

# Health Literacy, Self-Management Behaviors, and Health-Related Quality of Life of the elderly with Hypertension in Korea's Urban and Rural Areas

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Received: 26-November-2022

Revised: 04-January-2023

Accepted: 10-February-2023

## Abstract

**Background/Objectives:** The purpose of this study was to explore health literacy, self-management behaviors, and health-related quality of life, and to examine the factors influencing the health-related quality of life of elderly people with hypertension living in urban and rural areas.

**Methods/Statistical analysis:** From November to December, 2017 trained research staff collected data. For two months, 160 urban and rural residents who taking antihypertensive medications, consented to participate in the research, of which, 157 completed the survey. Descriptive statistics, t-test, Pearson correlations, and stepwise regression were used.

**Findings:** The health literacy of older adults who took antihypertensive medication did not differ in urban areas compared to rural areas. However, the elderly in urban areas reported higher self-management behaviors, while those in rural areas reported a higher health-related quality of life. Health literacy and self-management behaviors were highly correlated. The factors, including older adults in urban areas and those aged 60 to 75 years, had the influence on health-related quality of life.

**Improvements/Applications:** The research findings suggest the design of a health promotion program for older adults with hypertension, considering health literacy, place to live, and the participant's age, to improve health-related quality of life.

**Keywords:** Hypertension, elderly, Health Literacy, Self-management, Health-Related Quality of life

## 1. Introduction

The proportion of the elderly in Korea was 17.6% in 2022 [1] and it is expected to increase to 20.3% in 2025 and 43.9% in 2060 [2] due to the country's rapidly aging population. Hypertension (HTN) increases in older people because arteriosclerosis or nephropathy occurs [3], and increases the incidence of cardiovascular disease causing death in Korea [4]. In 2020, there was 21.3% of women over 30 who had HTN, 34.9% of men, and 28.3% of the total population. It is estimated that 48.1% of those aged 60-69 and 64.3% of those aged 70 or older have high blood pressure. One in two elderly people has high blood pressure [5].

HTN is difficult to treat and often leads to complications such as stroke, myocardial infarction, and kidney disease; however, complications can be prevented if blood pressure is well managed within the normal range. Self-management strategies include a low salt diet, exercise, smoking cessation, and abstinence from alcohol help lower blood pressure as well as lessen the risk of complications. Therefore, they are strongly advised to prevent or treat HTN [6].

Health literacy is a concept that goes beyond reading brochures and making medical appointments. It aims to determine appropriate health behaviors for one's own health and practice treatment guidelines, empowering patients [7]. The greater the health literacy of the hypertensive elderly, the greater their self-management behaviors [7-9]. Quality of life includes the subjective evaluation of an individual's life from various perspectives, including physical, psychological, social, and spiritual aspects [10]. Chronic disease lowers adults' quality of life. High blood pressure, a typical chronic disease, has the second-lowest quality of life after stroke and heart disease and a lower quality of life than diabetes [11]. Therefore, improving the quality of life of

individuals with HTN through continuous health management guidance is important. Data from a community health survey showed differences in health behaviors, diagnoses, and treatment experiences among elderly in the community [12] and in physical activity among seniors with high blood pressure. Older adults with HTN in urban areas are over 50% more physically active than those in rural areas [13]. Research has compared depression and quality of life for elderly living in city and countryside for elderly people [14], but a study comparing health information comprehension ability and self-management behaviors investigated only one residential area [15, 16]. Although the characteristics of urban and rural elderly differ, no studies have been conducted to compare their health literacy and health management behaviors. Therefore, understanding regional differences in health literacy, health management behaviors, and health-related quality of life of elderly people with living in urban and rural areas need and develop health promotion programs tailored to regional characteristics. In addition, factors affecting health-related quality of life figure out to produce basic data for developing programs and policies to improve the health-related quality of life of the elderly with hypertension.

