Therefore, it is not surprising that many people had poor blood pressure control [12]. However, the magnitude of poor blood pressure self-management behavior is not only the disease itself but also its related complications; therefore, having strategies to enhance blood pressure self-management behavior among people are of great importance to prevent complications and protect healthy people from the disease of hypertension. Hence, there is a need to survey the phenomenon of blood pressure self-management in both patients with hypertension and healthy people with a view to encourage it to Vietnamese government to urgently assist its implementation in order to provide benefit strategy for controlling the prevalence and complication of hypertension. Moreover, to realize the popular sources of health information and preferred sources of hypertension information as well as hypertension knowledge is essential to guide health professional interventions. However, to the best of our knowledge, none of the studies have explored about the blood pressure self-management behavior among patients with hypertension and healthy people in Vietnam.

Therefore, we conducted a cross-sectional study to evaluate the differences of the hypertension knowledge, blood pressure self-management behavior among patients with hypertension and healthy people and to suggest possible predictors for blood pressure self-management, as well as identify the major and preferred sources for participants to get health- or hypertension-related knowledge in Vietnam.

## Methods

### Study design and Sample

A total of 362 patients who were diagnosed with hypertension and have been receiving antihypertensive medication for at least 6 months were recruited from July 2015 to September 2015 as a case group at 6 hospitals, including one national hospital, three provincial hospitals, and two district hospitals in Vietnam. Meanwhile, 174 healthy individuals consulting for

general health checks were randomly selected from the same geographic area to act as the controls.

Participants enrolled in this study were Vietnamese of both genders, able to speak Vietnamese language and communicative ability, aged 20 years and older for patients with hypertension and healthy people. People with mental disorders, the blind and deaf were excluded in this study. The study was performed with the approval of Ha Noi School of Public Health Institutional Review Board (No. 015-256/DD-YTCC) and obtaining permission from the director of each of the six hospitals and informed written consent was obtained from each individual.

### Instruments

The Self-Management questionnaire developed by Lin [8] comprises 40 item-questions which have different aspects of blood pressure self-management including 5 dimensions. The first dimension is self-integration with 13-items. The second dimension is self-regulation with 9-items, followed by the third component with 9-items after that is self-monitoring with 4-items, and then the last component with 5-items. The participants were asked to answer the single questions following their performance about self-management behavior by frequency. Then, the responses were measured 4 points (ranging from 1 to 4 while 1 point means never and 4 point means always). The higher scores mean the higher self-management behavior. The internal consistency and reliability of the instrument were assessed by using Cronbach's alpha 0.70.

The Hypertension Knowledge Level Scale (HK-LS) developed by Erkoc et al. [13] was used to assess the knowledge of hypertension. It consisted of 22-items addressing different aspects of knowledge about hypertension. This scale included 6 sub-dimensions of knowledge about hypertension including 2-items about definition; 4-items about medical treatment; 4-items about drug compliance; 5-items about lifestyle; 2-items about diet; and 5-items about complication of hypertension. The participants were asked to respond by a standard answer including correct, incorrect, or do not know while each correct answer was given 1 point and the others were 0 points. In our study, each dimension was dichotomized into two levels, 0 = less knowledgeable for those with less than half of correct answers; and 1 = more knowledgeable for those with equal or more than half of correct answers. For example, the knowledge of the definition of hypertension had 2 items, those had equal or more than one correct answers indicating more knowledgeable about the definition of hypertension. The comprehensive knowledge score about hypertension was considered by all six of these dimensions which were divided by 2 levels including high (for those who have half or more of the six components correct answers) and low (for those with less than half of six components correct answers). The internal consistency and reliability of the instrument were assessed by

using Cronbach’s alpha 0.82.

**Data collection/procedure**

The trained nurses were recruited as research assistants to aid in the data collection. After the explanation of the study and obtaining the agreement and informed written consent from each individual the face-to-face interviews for questionnaires were done. All questionnaires were checked at the collection point by the researcher during data collection. The questionnaires were then crosschecked and thoroughly reviewed again for completeness after every data collection exercise by the researcher. Coding data were also screened before analyzing.

