Health Literacy on Sodium Restriction and Associated Factors among Patients with Hypertension in Phnom Penh, Cambodia*

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Abstract

Purpose: To determine the level of health literacy on sodium restriction and factors associated with health literacy on sodium restriction among patients with hypertension in Phnom Penh, Cambodia.

Design: A cross-sectional descriptive design was conducted among 317 outpatients with hypertension at the Khmer-Soviet Friendship hospital. Data were collected with the self-reported questionnaire comprising demographic characteristics, literacy skills, knowledge about hypertension and sodium restriction, health literacy on sodium restriction, and health professional communication. Descriptive statistics and linear regression were performed.

Main findings: The average health literacy on sodium restriction among patients with hypertension in this study was 35.38 (SD = 9.60). Four factors including educational level, literacy skills ($\beta = .125$, $p = .019$), knowledge about hypertension and sodium restriction ($\beta = .266$, $p < .001$), and health professional communication ($\beta = .359$, $p < .001$) were significantly associated with the level of health literacy on sodium restriction.

Conclusion and recommendations: Patients with hypertension in Phnom Penh, Cambodia had limited health literacy on sodium restriction. Education level, literacy skills, knowledge about hypertension and sodium restriction, and health professional communication were positively associated with health literacy on sodium restriction. Consequently, healthcare provider should promote health literacy on sodium restriction by improving patients' literacy skills and knowledge about hypertension and sodium restriction through supportive communication especially among patients with low education level.

Keywords: Cambodia, health literacy, hypertension, sodium restriction

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ความรอบรู้ด้านสุขภาพในการจำกัดโซเดียม และปัจจัยที่เกี่ยวข้องในผู้ป่วยความดันโลหิตสูงในพนมเปญ ประเทศกัมพูชา*

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาระดับความรอบรู้ด้านสุขภาพเกี่ยวกับการจำกัดโซเดียมและปัจจัยที่เกี่ยวข้องในผู้ป่วยโรคความดันโลหิตสูงในกรุงพนมเปญ ประเทศกัมพูชา

รูปแบบการวิจัย: การวิจัยเชิงพรรณนาแบบภาคตัดขวางในผู้ป่วยนอกที่เป็นความดันโลหิตสูงจำนวน 317 คนที่มารักษาที่โรงพยาบาลมิตรภาพเขมร-โซเวียต เก็บข้อมูลด้วยแบบสอบถามชนิดรายงานด้วยตนเองประกอบด้วยหัวข้อลักษณะทั่วไปของประชากร ทักษะความรอบรู้หนังสือ ความรู้เกี่ยวกับความดันโลหิตสูงและการจำกัดโซเดียม ความรอบรู้ด้านสุขภาพเกี่ยวกับการจำกัดโซเดียม และการสื่อสารกับบุคลากรสุขภาพ วิเคราะห์ข้อมูลด้วยสถิติเชิงพรรณนาและสถิติถดถอยเชิงเส้น

ผลการวิจัย: ค่าเฉลี่ยระดับความรอบรู้ด้านสุขภาพเกี่ยวกับการจำกัดโซเดียมเท่ากับ 35.38 (SD = 9.60) ปัจจัย 4 อย่าง ได้แก่ ระดับการศึกษา ทักษะความรอบรู้หนังสือ (β = .125, p = .019) ความรู้เกี่ยวกับความดันโลหิตสูงและการจำกัดโซเดียม (β = .266, p < .001) และการสื่อสารกับบุคลากรสุขภาพ (β = .359, p < .001) มีความสัมพันธ์อย่างมีนัยสำคัญกับระดับความรอบรู้ด้านสุขภาพในการจำกัดโซเดียม

สรุปและข้อเสนอแนะ: ผู้ป่วยความดันโลหิตสูงในพนมเปญ กัมพูชา มีระดับความรอบรู้ด้านสุขภาพเกี่ยวกับการจำกัดโซเดียมที่จำกัด ระดับการศึกษา ทักษะความรอบรู้หนังสือ ความรู้เกี่ยวกับความดันโลหิตสูงและการจำกัดเกลือโซเดียม และการสื่อสารกับบุคลากรสุขภาพมีความสัมพันธ์ทางบวกกับความรอบรู้ด้านสุขภาพในการจำกัดโซเดียม ดังนั้นบุคลากรสุขภาพควรพัฒนาความรอบรู้ด้านสุขภาพเกี่ยวกับการจำกัดโซเดียม โดยการส่งเสริมทักษะความรอบรู้หนังสือและความรู้เกี่ยวกับความดันโลหิตสูง และการจำกัดโซเดียมผ่านการสื่อสารที่สนับสนุนผู้ป่วยโดยเฉพาะอย่างยิ่งในผู้ที่มีการศึกษาน้อย

คำสำคัญ: ประเทศกัมพูชา ความรอบรู้ด้านสุขภาพ ความดันโลหิตสูง การจำกัดโซเดียม

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Background and Significance

High sodium consumption is strongly associated with risk of developing cardiovascular disease (CVD) among patients with hypertension (HTN)[1]. People with HTN in Central Asia had the highest cardiovascular mortality associated with high sodium intake, in which the average sodium intake was greater than 4.60 g/day[2]. Conversely, the American Heart Association [AHA] recommends that normotensive people should consume sodium less than 2,300 mg/day and less than 1,500 mg/day for people with chronic diseases and older age[3]. Reducing 1,200 mg of sodium led to a reduction of systolic blood pressure (SBP) at 3.6-5.6 mmHg and diastolic blood pressure (DBP) at 1.9-3.2 mmHg among patient who had been diagnosed with HTN[4].