## **2. Materials and Methods**

### **2.1. Study design and sample**

This descriptive research aimed to understand health literacy, self-management behaviors, health-related quality of life, and factors affecting health-related quality of life in elderly with high blood pressure. Participants had to be at least 60 years old, have been diagnosed with high blood pressure, and be taking medication to treat it. The necessary study sample size was determined to be 135 using G-power 3.1, with a significance level of .05, a median effect size of .15, a power of .80, and 14 independent variables required for multiple regression analysis.

A total of 160 people were collected considering a dropout rate of 15%, and 80 people each were selected from the urban and rural areas to distribute the subjects evenly. 157 questionnaires were analyzed, excluding three with incomplete responses from urban participants, giving 77 responses from urban areas, and 80 from rural areas.

### **2.2. Variable measurements**

#### **2.2.1. General and health's characteristics**

The general characteristics of the subjects included sex, age, height, weight, educational background, marital status, number of family members living together, and total household monthly income. Health characteristics included the duration of hypertension, whether or not they completed hypertension management education, and the presence or absence of comorbidities such as diabetes, hyperlipidemia, cerebrovascular disease, body mass index (BMI), and blood pressure. The subject's BMI was subjectively calculated based on the height and weight recorded in the questionnaire. The research assistant used an OMRON JPN700 automatic blood pressure machine to measure the subjects' blood pressure twice at 10 minute intervals. The average of two readings was used in this study.

#### **2.2.2. Health Literacy**

The health literacy was measured by a 15-item instrument, a translated version [18] of the health literacy screening questionnaire developed by Chew [17]. It measured how much participants understood about searching for and deciphering information, filling out medical-related forms, and interactions with medical personnel when using medical services. Responses to each question were rated on a 5-point scale ranging from "not at all" to "always" (1-5) with a possible score range of 15-75 points. The reliability of the tool was Cronbach's  $\alpha = .75$ .

#### **2.2.3. Self-Management Behaviors**

Self-management behaviors were measured by an 18-item instrument to assess self-management behaviors including food restrictions, sobriety, smoking cessation, sports, stress control, weight management, and taking medicine in patients with HTN by Oh and Park [19]. Each question was scored on a 4-point scale with 1 point for "not at all," 2 points for "somewhat yes," 3 points for "mostly yes," and 4 points for "always." Scores range from 18 to 72 points, with higher scores indicating more self-management behavior. The reliability of the tool was Cronbach's  $\alpha = .89$ .

### 2.2.4. Health-Related quality of life

Health-related quality of life was measured with the Korean version of the EuroQoL 5-dimension 3 level (EQ-5D-3L) tool developed by the EuroQoL group in Europe [18]. This instrument includes the five items of movements, self-managements, daily activities, ache/discomfort, and unrest/moodiness. Each item is scored on a 1 (“no problem”) to 3 (“severe problem”) point scale. The EQ-5D-3L index score was calculated by applying the weights [20] recommended from the raw data of the community health survey.

### 2.3. Data collection

The data for this study was collected over two months, from November to December 2017. Before collecting data, the research team presented the purpose and contents of the study at K and KS clinics in D Metropolitan City for urban areas and at O-myeon health clinics in B-gun for rural areas. The researcher explained the purpose of the study and criteria for participation to the potential participants. Those who consented to participate signed their informed consent forms and completed the survey. Participants were given instructions on how to use the 5-and 4-point scales to answer in accordance with the context of each question. It took approximately 25 minutes to complete questionnaires. Participants received a small gift card upon completing the questionnaires.

### 2.4. Data analysis

All data was di-identified and stored on the university ‘s secure server. Descriptive statistics, an independent t-test, a person’s correlation coefficients, and stepwise multiple regression with the SPSS Statistics for Windows, Version 24.0 (Armonk, NY: IBM Corp.) were used to analyze data.

### 2.5. Ethical considerations

This research protocol was approved by the Bioethics Review Committee of [BLINDED] University IRB No.0000-0002-1343-9624).