**Data analysis**

An independent t-test and a chi-square test were respectively used to compare the differences of continuous and categorical variables between two groups. A one-way ANOVA test was used to detect the difference among three groups. Multiple linear regression models were used in order to examine the factors associated with blood pressure self-management behavior. A P value <0.05 was considered significant. The data were analyzed on SPSS software program version 20.

The sample size estimation for the patients was determined by using the G-power software. A power analysis was performed with a two-tailed t-test, alpha level set at 0.05, power at 0.95, effect size of 0.5, a response rate of 85%, and adjusting confounding factors [14]. A final analytic sample size of 362 patients and 174 healthy people were recruited in the study.

**Results**

We estimated differences of demographical characteristic between patients with hypertension and healthy people, including age, gender, body mass index (BMI), educational level, occupational status, monthly average income, and residential area. There were significant differences (p<0.05) of age, gender, educational level, and residential area between patients with

hypertension and healthy people (data not shown).

The differences in hypertension knowledge-level scale between patients with hypertension and healthy subjects are shown in Table 1. Except for knowledge about drug and lifestyle, there were significantly high scores of estimated parameters in patients with hypertension compared to those in healthy people.

The differences of blood pressure self-management behavior between patients with hypertension and healthy subjects are shown in Table 2. There were significantly higher scores of estimated parameters among patients with hypertension compared to healthy people. The mean score of adherence to recommended regimen was 3.58 (SD=0.68) (Table 2), and the total score of blood pressure self-management behavior was 2.83 (SD=0.47) among patients with hypertension (data not shown).

The potential predictors of blood pressure self-management behavior was living area in rural ( $\beta = -2.32, P < 0.0001$ ) and more than six years duration of hypertension ( $\beta = 1.88, P < 0.0001$ ) for patients with hypertension (Table 3) and knowledge of hypertension ( $\beta = 0.35, P < 0.0001$ ) and the previous education on prevention of hypertension ( $\beta = 0.86, P = 0.002$ ) for healthy people (Table 4), respectively.

The major source for both patients with hypertension and healthy individuals to acquire health- or hypertension-related knowledge was TV or radio program and followed by books, magazines or newspaper. The third source was health promotion program conducted by health center (Table 5). However, the acquirement of education from health center was their preferred choice, followed by TV or radio, and proceeded by books, magazine, or newspaper (Table 5). Moreover, we found that healthy subjects were significantly (p=0.0001) likely to acquire health information from the internet compared to patients with hypertension (Table 5).

**Table 1: Independent t-test Analyses Differences of Hypertension Knowledge**

Variable	Patients Mean ± SD, n=362	Healthy people Mean ± SD, n=174	p-value
Knowledge about definition of hypertension	0.64 ± 0.84	0.49 ± 0.75	0.043*
Knowledge about medical treatment of hypertension	1.57 ± 0.93	1.36 ± 0.94	0.011*
Knowledge about drug of hypertension	1.21 ± 0.89	1.18 ± 1.02	0.727
Knowledge about lifestyle modulation of hypertension	2.59 ± 1.18	2.37 ± 1.32	0.062
Knowledge about diet of hypertension	1.39 ± 0.74	1.15 ± 0.81	0.001***

Knowledge about complications of hypertension	3.61 ± 1.49	2.74 ± 1.84	0.001***
Total score about knowledge	11.0 ± 3.31	9.29 ± 3.68	0.001***

Note: N =536 \* p < .05, \*\* p <.01, \*\*\*p < .001.

