

Utilization of usual source of care and health literacy among older adults with hypertension: a retrospective study

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Abstract

Background and Objectives: Usual source of care (USC) is a key aspect of primary care that can significantly enhance health literacy by facilitating regular health education, consistent communication with health professionals, and access to health resources. This study aims to investigate the relationship between the utilization of USC and health literacy among older adults with hypertension.

Research Design and Methods: This study is a cross-sectional analysis utilizing data from the Korean Health Panel from 2020 to 2021, based on Andersen's Behavioral Model of Health Services Use. The study included 1,986 older adults with hypertension ($n = 821$ men and 1,165 women). We employed multinomial logistic regression analysis to assess the association between USC utilization and health literacy, as well as the association between different types of USC health care settings and health literacy. Additionally, logistic regression was used to investigate the association between USC utilization and each domain of health literacy.

Results: Among older adults with hypertension, those who do not utilize USC are significantly more likely to have inadequate health literacy compared to those who do (odds ratio [OR] = 2.58, 95% confidence interval [CI] 1.81, 3.68). This association remains consistent across all five items within the disease prevention domain. Additionally, among older adults with hypertension who utilize USC, those who visit physicians' offices are more likely to have sufficient health literacy (OR = 1.42, 95% CI = 1.01, 1.99).

Discussion and Implications: This study demonstrates a positive association between the utilization of a USC and health literacy among older adults with hypertension, highlighting the former's potential as an effective tool for managing hypertension. Furthermore, it suggests that future interventions should adopt tailored strategies suited to various health care settings to optimize health literacy and effectively support hypertension management.

Keywords: Chronic disease, Health education, Primary care

Translational Significance: In South Korea, where health care is low-cost and easily accessible without referrals, the rate of usual source of care (USC) utilization is relatively low. This study found that USC use is positively associated with health literacy, particularly in the disease prevention domain, which is essential for managing hypertension and preventing complications. Additionally, using a physician's office as a USC was more strongly associated with higher health literacy than using a hospital. These findings highlight the importance of promoting USC in countries with low USC utilization and offer evidence to support strengthening its role in systems where it is already established.

Background and objectives

Hypertension, estimated to have affected approximately 1.3 billion people worldwide as of 2019, is responsible for more than 10 million deaths each year (World Health Organization, 2023). It is a major risk factor for cardiovascular disease and stroke, significantly contributing to increased mortality rates (Fuchs & Whelton, 2020; Wang et al., 2020). Older adults, who are at higher risk of developing cardiovascular diseases

compared to other age groups, are particularly vulnerable to the consequences of inadequate management of hypertension, which can lead to increased cardiovascular incidence and mortality rates (Burnier et al., 2020). It is anticipated that effective management of hypertension will prevent 76 million cardiovascular deaths between 2023 and 2050 (World Health Organization, 2023), underscoring its critical role in older adults. As of 2021, approximately 12.3 million adults in South Korea

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had hypertension, including about 5.3 million individuals aged 65 years and older—a number that continues to grow with the aging population (Kim et al., 2024). Although the hypertension control rate among older adults in Korea is relatively high at approximately 60%, there is an urgent need for more effective management strategies targeting this population, which accounts for 43.5% of all individuals with hypertension (Kim et al., 2024).

Health literacy is vital in hypertension management, as it encompasses an individual's ability to acquire, process, and understand the necessary health information so as to make informed decisions (Burnier et al., 2020). Higher health literacy can improve medication adherence (Paczkowska et al., 2021) and is positively associated with adopting recommended healthy behaviors, such as weight control, quality nutrition, and regular physical activity, which are essential for managing hypertension (Gaffari-Fam et al., 2020). Such medication adherence and lifestyle modification serve as positive factors in blood pressure control (Paczkowska et al., 2021). However, according to a systematic review, health literacy among older adults tends to decline with age (Lima et al., 2024), and this trend is also observed among older adults with hypertension (Esen & Kolcu, 2024). This may be due to age-related physiological changes, such as visual and hearing impairments, which hinder access to health information (Zhu et al., 2024). For example, 71% of adults aged 60 years and older experience difficulties using printed materials, such as health education materials and medication instructions (Kutner et al., 2006), one of the primary sources of health information (Haji, 2019). Additionally, age-related factors, such as reduced hand-eye coordination and low self-efficacy with digital devices, also limit older adults' ability to access online health information (Zhao et al., 2022). Consequently, older adults who struggle with both printed and digital information often face significant barriers to independently accessing and understanding health information (Kruse et al., 2020; Turner et al., 2018). These challenges highlight the importance of identifying factors associated with health literacy among older adults with hypertension and developing effective strategies to support it.