## 3. Results and Discussion

### 3.1. Characteristics of the elderly people with HTN in urban and rural areas

Table 1 lists the demographic feature of elderly people with HTN. A total of 157 subjects were included in the analysis. A total of 77 (49.0%) subjects resided in urban areas: 39% were male; the average age and length of illness were 73.08 (SD=8.33) and 8.5 (SD = 8.02) years, respectively; 23.4% received HTN education; and 35.5% and 49.4% had BMI and blood pressure within normal ranges, respectively. A total of 80 (51.0%) resided in rural areas: 37.5% were male; The average age and length of illness were 71.23 (SD=723) and 7.3 (SD=4.46) years, respectively; 35% received HTN education, and 41.3% and 72.5% had normal BMI and blood pressure, respectively.

**Table 1. Characteristics of the elderly people HTN (N=157)**

Sociodemographic Characteristics		Total (N=157)		Urban (n=77)		Rural (n=80)	
		n	%	n	%	n	%
Sex	Male	60	38.2	30	39.0	30	37.5
	Female	97	61.8	47	61.0	50	62.5
Age, years	60 ~ 75	105	66.9	46	59.7	59	73.8
	≥76	52	33.1	31	40.3	21	26.3
	Mean±SD	72.15±7.74		73.08±8.33		71.23±7.06	
Marital Status	Married	104	66.2	49	63.6	55	68.8
	Widowed, divorced, separated	53	33.8	28	36.4	25	31.2
Education	Never in school	46	29.3	17	22.1	29	36.3
	≤Middle school	73	46.5	29	37.6	44	54.9

	≥High School	38	24.2	31	40.3	7	8.8
An average monthly income of households, won	<1,000,000	84	53.5	46	59.8	38	47.5
	≥1,000,000	73	46.5	31	40.2	42	52.5
Living Status	Alone	40	25.5	20	26.0	20	25.0
	With family	117	74.5	57	74.0	60	75.0
Duration of HTN, year	≤5	60	38.2	32	41.6	28	35.0
	5~10	65	41.4	25	32.4	40	50.0
	≥10	32	20.4	20	26.0	12	15.0
	M±SD	7.90±6.46		8.5±8.02		7.3±4.46	
HTN education	Yes	80	51.0	18	23.4	62	77.5
	No	77	49.0	59	76.6	18	22.5
Comorbid Disease	No	48	30.8	24	21.2	25	31.2
	Yes	108	68.8	53	68.8	55	68.8
BMI	Normal (BMI<23.0)	60	38.2	27	35.1	33	41.3
	Overweight (BMI=23.0~24.9)	35	22.3	19	24.7	16	20.0
	Obese (BMI≥25.0)	62	39.5	35	40.2	31	38.7
Blood Pressure	Normal: SBP<140 and DBP <90	96	61.1	38	49.4	58	72.5
	HTN ClassI: SBP[140-159] or DBP[90-99]	42	26.8	25	30.8	17	21.3
	HTN ClassII: SBP[≥160] or DBP[≥100]	19	12.1	14	19.8	5	6.2
BMI=Body Mass Index HTN=Hypertension; SBP=Systolic Blood Pressure; DBP=Diastolic Blood Pressure							

### 3.2. Health literacy, self-management behaviors, and health-related quality of life

As shown in Table 2, there was no significant difference in health literacy between urban and rural residents ( $t=1.72$ ,  $p=0.087$ ). The average health literacy score for elderly in urban areas (49.51) is not significantly higher than the score (47.30) for rural areas. The difference in self-management behaviors between older adults in urban and rural areas was significant ( $t = 4.95$ ,  $p.001$ ), indicating that the average self-management scores for old adults in urban areas (56.30) are significantly higher than those in rural areas (49.75). The average quality of life scores for those who in urban areas (0.86) is significantly lower than the scores (0.92) for those who in rural areas ( $t=0.05$ ,  $0<.001$ ) (see Table 2).