**Table 2: Independent t-test Analyses Differences of Blood Pressure Self-Management Behavior**

Variable	Patients Mean ± SD, n =362	Healthy people Mean ± SD, n =174	p-value
Self-integration	2.76 ± 0.54	2.28 ± 0.58	0.001***
Self-regulation	2.55 ± 0.71	1.78 ± 0.96	0.001***
Interaction with health care professionals and significant others	2.63 ± 0.74	1.95 ± 0.94	0.001***
Self-monitoring	2.66 ± 0.81	1.86 ± 1.02	0.001***
Adherence to recommended regimen	3.58±0.68	Not applicable	-

Note: N =536\* p < .05, \*\* p <.01, \*\*\*p < .001.

**Table 3: Multiple Regression Analyses Predicting Blood Pressure Self-Management Behavior Among Patients with Hypertension.**

Independent Variables	Significant R2	Coef (β)	95% CI	P value
Knowledge	0.56	0.01	-0.04;0.06	0.736
<b>Gender</b>				
Male (Reference)		–	–	–
Female		-0.28	-0.62;0.06	0.105
<b>Residential area</b>				
Urban (Reference)		–	–	–
Rural		-2.32	-2.72;-1.91	0.001***
<b>Duration with hypertension</b>				
≤ 6 years (Reference)		–	–	–
>6 years		1.88	1.49;2.27	0.001***
<b>Previous education on hypertension prevention</b>				
No (Reference)		–	–	–
Yes		0.34	-0.03;0.71	0.069

Note: N = 362.The βwith their 95% confidence intervals (CI) were estimated by multiple regression models by adjusting potential confounding variables which had a p value less than 0.10 in bivariate analysis.\* p < .05, \*\* p <.01, \*\*\*p < .001.

**Table 4: Multiple Regression Analyses Predicting Blood Pressure Self-Management Behavior Among Healthy People**

Independent Variables	Significant R2	Coef (β)	95% CI	P value
Knowledge	0.29	0.35	0.24;0.46	0.001***
<b>Education level</b>				

No formal education and Primary (Reference)		-	-	-
High school		0.12	-1.29;1.52	0.871
>High school		0.43	-1.11;1.97	0.586
<b>Residential area</b>				
Urban (Reference)		-	-	-
Rural		-0.28	-1.32;0.76	0.598
<b>Family history</b>				
Without disease		-	-	-
With hypertension		0.33	-0.66;1.32	0.510
With other diseases		0.81	-0.32;1.93	0.158
<b>Occupation</b>				
Others		-	-	-
Agriculture		-0.49	-1.46;0.47	0.309
<b>Previous education on hypertension prevention</b>				
No		-	-	-
Yes		0.86	0.33;1.39	0.002**

Note: N = 174. The  $\beta$  with their 95% confidence intervals (CI) were estimated by multiple regression models by adjusting potential confounding variables which had a p value less than 0.10 in bivariate analysis. \* p < .05, \*\* p < .01, \*\*\*p < .001.

**Table 5: The Major and Preferred Sources for Participants to Get Health- or Hypertension-Related Knowledge (n=536)**

<b>The major sources for participants to get health- or hypertension-related knowledge</b>			
<b>Variable</b>	<b>Patients with hypertension (n=362) n (%)</b>	<b>Healthy people (n=174) n (%)</b>	<b>p-value</b>
Books, magazines or newspaper	59 (16.3)	30 (17.2)	0.088
Brochure or pamphlet from hospital or health	34 (9.5)	12 (6.9)	0.125
Health promotion program conducted by health center	58 (16.0)	24 (13.8)	0.531
TV or radio	90 (24.9)	40 (23.0)	0.837
Internet	22 (6.2)	21 (12.1)	0.001***
Family member	43 (11.8)	19 (11.0)	0.634
Friends	46 (12.6)	23 (13.2)	0.107
No information	8 (2.1)	5 (2.8)	0.262
Other	2 (0.6)	0 (0)	0.088
<b>The preferred sources for participants to get health- or hypertension-related knowledge</b>			
<b>Variable</b>	<b>Patients with hypertension (n=362) n (%)</b>	<b>Healthy people (n=174) n (%)</b>	<b>p-value</b>
Books, magazines or newspaper	69 (19.1)	36 (20.7)	0.054