A usual source of care (USC) is defined as the health care provider or location that individuals typically visit when they need medical advice or counseling (Medical Expenditure Panel Survey, 2023), and it has recently emerged as a significant determinant of health literacy (Kim et al., 2025; Sturmberg, 2011), primarily through its role in promoting continuity of care—a factor closely associated with improved health literacy (Kim et al., 2025). A systematic review has shown that having a USC increases the likelihood of regular use of health care services and consistent contact with physicians (Babitsch et al., 2012). This continuity is especially beneficial for individuals with hypertension (Choi et al., 2020), a condition that requires complex self-care behaviors such as medication adherence and lifestyle modification.

For older adults, who are more likely to experience age-related cognitive decline, repeated education becomes essential (Zhu et al., 2024). Regular interaction with a USC can provide consistent and continuous education, supporting better health management among older adults with hypertension. Additionally, continuity of care allows health care providers to gain a deeper understanding of their patients' health needs and preferences, enabling more personalized treatment and

communication where critical health information is delivered (Bolton et al., 2020; Du et al., 2015). This personalized approach helps patients better understand their health conditions (Giuse et al., 2012) and strengthen their relationship with health care providers, both of which contribute to improved health literacy (Brooks et al., 2017).

Despite the potential of USC to improve health literacy, research examining the relationship between USC and health literacy among older adults with hypertension remains limited, particularly in Korea. A cross-sectional study conducted in the United States on adults aged 50 years and older found that individuals with lower health information comprehension were less likely to use USC (Levy & Janke, 2016). Additionally, a systematic review of adults aged 18 years and older indicated that primary care environments contribute to improving health literacy through individual counseling (Taggart et al., 2012). However, since these studies did not specifically focus on adults aged 65 years and older, there is a pressing need for further research targeting this age group, particularly those managing chronic conditions such as hypertension.

The use of USC in the context of Korea's health care system

Korea operates a single-payer, universal health care system in which all citizens are covered either through the National Health Insurance (NHI) or the Medical Aid program, ensuring access to health care regardless of income. While all citizens are insured under one of these two programs, approximately 97% of the population is covered by the NHI. The NHI functions as a form of social insurance, whereas the Medical Aid program—similar to Medicaid in the United States—is a publicly funded scheme designed to ensure health care access for low-income individuals (Park, 2021).

Patients in Korea are responsible for a portion of medical costs, with copayment rates varying based on the type of medical institution and whether the care is inpatient or outpatient. For outpatient care, copayments typically range from about 30% to 60% of the total cost of covered services. However, under the Co-Payment Ceiling System, if a patient's annual copayments exceed a specific income-based threshold, the National Health Insurance Service (NHIS) covers the excess amount (National Health Insurance Service, 2023). Individuals under the Medical Aid program generally face lower costs, with outpatient services either fully exempt from copayments or subject to a reduced rate of approximately 15% of the total care expenses (Health Insurance Review and Assessment Service, 2025).

Korea's health care system comprises four service provision levels: clinics, hospitals, general hospitals, and tertiary hospitals. Unlike in many other countries where general practitioners typically serve as gatekeepers, providing primary care and managing referrals (Bi & Liu, 2023), Korea does not enforce a strict referral system. As a result, most medical services are broadly accessible without restriction, with the exception that a referral is required to receive insurance benefits when using tertiary hospitals (National Health Insurance Service, 2023). While this structure enhances patient autonomy and access, it may hinder the development of continuous relationships with a single health care provider, contributing to the relatively low utilization of USC in Korea.

A cross-national study across 14 countries found that 74.6% of respondents reported having a USC, defined as a health care provider or facility they usually visit for health problems (Croke et al., 2024). In comparison, an analysis of the 2020 Korean Health Panel (KHP) data using the same definition of USC showed that 62.0% of Korean respondents reported having a USC, indicating a comparatively lower rate. The concept of a USC remains underdeveloped in Korea and is primarily shaped by international definitions. In fact, many Korean studies, including the present one, define USC as the health care institution or provider that individuals typically visit when they are ill, need a medical check-up, or seek health-related advice (An et al., 2016; Sung & Lee, 2018).