The subjects in this study scored 48.38 (SD = 8.13) on health literacy. In Kim's [18] research of the old adults aged over 60 living in the community setting, the health literacy score measured with the same tool, the score was 49.84 (SD = 9.57). The score in the present study was slightly lower than the score of 49.80 (SD = 12.40) in Oh and Park [9]'s study of hypertensive patients elderly, and higher than the score of 37.83 (SD = 9.86) in Hwang's [22] study of women elderly in rural areas. On possible reason why the score in this research was lower than those of previous urban-centered studies [9,18] may be that the regions of the subjects of this research were evenly distributed in urban and rural areas, and age and comorbidities were also affected.

In this study, older adults with HTN had a self-management score of 52.96 (SD=8.08), which was lower than the score of 55.80 (SD=6.70) in the study by Oh and Park [9], and the score of 57.79 (SD=12.66) in

the study by Son and Song [23] in patients with HTN over 40 years of age. In particular, the self-management score of the rural subjects was 49.75 (SD=8.15), which was lower than the results of previous studies. These results indicate that elderly living in town areas have easier access to medical care than those living in rural areas, and they engage more in self-management behaviors for high blood pressure due to the number of times they meet with medical personnel and exposure to education. This suggests that education and reinforcement methods for promoting self-management behavior of the hypertensive elderly should reflect regional and demographic characteristics.

The health-related quality of life score of the elderly with HTN in the present study was 0.89 (SD=0.91). In the study by Kim and Min [24], patients with HTN over 65 years of age had a score of 0.82 (SD=0.17), while in the Lee and Cho study [25], patients with HTN over 65 years of age had a score higher than 0.82 (SD=0.15). The results of this study demonstrate that participant in rural areas scored higher for quality of life (M=0.92, SD=0.04) than in prior studies. These results are most likely due to the fact that rural areas have a higher percentage of participants with normal BMI and blood pressure than urban areas. Therefore, education and reinforcement methods for improving the health-related quality of life of elderly people with HTN should be tailored to the participants' specific health-related needs.

**Table 2. Health literacy, self-management behaviors, and health-related quality of life in elderly subjects with hypertension in urban and rural areas**

	Total N=157	Urban area n=77	Rural area n=80	t- value (p)
Health literacy	48.38±8.13	49.51±7.37	47.30±8.70	1.72(.087)
Self-management behaviors	52.96±8.08	56.30±8.39	49.75±8.15	4.95(<.001)
Health-related quality of life	0.89±0.91	0.86±0.91	0.92±0.04	.05 (<.001)

### 3.3. Relationships among health information comprehension ability, health management behaviors, and health-related quality of life in the elderly with HTN

As shown in Table 3, strong relationship were found between health literacy and self-management behaviors ( $r=.40$ ,  $p<.001$ ) and between health-related quality of life ( $r=.15$ ,  $p=.047$ ). Subjects who have high health literacy scores generally have high self-management behaviors and a high health-related quality of life (Table 3). These results were similar to those on health literacy and self-management behavior of elderly patients with HTN in the study by Oh and Park [9] and that of patients with HTN over 40 years of age by Son and Song [23]. In line with existing research, the findings show that health-related quality of life is an important variable that correlates with health literacy and self-management behaviors.

**Table 3. Correlations among health literacy, self-management behaviors, and health-related quality of life of elderly with HTN living in urban and rural areas**

Variables	Health literacy	Self- management behaviors	Health-related quality of life
	r(p)	r(p)	r(p)
Health literacy	1.0		
Self-management behaviors	.40 (<.001)	1.0	
Health-related quality of life	.15 (.047)	-.12 (.127)	1.0

### 3.4. Factors affecting quality of life in elderly with people HTN

As shown in Table 4, residential area and age are significant predictors of health-related quality of life, with a total explanatory power of 18.0%. Specifically, the combination of subjects with HTN who were 60-75 years of age and lived in urban areas was found to significantly predict health-related quality of life. The regression model was statistically significant ( $F=16.69$ ,  $p<.001$ ) (Table 4). Therefore, further research is needed to diversify health promotion strategies based on the features of the residential area and the age of the subjects, and to expand the opportunities to improve the health-related quality of life of the elderly with HTN.