**Citation:** Duong Thi To Anh, Ya-Wen Shih, Nae-Fang Miao, Yuan-Mei Liao, Yeu-Hui Chuang, Hsiu-Ju Chang, Hui-Chuan Huang, Hsiu-Ting Tsai (2017). Differences of Self-Management in Controlling Blood Pressure between Patients with Hypertension and Healthy People in Vietnam. POJ Nurs Prac Res 1(1): 1-8.

Brochure or pamphlet from hospital or health	37 (10.2)	11 (6.3)	0.137
Health promotion program conducted by health center	117 (32.3)	51 (29.3)	0.489
TV or radio	108 (29.8)	43 (24.7)	0.765
Internet	27 (7.5)	33 (19.0)	0.001***
Other	4 (1.1)	0 (0)	0.065

Data presented as number (%) were performed using Chi-square. \* p < .05, \*\* p <.01, \*\*\*p < .001.

**Discussion**

This is the first study to provide the information and predictors of blood pressure self-management behavior, as well as identify the major and preferred sources for people to get health- or hypertension-related knowledge in Vietnam.

In this study, we found that patients with hypertension had higher scores about knowledge of hypertension in comparison with healthy people. Our results are similar to those of Eshah et al [15]. Eshah et.al pointed out the potential reason that once people suffered from any diseases, they are likely to be motivated for the better learning about the controlling of their own disease and the prevention of complications [15]. We also found that the scores of blood pressure self-management behaviors were significantly elevated in patients with hypertension compared to healthy people. It was reported that patients with hypertension were usually followed and monitored with regular blood pressure measurements and given treatment drugs [15, 16]. Therefore, patients with hypertension might have more opportunity learning to increase their blood pressure control compared to those without the disease [17]. Moreover, in our study, among patients with hypertension, the mean score of adherence to recommended regimen was higher than other domains of blood pressure self-management. Our finding is consistent with other studies [18]. Namara et al. reported that only 15% of patients with non-adherence to medication [18]. Inkster et al. showed that 91% of patients take medication as prescribed [19]. Our result implied that Vietnamese patients with hypertension believe in the treatment of hypertension. However, the total mean score of blood pressure self-management behavior among patients was only 2.83 (SD=0.47). It could be due to the shortage of health professional in Vietnam [5], which results in the less of opportunity to discuss self-management strategies [20]. Our findings are important and will provide vital information to the Ministry of Health in Vietnam for the improvement of the comprehensive health care service and education.

Our study showed that blood pressure self-management behavior among patients with hypertension was predicted by two factors: living in the urban areas and longer duration with hypertension (>6 years) had better blood pressure self-management behavior. It has been found that patients

living in rural communities could limit their access to health care resources and induce a poor hypertension self-management [21]. Some studies also found that longer duration with hypertension was one of the variables predicting for self-management behavior [11, 22]. The potential explanation was that the longer chronic hypertension the more available chances to learn more about the management of the disease [22]. Our finding implies that health care providers should focus more on those with newly diagnosed hypertension.

Among healthy people, blood pressure self-management behavior was potentially influenced by the factors including knowledge about hypertension and previous education on prevention of hypertension. Good knowledge about hypertension has been reported to correlate with better blood pressure control [23], self-integration [24] and self-care [11]. It also be reported that education benefits the understanding about the prevention and controlling of disease, thereby having better self-care [25]. Our finding implies that health professionals should focus more on education about the knowledge of hypertension for those without hypertension to increase their self-management behavior on prevention of hypertension [26].

On the contrary, among patients with hypertension, knowledge about hypertension was not a significant predictor of blood pressure self-management behavior. Our result was similar to that of Lee et al [22]. Some studies found that health self-management behavior is not only affected by knowledge itself but also affected by many other factors such as environmental conditions and self-efficacy [3, 22, 27, 28]. We suggest that future research should assess the effects of self-efficacy on blood pressure self-management behavior among patients with hypertension in Vietnam.