Framework of the current study and research aim

This study applied the Phase 3 Andersen Behavioral Model of Health Services Use (Figure 1; Andersen, 1995), a theoretical framework designed to explain patterns of health care utilization, to examine the relationship between the use of a USC and health literacy among older adults with hypertension. In this model, population characteristics—considered primary determinants of health behavior—consist of three subcomponents: predisposing factors, enabling factors, and need factors. Predisposing factors include individual characteristics that influence health care use before the onset of illness, such as sex, age, and marital status. Enabling factors refer to conditions that facilitate access to health care, including the presence of a USC, educational attainment, income level, employment status, residential area, and health insurance coverage. Need factors represent an individual's perceived or evaluated health status that necessitates medical care, including comorbidities and self-reported general health status.

A recent scoping review on the application of Andersen's Behavioral Model identified health literacy as an emerging and increasingly important factor. According to this review, health literacy is associated with multiple components of the model, making it difficult to classify within a single category or level (Lederle et al., 2021). In the present study, health literacy was conceptualized as an intermediary factor that links primary determinants—such as USC utilization—to health behaviors. This approach is supported by previous research suggesting that having a USC is associated with higher levels of health literacy, which in turn positively influences self-management behaviors for hypertension control.

The purpose of this study is to examine the relationship between USC utilization and health literacy among older adults with hypertension in Korea, using Andersen's Behavioral Model of Health Services Use as the guiding framework. The findings may offer empirical evidence that can inform the development of effective hypertension management strategies for the older population.

Research design and methods

Data resource and study participants

This study utilized data from the 2020 and 2021 KHP data, a nationally representative longitudinal panel survey conducted annually by the Korea Institute for Health and Social Affairs and the National Health Insurance Corporation. The KHP uses a two-stage stratified cluster sampling method based on the Population and Housing Census to select samples and then employs the computer-assisted personal interviewing method. Trained interviewers visit the selected households in person and conduct face-to-face interviews while also completing the questionnaires (Korea Institute for Health and Social Affairs & National Health Insurance Service, 2024). The KHP provides data on health care behaviors, including socioeconomic and medical status and health care utilization at both household and individual levels. Although the KHP is longitudinal in design, health literacy was measured only once in 2021. To consider the temporal sequence between the independent and dependent variables, we used data on USC utilization and other covariates from 2020 and health literacy data from 2021. Accordingly, we conducted a cross-sectional analysis using temporally ordered variables to examine the association between prior USC utilization and subsequent health literacy.

The total number of respondents in the 2020 KHP was 13,530. Individuals under the age of 65 years ($n=8,787$) were excluded. Additionally, individuals with missing data related to hypertension diagnosis or those who reported not being diagnosed with hypertension ($n=2,203$) were excluded. Participants with missing data on covariates ($n=36$) were also excluded. Subsequently, individuals who were lost to follow-up in 2021 ($n=106$) were excluded, along with those who either did not respond to the health literacy items or provided only partial responses that were insufficient to compute the health literacy score ($n=412$). As a result, a total of 1,986 participants were included in this study.

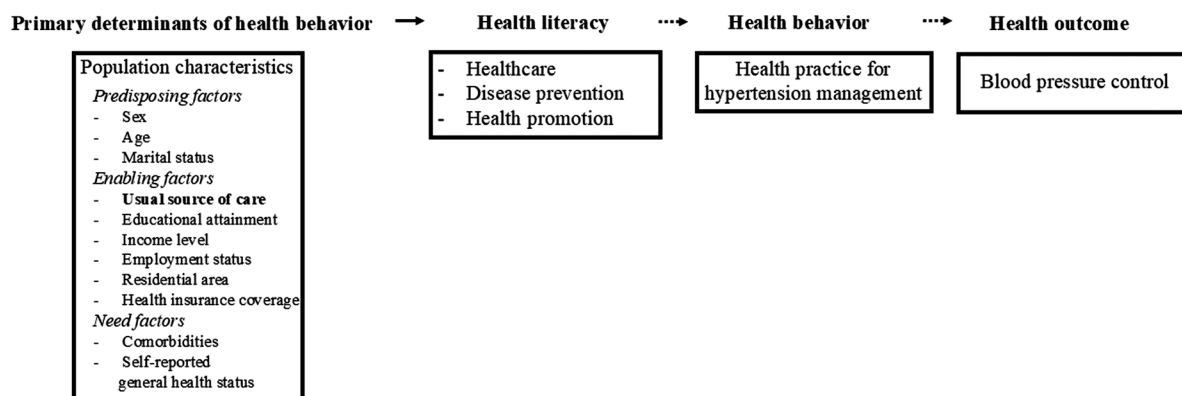


Figure 1. Conceptual model based on Andersen's behavioral model of service use.