**Table 4. Influencing factors of quality of life in elderly people with HTN in urban and rural areas**

Variables	B	SE	$\beta$	t	$\rho$
(Constants)	.794	.19		41.64	<.001
Living place=urban	.051	.012	.33	4.42	<.001
Age=60-75year	.037	.012	.22	2.99	.009

R<sup>2</sup>=.18, Adjusted R<sup>2</sup>=.17, F=16.69, p<.001

### 4. Conclusion

There was no difference in the health literacy of elderly people with HTN in urban and rural areas. Older adults in urban areas had significantly higher self-management behavior scores than those in rural areas. The average health-related quality of life scores for people living in urban areas are significantly lower than those for people living in rural areas. There was a significant relationship between health literacy and self-management behaviors. Similarly, this is true for health literacy and health-related quality of life. Therefore, it is crucial to consider these variables when developing strategies to promote health-related quality of life in this population.

### 5. Acknowledgment

This study was supported by the Research Program funded by the [BLINDED] University.

### 6. References

- [1] Statistics Korea. Percentage of the elderly population(city/do/county/gu), Korean Statistical Information Service [Internet]. Daejeon: Statistics Korea. 2021 [cited 2021 May 25]. available from: [https://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT\\_1YL20631&conn\\_path=I2](https://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_1YL20631&conn_path=I2)
- [2] Statistics Korea. 2020 senior citizen statistics, Press release [Internet]. Daejeon: Statistics Korea. 2020 [cited 2020 September 28]. available from: [http://kostat.go.kr/portal/korea/kor\\_nw/1/1/index.board?bmode=read&aSeq=385322](http://kostat.go.kr/portal/korea/kor_nw/1/1/index.board?bmode=read&aSeq=385322)
- [3] Lionakis N, Mendrinou D, Sanidas E, Favatas G, Georgopoulou M. Hypertension in the elderly. *World Journal of Cardiology*. 2012;4(5):135-147. DOI: 10.4330/wjc.v4.i5.135
- [4] Lim D, Ha M, Song I. Trends in the Leading Causes of Death in Korea, 1983-2012. *Journal of Korean Medical Science*. 2014;29(12):1597-1603. DOI:10.3346/jkms.2014.29.12.1597
- [5] Korean Statistical Information Service[KOSIS]. [Internet]. 2020. available from: [https://kosis.kr/statHtml/statHtml.do?orgId=177&tblId=DT\\_11702\\_N105&conn\\_path=I2](https://kosis.kr/statHtml/statHtml.do?orgId=177&tblId=DT_11702_N105&conn_path=I2)
- [6] Shin J, Park JB, Kim KI, Kim JH, Yang DH, Pyun WB, et al. 2013 Korean society of hypertension guidelines for the management of hypertension. Part II- treatments of hypertension. *Clinical Hypertension*. 2015;21(2):1-10. DOI:10.1186/s40885-014-0013-2
- [7] Oh HJ, Choi MI. Issues and political implications for health literacy research and practice in South Korea. *Korean Journal of Health Education and Promotion*. 2015;32(4):47-57. DOI:10.14367/kjhep.2015.32.4.47
- [8] Paek KS. Impact of health literacy on adherence to self care behaviors among the elderly with hypertension in a community. *Crisisonomy*, 2015; 11(8):157-174.