**Limitation:**

This study was only conducted in one province out of a total of 63 provinces in Vietnam; therefore, results might not be generalized.

**Conclusion:**

Patients with hypertension presented with higher scores of self-management behavior. The duration with hypertension

and living areas as well as the knowledge and education for hypertension were predictors for self-management behavior among patients with hypertension and healthy people, respectively. The Vietnamese government should provide more health education program to help the prevention and controlling of hypertension. To develop an credible media technology (e.g., television, radio, internet) in disseminating information on the prevention and controlling of hypertension is strongly recommended.

## References

- Osamor PE, Owumi BE. Factors Associated with Treatment Compliance in Hypertension in Southwest Nigeria. *J Health Popul Nutr.* 2011;29(6):619-28.
- World Health Organization. Preventing chronic diseases: a vital investment. 2005.
- Peiris D, Thompson SR, Beratarrechea A, Cardenas MK, Diez-Canseco F, Goudge J, et al. Behaviour change strategies for reducing blood pressure-related disease burden: findings from a global implementation research program. *Implement Sci.* 2015;10:158. doi: 10.1186/s13012-015-0331-0.
- World Health Organization. A global brief on hypertension: silent killer, global public health crisis. World. 2015.
- 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. doi: 10.1016/s0140-6736(05)17741-1.
- Son P, Quang N, Viet N, Khai P, Wall S, Weinehall L, et al. Prevalence, awareness, treatment and control of hypertension in Vietnam—results from a national survey. *J Hum Hypertens.* 2011;26(4):268-80.
- Do HT, Geleijnse JM, Le MB, Kok FJ, Feskens EJ. National prevalence and associated risk factors of hypertension and prehypertension among Vietnamese adults. *Am J Hypertens.* 2015;28(1):89-97. doi: 10.1093/ajh/hpu092.
- Lin CC, Anderson RM, Chang CS, Hagerty BM, Loveland-Cherry CJ. Development and testing of the Diabetes Self-management Instrument: a confirmatory analysis. *Res Nurs Health.* 2008;31(4):370-80. doi: 10.1002/nur.20258.
- Almas A, Godil SS, Lalani S, Samani ZA, Khan AH. Good knowledge about hypertension is linked to better control of hypertension; a multicentre cross sectional study in Karachi, Pakistan. *BMC Res Notes.* 2012;5:579. doi: 10.1186/1756-0500-5-579.
- Bosworth HB, Powers BJ, Oddone EZ. Patient self-management support: novel strategies in hypertension and heart disease. *Cardiol Clin.* 2010;28(4):655-63.
- Peters RM, Templin TN. Measuring blood pressure knowledge and self-care behaviors of African Americans. *Res Nurs Health.* 2008;31(6):543-52. doi: 10.1002/nur.20287.
- Leite MLC, Firmo JO, Loyola Filho AI, Lima-Costa MF. Discontinuation of anti-hypertensive drugs increases 11-year cardiovascular mortality risk in community-dwelling elderly (the Bambuí Cohort Study of Ageing). *BMC Public Health.* 2014;14(1):725.
- Erkoc SB, Isikli B, Metintas S, Kalyoncu C. Hypertension Knowledge-Level Scale (HK-LS): a study on development, validity and reliability. *Int J Environ Res Public Health.* 2012;9(3):1018-29. doi: 10.3390/ijerph9031018.
- Cohen MA, Lee HL. Strategic analysis of integrated production-distributed systems: models and methods. *Oper Res.* 1988;36(2):216-28. doi: 10.1287/opre.36.2.216.
- Eshah NF, Al-daken LI. Assessing Publics' Knowledge About Hypertension in a Community-Dwelling Sample. *J Cardiovasc Nurs.* 2016;31(2):158-65.
- Ibrahim MM, Damasceno A. Hypertension in developing countries. *Lancet.* 2012;380(9841):611-9. doi: 10.1016/s0140-6736(12)60861-7.
- McManus RJ, Bray EP, Mant J, Holder R, Greenfield S, Bryan S, et al. Protocol for a randomised controlled trial of telemonitoring and self-management in the control of hypertension: telemonitoring and self-management in hypertension. [ISRCTN17585681]. *BMC Cardiovasc Disord.* 2009;9:6. doi: 10.1186/1471-2261-9-6.
- Mc Namara KP, Versace VL, Marriott JL, Dunbar JA. Patient engagement strategies used for hypertension and their influence on self-management attributes. *Fam Pract.* 2014;31(4):437-44. doi: 10.1093/fampra/cmu026.
- Inkster ME, Donnan PT, MacDonald TM, Sullivan FM, Fahey T. Adherence to antihypertensive medication and association with patient and practice factors. *J Hum Hypertens.* 2006;20(4):295-7. doi: 10.1038/sj.jhh.1001981.
- Longtin Y, Sax H, Leape LL, Sheridan SE, Donaldson L, Pittet D. Patient Participation: Current Knowledge and Applicability to Patient Safety. *Mayo Clin Proc.* 2010;85(1):53-62. doi: 10.4065/mcp.2009.0248.
- Flynn SJ, Ameling JM, Hill-Briggs F, Wolff JL, Bone LR, Levine DM, et al. Facilitators and barriers to hypertension self-management in urban African Americans: perspectives of patients and family members. *Patient Prefer Adherence.* 2013;7:741-9. doi: 10.2147/ppa.s46517.
- Lee JE, Han HR, Song H, Kim J, Kim KB, Ryu JP, et al. Correlates of self-care behaviors for managing hypertension among Korean Americans: a questionnaire survey. *Int J Nurs Stud.* 2010;47(4):411-7. doi: 10.1016/j.ijnurstu.2009.09.011.
- Almas A, Godil SS, Lalani S, Samani ZA, Khan AH. Good knowledge about hypertension is linked to better control of hypertension; A multicentre cross sectional study in Karachi,