Standard protocol approvals

The study was reviewed and approved by the Institutional Review Board (IRB) (4-2024-0262).

Health literacy

Health literacy was evaluated using the Korean version of the European Health Literacy Survey Questionnaire (HLS-EU-Q16) (Heeran & Ju Yul, 2020). It consists of 16 items encompassing three domains: health care (7 items), disease prevention (5 items), and health promotion (4 items). Each item is answered as follows: very difficult, difficult, easy, very easy, and don't know. In scoring the HLS-EU-Q16, responses of "very difficult" and "difficult" are assigned 0 points, while "easy" and "very easy" are assigned 1 point. To ensure clarity of interpretation, responses indicating don't know were excluded from the analysis (Kwon & Kwon, 2025). Scores can be calculated if at least 14 items have been answered (Pelikan & Ganahl, 2017). The total score ranges from 0 to 16, with the following categories: inadequate health literacy (0–8), problematic health literacy (9–12), and sufficient health literacy (13–16) (Pelikan & Ganahl, 2017). The internal consistency (Cronbach's α) of the Korean version of the HLS-EU-Q16 was reported to be 0.86 in a study of Korean older adults (ages 60–79 years) (Heeran & Ju Yul, 2020), and was 0.90 in this study.

Usual source of care

The use of a USC was identified through two questions regarding both health care facilities and health professionals: "Do you have a healthcare setting, including physician's office, hospital, public health center, that you usually visit when you are sick, need a check-up, or require treatment consultation?" and "Do you have a regular doctor you usually visit when you are sick, need a check-up, or require treatment consultation?" In this study, USC usage was categorized binomially, indicating whether participants had a USC or not. If a respondent answered "yes" to either question, they were classified as having a USC. Those who answered "no" to both questions were classified as not having a USC.

Covariates

In the current study, the covariates were selected to represent each component of Andersen's behavioral model of health service use. Predisposing factors included sex, age (<70, 70–74,

75–79, or ≥ 80 years), and marital status (spouse or no spouse). Enabling factors included educational attainment ($\leq$ elementary school, middle school, high school, or $\geq$ college), income level (low, low-middle, middle-high, or high), employment status (yes or no), residential area (metropolitan, medium and small, or rural areas), and health insurance coverage (NHI or medical aid). Need factors included one or more comorbidities excluding hypertension (yes or no) and general self-reported general health status (good, neutral, or bad).

Statistical analysis

Descriptive analysis was performed to examine the distribution of the general characteristics of the participants using the chi-squared test. In Table 2, a multinomial logistic regression analysis was conducted to examine the association between USC utilization and levels of health literacy. Individuals with sufficient health literacy served as the reference group, and odds ratios (ORs) were calculated for those with problematic and inadequate health literacy. In Figure 2, logistic regression was performed to analyze the ORs for scoring 0 on each item of the HLS-EU-Q16. Individuals with a USC were set as the reference group. In Table 3, we analyzed how health literacy levels differ by type of USC health care settings—physician's office, hospital, and public health clinic—among individuals with a USC. In this analysis, inadequate health literacy was used as the reference group, and ORs for problematic and sufficient health literacy were estimated using multinomial logistic regression. All analyses were adjusted for other covariates.

Although the survey weights included in the analytical data set are appropriate for analyses of the full national sample (Anza-Ramirez et al., 2022), They were not applied in our analysis, as this study focused on a specific subpopulation—older adults aged 65 years and older with hypertension. Results were indicated as ORs and 95% Confidence Intervals (CIs). Additionally, multicollinearity was tested using the variance inflation factors (VIF). We set the significance level at $p < .05$. Statistical analyses were performed using SAS, version 9.4 (SAS Institute Inc; Cary, North Carolina).