- [9] Oh JH, Park E. The impact of health literacy on self-care behaviors among hypertensive elderly. *Korean Journal of Health Education and Promotion*. 2017;34(1):35-45. DOI:10.14367/kjhep.2017.34.1.35
- [10] The WHOQOL Group. (1995). The World Health Organization Quality of Life assessment(WHOQOL): Position paper from the WorldHealth Organization. *Social Science & Medicine*,41(10), 1403-1409.
- [11] Ha, S. S. (2015). The affecting factor between chronic disease and quality life. Master's thesis, Inje University, Gimhae.
- [12] Lee MJ, Kown DH, Kim YY, Kim JH, Moon SJ, Park KW, et al. Factors associated with experience of diagnosis and utilization of chronic diseases among Korean elderly : focus on comparing between urban and rural elderly. *Journal of Agricultural Medicine and Community Health*. 2019;44(4):165-184. DOI:10.5393/JAMCH.2019.44.4.165
- [13] Paek HH, Lee SG. Factors related to physical activities of elderly with hypertension between urban and rural Areas. *Journal of Agriculture Medicine and Community Health*. 2015;40(2):62-71. DOI:10.5393/JAMCH.2015.40.2.062
- [14] Y.S. Kim, H.Y. Jun, C.H. Kim & S.H. Hwang (2012). Comparison on the Depression and Quality of Life in Low-income Elderly between Urban and Rural Area *J. Korean Soc. Living Environ. Sys*. 19(1), 42-50.
- [15] K.O. Chang(2016). Effects of public health center hypertension health school program on hypertension-related knowledge, self-care behavior, quality of life and physiological parameters in hypertensive patients. *Journal of the Korea Academia-Industrial Cooperation Society*;17(11);236-247. DOI :10.5762/KAIS.2016.17.11.236
- [16] J.H. Oh & E.O. Park(2017). The impact of health literacy on self-care behaviors among hypertensive elderly. *Korean Journal of Health Education and Promotion*.;34(1):35-45. DOI : 10.14367/kjhep.2017.34.1.35
- [17] Chew LD, Bradley KA, Boyko EJ. Brief questions to identify patients with inadequate health literacy. *Family Medicine*, 2004;36(8):588-594.
- [18] Kim SH. Older adults' self-reported difficulty in understanding and utilizing health information. *Journal of the Korean Gerontological Society*. 2010;30(4):1281-1292.
- [19] Oh JH, Park E. The impact of health literacy on self-care behaviors among hypertensive elderly. *Korean Journal of Health Education and Promotion*. 2017;34(1):35-45. DOI:10.14367/kjhep.2017.34.1.35
- [20] EuroQol group. EuroQol—a new facility for the measurement of healthrelated quality of life. the EuroQol Group Health Policy. 1990;16:199–208.
- [21] Korea Centers for Disease Control and Prevention [KCDC].Korea healthstatistics 2010: South Korean time trade-off values for EQ-5D health states.KCDC: Osong, South Korea; 2010.
- [22] Hwang H. Impacts of colorectal cancer knowledge and health literacy on self-management behaviors among elderly women in rural Areas. *Korean Journal of Adult Nursing*. 2017;29(5):527-535. DOI:10.7475/kjan.2017.29.5.527
- [23] Son YJ, Song EK. Impact of health literacy on disease-related knowledge and adherence to self-care in patients with hypertension. *Journal of the Korean Academy of Fundamentals of Nursing*. 2012;19(1):6-15. DOI:10.7739/jkafn.2012.19.1.006
- [24] Kim H-J, Min E-S. Health behaviors and quality of life by life cycle of hypertensive patients. *Journal of Convergence for Information Technology*. 2020;10(7):58-66. DOI:10.22156/CS4SMB.2020.10.07.058
- [25] Lee K, Cho E. Factors Influencing Health related Quality of Life in Patients with Hypertension: Based on the 5th Korean National Health and Nutrition Examination Survey. *The Journal of the Korea Contents Association*. 2016;16(5):399-409. DOI:10.5392/JKCA.2016.16.05.39