Pakistan. *BMC Res Notes*. 2012;5(1):579.

24. Awotidebe T, Adedoyin R, Rasaan W, Adeyeye V, Mbada C, Akinola O, et al. Knowledge, attitude and Practice of Exercise for blood pressure control: A cross-sectional survey. *Journal of Exercise Science and Physiotherapy*. 2014;10(1):1.

25. Yang S, Kong W, Hsue C, Fish AF, Chen Y, Guo X, et al. Knowledge of A1c Predicts Diabetes Self-Management and A1c Level among Chinese Patients with Type 2 Diabetes. *PloS One*. 2016;11(3):e0150753. doi: 10.1371/journal.pone.0150753.

26. Douglas BM, Howard EP. Predictors of Self-Management Behaviors in Older Adults with Hypertension. *Adv Prev Med*. 2015;2015:960263. doi: 10.1155/2015/960263.

27. Williams RL, Flocke SA, Stange KC. Race and preventive services delivery among black patients and white patients seen in primary care. *Med Care*. 2001;39(11):1260-7.

28. Warren-Findlow J, Seymour RB, Brunner Huber LR. The Association Between Self-Efficacy and Hypertension Self-Care Activities Among African American Adults. *J Community Health*. 2012;37(1):15-24. doi: 10.1007/s10900-011-9410-6.

29. Griffiths F, Lindenmeyer A, Powell J, Lowe P, Thorogood M. Why Are Health Care Interventions Delivered Over the Internet? A Systematic Review of the Published Literature. *J Med Internet Res*. 2006;8(2). doi: 10.2196/jmir.8.2.e10.

30. Mo P. The Use of Internet for Health Education. *J Biosafety Health Educ*. 2012;1(1):1-3.