Results

Table 1 summarizes the general characteristics of this study's population, which included 821 men (41.3%) and 1,165

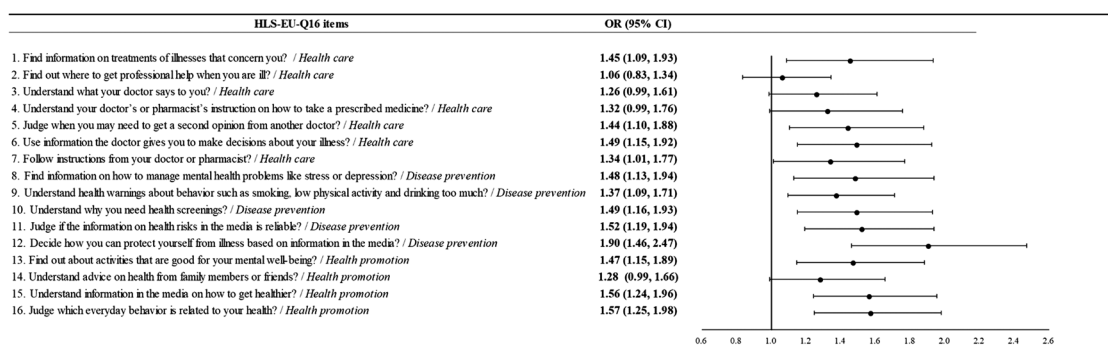


Figure 2. Results of logistic regression for scoring 0 on each HLS-EU-Q16 item by USC status ($N=1,986$). Note. The reference group consists of individuals who have a USC. CI = confidence interval; HLS-EU 16 = Health Literacy Survey Questionnaire; OR = odds ratio; USC = usual source of care. Adjusted for predisposing factors (sex, age, marital status); enabling factors (educational attainment, income level, employment status, residential area, health insurance coverage); and need factors (comorbidities, self-reported general health status).

women (58.7%). A significant difference in health literacy levels was found based on the use of USC ($p = <.001$). Of 473 individuals without a USC, 309 (65.3%) were classified as having inadequate health literacy, 105 (22.2%) were classified as having problematic health literacy, and 59 (12.5%) as having sufficient health literacy.

Table 2 presents the results of multinomial regression with adjusted predisposing factors, enabling factors, and need factors and shows the ORs of belonging to the other two groups (problematic and inadequate health literacy) compared to sufficient health literacy groups. The absence of USC was significantly associated with problematic health literacy (OR: 1.69,

Table 1. General characteristics of the study population ($N = 1,986$).

Variables	Health literacy							<i>p</i>
	Total	Inadequate		Problematic		Sufficient		
	<i>N</i>	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Variables	1,986	1,161	58.5	468	23.6	357	18.0	
<i>Predisposing factors</i>								
Sex								<.001
Men	821	394	48.0	231	28.1	196	23.9	
Women	1,165	767	65.8	237	20.3	161	13.8	
Age								<.001
<70	481	177	36.8	149	31.0	155	32.2	
70–74	542	278	51.3	161	29.7	103	19.0	
75–79	525	352	67.0	97	18.5	76	14.5	
≥80	438	354	80.8	61	13.9	23	5.3	
Marital status								<.001
Spouse	1,327	705	53.1	334	25.2	288	21.7	
No spouse	659	456	69.2	134	20.3	69	10.5	
<i>Enabling factors</i>								
USC								<.001
Yes	1,513	852	56.3	363	24.0	298	19.7	
No	473	309	65.3	105	22.2	59	12.5	
Educational attainment								<.001
≤Elementary school	1,000	739	73.9	185	18.5	76	7.6	
Middle school	420	209	49.8	124	29.5	87	20.7	
High school	407	172	42.3	113	27.8	122	30.0	
≥College	159	41	25.8	46	28.9	72	45.3	
Income level								<.001
Low	498	346	69.5	102	20.5	50	10.0	
Low-middle	495	332	67.1	97	19.6	66	13.3	
Middle-high	495	273	55.2	130	26.3	92	18.6	
High	498	210	42.2	139	27.9	149	29.9	
Employment status								.19
Yes	795	451	56.7	186	23.4	158	19.9	
No	1,191	710	59.6	282	23.7	199	16.7	
Residential area								<.001
Metropolitan	780	402	51.5	226	29.0	152	19.5	
Medium and small	547	309	56.5	118	21.6	120	21.9	
Rural	659	450	68.3	124	18.8	85	12.9	
Health insurance coverage								0.07
NHI	1,857	1,076	57.9	438	23.6	343	18.5	
Medical aid	129	85	65.9	30	23.3	14	10.9	
<i>Need factors</i>								
Comorbidities								<.001
No	198	88	44.4	50	25.3	60	30.3	
Yes	1,788	1,073	60.0	418	23.4	297	16.6	
Self-reported general health status								<.001
Good	412	180	43.7	113	27.4	119	28.9	
Neutral	876	487	55.6	221	25.2	168	19.2	
Bad	698	494	70.8	134	19.2	70	10.0	

Note. NHI = National Health Insurance; USC = usual source of care.

Table 2. Results of factors associated with health literacy ($N=1,986$).

Variables	Health literacy	
	Problematic	Inadequate
	OR (95% CI)	OR (95% CI)
Predisposing factors		
Sex		
Men	Ref.	Ref.
Women	0.88 (0.63, 1.22)	1.45 (1.06, 1.98)
Age		
<70	Ref.	Ref.
70–74	1.47 (1.04, 2.09)	2.09 (1.48, 2.96)
75–79	1.17 (0.78, 1.76)	3.55 (2.42, 5.21)
≥80	2.48 (1.40, 4.41)	12.74 (7.43, 21.83)
Marital status		
Spouse	Ref.	Ref.
No spouse	1.30 (0.89, 1.88)	1.28 (0.90, 1.81)
Enabling factors		
Usual source of care		
Yes	Ref.	Ref.
No	1.69 (1.16, 2.44)	2.58 (1.81, 3.68)
Educational attainment		
≤Elementary school	3.27 (1.97, 5.45)	10.08 (5.95, 17.07)
Middle school	2.08 (1.27, 3.41)	4.02 (2.38, 6.78)
High school	1.38 (0.86, 2.21)	2.20 (1.33, 3.63)
≥College	Ref.	Ref.
Income level		
Low	1.37 (0.85, 2.21)	1.50 (0.95, 2.37)
Low-middle	1.17 (0.77, 1.79)	1.58 (1.06, 2.35)
Middle-high	1.33 (0.92, 1.92)	1.44 (1.00, 2.07)
High	Ref.	Ref.
Employment status		
Yes	Ref.	Ref.
No	1.02 (0.74, 1.41)	0.81 (0.60, 1.10)
Residential area		
Metropolitan	Ref.	Ref.
Medium and small	0.75 (0.53, 1.05)	1.26 (0.90, 1.74)
Rural	0.88 (0.61, 1.27)	1.70 (1.20, 2.39)
Health insurance coverage		
NHI	Ref.	Ref.
Medical aid	1.06 (0.52, 2.16)	1.21 (0.62, 2.36)
Need factors		
Comorbidities		
No	Ref.	Ref.
Yes	1.42 (0.92, 2.19)	1.43 (0.93, 2.19)
Self-reported general health status		
Good	0.83 (0.59, 1.18)	0.67 (0.48, 0.94)
Neutral	Ref.	Ref.
Bad	1.21 (0.84, 1.75)	1.58 (1.12, 2.24)

Note. CI=confidence interval; OR=odds ratio; NHI=National Health Insurance; Ref. = reference. The reference group is the individuals with sufficient health literacy.

95% CI 1.16, 2.44) and inadequate health literacy (OR: 2.58, 95% CI 1.81, 3.68).

Figure 2 presents the results of the logistic regression analysis conducted to assess the association between the presence of a USC and responses to the HLS-EU-Q16 questions (0: very difficult or difficult; 1: easy or very easy). The absence of a USC was significantly associated with a score of 0 across all five questions in the disease prevention domain.

Table 3 shows the association between the type of USC settings and HLS-EU-Q16 scores among individuals who reported having a USC. When the USC setting was a physician's office, the likelihood of having sufficient health literacy was significantly higher compared to a hospital setting (OR: 1.42, 95% CI 1.01, 1.99).

Discussion and implications

In this study, we applied Andersen's Behavioral Model as a theoretical framework to investigate the relationship between the utilization of USC and health literacy among older adults with hypertension. We found that not having a USC was associated with lower health literacy among older adults with hypertension, particularly in the domain of disease prevention. Notably, having a physician's office as one's USC was positively associated with sufficient health literacy, further underscoring the important role of USC in supporting timely and appropriate responses to an individual's health needs. These findings suggest that USC, as an enabling factor, may contribute to improved health literacy among older adults with hypertension.

Our research findings align with previous studies showing a negative association between not using USC and health literacy (Levy & Janke, 2016). According to Andersen's Behavioral Model, a USC, as an enabling factor, plays an important role in enhancing access to the health care system, which is particularly important for older adults. For older adults who lack knowledge and the skills to use the internet or access health information, independently searching for and understanding health information can be challenging (Kruse et al., 2020; Turner et al., 2018). In contrast, physicians, who are traditionally the primary source of health information for older adults (Kruse et al., 2020), are preferred because they offer direct, face-to-face communication (Cutilli et al., 2018; Turner et al., 2018). The health information and education given by health care providers serve as an efficient channel for patients to seek advice (Buawangpong et al., 2022), which can be particularly beneficial for older adults. Improved access to the health care system through a USC can enhance an individual's ability to maintain their health with the support of health care providers—a key element of health literacy (Liu et al., 2020). Moreover, USC can support patient-centered communication (Finney Rutten et al., 2015), which contributes to enhanced health literacy; indeed, patient-centered communication is one of the strategies used to enhance health literacy (Speros, 2011). Through this approach, patients become more actively involved

Table 3. Analysis of health literacy based on USC settings ($n=1,502$).

USC settings	Health literacy	
	Problematic	Sufficient
	OR (95% CI)	OR (95% CI)
Hospital	Ref.	Ref.
Physicians' offices	1.06 (0.79, 1.42)	1.42 (1.01, 1.99)
Public health center	0.48 (0.18, 1.28)	0.86 (0.34, 2.20)

Note. CI=confidence interval; OR=odds ratio; Ref.=reference; USC=usual source of care. The reference group is the individuals with inadequate health literacy. Adjusted for predisposing factors (sex, age, marital status); enabling factors (educational attainment, income level, employment status, residential area, health insurance coverage); and need factors (comorbidities, self-reported general health status).

in their health issues (Jiang et al., 2024), which can improve their self-efficacy and health information comprehension, ultimately leading to positive effects on blood pressure management (Tavakoly Sany et al., 2020).

This study shows an association between not utilizing USC and lower scores in the disease prevention domain of the HLS-EU-Q16. Health literacy in disease prevention entails accessing, understanding, and interpreting information about health risk factors, evaluating that information, and making informed decisions to mitigate these risks (Sørensen et al., 2013). Disease prevention is especially important as improper management of hypertension owing to inadequate disease prevention can result in serious health complications, such as stroke and cardiovascular disease (Fuchs & Whelton, 2020), as well as an increased mortality rate (Burnier et al., 2020). Therefore, older adults with hypertension should improve their health outcomes by understanding and assessing risk factors and adopting proactive measures to prevent complications. Since older adults who do not use a USC may be more vulnerable in terms of disease prevention, targeted monitoring, and tailored interventions are needed to enhance health literacy in this group.

Additionally, our study found that utilizing physicians' offices in different USC settings may help improve health literacy more effectively than using hospitals. The difference may be owing to the varying severity of conditions between patients visiting physicians' offices and those visiting hospitals. According to a study comparing physicians' offices and hospitals, patients visiting hospitals are around 4%–6% sicker than those visiting physicians' offices. Additionally, hospitals perform minor surgeries and specialized tests, showing 5%–15% higher service intensity compared to patients in physicians' offices, and the complexity of the treatment process leads to lower continuity of care (Forrest & Whelan, 2000). Differences in continuity of care may give rise to variations in health literacy between hospitals and physicians' offices. Additionally, in Korea, the proportion of consultation and education during the examination time per patient is 28.0% in physicians' offices, compared to 26.3% in hospitals (Korean Medical Association, 2021). This lower proportion of time spent on consultation and education in hospitals may also contribute to differences in health literacy between the two types of settings. According to Andersen's Behavioral Model, both physicians' offices and hospitals are classified as enabling factors when used as a USC. However, the nature and quality of health care services provided by these settings may differ, potentially leading to variations in health literacy and affecting patients' ability to effectively navigate and utilize health information. In hospitals, it is necessary to allocate more time during consultations and education to ensure patients fully understand their conditions, considering the severity and complexity of their illnesses. If there are limitations in addressing consultation and education within the allocated consultation time, it may be necessary to involve other health care providers, such as nurses, to supplement these aspects.

This study has certain limitations. First, as a cross-sectional study, it cannot establish causal relationships between USC utilization and health literacy. Although we utilized data collected at two different time points to more precisely assess the association between these variables, the potential for reverse causality remains. It is possible that the use of a USC contributes to improved health literacy; however, it is also plausible that individuals with higher levels of health literacy are more

likely to actively seek and utilize a USC. As the underlying mechanisms linking USC utilization and health literacy are not yet clearly understood, future longitudinal research is warranted to explore the potential bidirectional nature of this relationship. Second, this study relies on self-reported data, which may impact measurement accuracy. To mitigate this issue and enhance the data reliability, the survey was conducted by trained interviewers. Third, due to limitations in the survey data, our study was unable to account for all potential factors influencing health literacy. Variables such as social activity and activities of daily living, which may be associated with health literacy, were not included. Additionally, the qualitative dimensions of USC utilization—such as the duration of the relationship with a usual provider, which is a key indicator of continuity, could not be captured. Future research should consider incorporating a broader range of individual and contextual factors, as well as more comprehensive and qualitative measures of USC, to better understand how USC utilization relates to health literacy and health outcomes. Fourth, there is a potential for selection bias in this study. In the KHP data, 14,741 participants were included at the beginning of the 2019 survey; however, this number decreased to 13,530 in 2020 and to 12,874 in 2021. While the direct impact of attrition may be limited in this cross-sectional design, the representativeness of the final analytical sample could still be affected. Furthermore, the analytic sample was restricted to older adults aged 65 years and above who also completed the health literacy items. Individuals with missing data on key variables—such as those related to hypertension diagnosis or had missing values for the HLS-EU-Q16 or other covariates—were excluded from the analysis. As information on nonrespondents was not systematically collected, the final analytical sample may differ systematically from those excluded. This possibility of selection bias should be considered when interpreting the findings. Finally, this study was conducted within the context of Korea's health care system, which may differ structurally and culturally from systems in other countries. As such, the observed association between USC utilization and health literacy may not be directly generalizable to other health care systems. Caution should be taken when applying these findings to different contexts.

Despite the limitations, this study has several notable strengths. First, this study applied Andersen's Behavioral Model as a theoretical framework to systematically examine the factors associated with health literacy among older adults with hypertension. This approach did not only provide a theoretical explanation of the important role that enabling factors, such as a USC play in improving health literacy and managing hypertension, but also offered practical implications applicable to real-world health care settings. Second, while most previous research on USC has been conducted in countries where the concept is well-established and institutionalized, this study uniquely contributes to the literature by examining USC utilization and its association with health literacy among older adults with hypertension in Korea—a context where USC is not clearly established and health care services are inexpensive and freely accessible without referrals. This allows for a deeper understanding of how USC may function in settings with low USC prevalence, offering valuable implications for health policy in similar health care systems. Third, our findings may inform health care systems where USC is already established by highlighting its potential

benefits for older adults with hypertension. This study extends current knowledge by identifying a significant association between USC use and health literacy, particularly in the domain of disease prevention, which is crucial for managing hypertension and preventing its complications. This finding may inform prevention-oriented public health strategies for aging populations. These strengths enhance the relevance and applicability of our findings to both local and global discussions on improving health outcomes among older adults through continuity of care and targeted health literacy strategies.

Conclusion

This study found a positive association between the use of USC and health literacy among older adults with hypertension, suggesting that USC can be an effective tool for managing hypertension in this population. The correlation between USC utilization and disease prevention further underscores the former's role in preventing complications among older adults with hypertension. Furthermore, the study revealed that health literacy outcomes can vary across different health care settings, highlighting the need for tailored approaches to improve health literacy in specific health care settings. Therefore, it is crucial to provide adequate counseling and education based on the severity of patients' conditions in each health care setting. Such differentiated approaches can enhance health literacy and ultimately improve disease management among older adults with hypertension.

Data availability

The KHP data are available at <https://www.khp.re.kr:444/eng/data/data.do> with the permission of the Korea Institute for Health and Social Affairs. The study was not preregistered.

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Conflicts of interest

None reported.

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