In Cambodia, the recent report of the Mistry of Health revealed the gradually increased number of people with HTN[5]. In 2015 there were 198,657 cases diagnosed with HTN that increased to 219,737 in 2016. The national survey conducted in 4 provinces in Cambodia found that greater than 98% of participants consumed more than 2 grams of sodium and 35% of them consumed higher than 6 grams of sodium daily[6]. Conferring to the survey findings, it demonstrated that Cambodian people consumed sodium twice higher than the AHA recommendations. It was further explained that Cambodians had limited understanding about benefits of sodium restriction and harms of excess sodium intake[6]. Only 25.1% and 3.3% of the total participants considered high sodium as the risk factor leads to elevated blood pressure and stroke, respectively. Similarly, the study in the United Kingdom found that one reason explaining failure to restrict sodium intake was lack of understanding differences between salt and sodium[7]. Additionally, limited food labels comprehension and misinterpretation of information from different sources were found to influence patients' health literacy (HL)[8].

HL was determined as a cognitive and social skill which enables people to obtain, understand, and use the information to enhance their health and well-being, and engage in healthcare decision making[9]. The concept has been expanded and integrated into 3 levels of HL including functional health literacy (FHL), communicative/interactive health literacy (C/IHL), and critical health literacy (CHL)[10].

Limited HL was found to be associated with several factors including age, income[11], sex1[2], educational level[13], literacy skills[14], presence of visual impairment and poor visual function[15], knowledge about HTN and sodium restriction[16], and professional communication[17]. Increase level of HL promotes a patient's understanding of HTN and relevant information required to effectively manage BP contro[l8]. In addition, lower HL is associated with lower self-report in perceived general health[14].

Knowledge about HL relevant to sodium restriction among patients with HTN in Cambodia and related factors is lacking. Consequently, this study was conducted to investigate the level of HL related to sodium restriction (HL-SR) and associated factors among patients with HTN in Phnom Penh, Cambodia.

Objectives

There were 2 objectives of this study including 1) to identify the level of HL-SR and 2) to determine the factors associated with HL-SR among patients with HTN in Phnom Penh, Cambodia.

Methodology

A descriptive cross-sectional study was conducted to examine HL-SR level and associated factors among patients with HTN at the outpatient department (OPD) in the Khmer-Soviet Friendship Hospital (KSFH).

Population and Sample

The target population of the study including both males and females who were at least 18 years old and met inclusion criteria including having a diagnosis of essential HTN for at least 6 months, ability to communicate and read Khmer language, and volunteer to

participate in the study. The participants would be excluded if they had any of the following conditions including a cognitive impairment as presented in their health history and developing a critical health condition such as shortness of breathing, signs or symptoms of heart attack or stroke, or other conditions that need immediate emergency care. However, there was none of the participants excluded from this study using the mentioned exclusion criteria.

The prevalence (74.9%, q = .25) from previous study in four provinces of Cambodia[6] was used to calculate required sample size at 95% confidence level (accepted sampling error at .05). The attrition rate of 10% was added. The calculation resulted in a requirement of 317 total study sample. This study used the following formula[18]:

$$n = \frac{(z^2\, pq)}{d2}$$

Research Instruments

The self-reported questionnaire used as a research instrument in the study contained 5 sections as followed:

1. Demographic characteristic form developed by the researchers was used to collect general participant information including age, sex, educational level, income, and vision and hearing problem.

2. Literacy skills questions developed by the researchers were used to evaluate the participants' level of comprehension to read and understand simple to complicate information. The 5-points Likert scale (poor to excellent) was used for this section. The total score was the sum of the total item-scores.

3. Knowledge about HTN and sodium restriction developed by the researchers was evaluated with 10 items-section including 5 items of knowledge about HTN and 5 items of knowledge about sodium restriction. The true/false answer was used for this section. The correct answer was counted as 1 score and the wrong or blank answer item was counted as 0. The total score was the sum of the correct answers.

4. HL-SR questions were developed by the researchers based on Nutbeam conceptual framework[10]. There were 17 items of HL-SR including 3 subscales, which were functional health literacy on sodium restriction (FHL-SR)-3 items, interactive health literacy on sodium restriction (IHL-SR)-6 item, and critical health literacy on sodium restriction (CHL-SR)-8 item. The 5-points Likert scale (never to always) was used for this section. The total score was the sum of the total item-scores.

5. Health professional communication questionnaire developed by the researchers was used to evaluate the patient-provider communication with 3-items, 5-points Likert scale rating from never to always. Likewise, the total score was the sum of the total item-scores.

Validity and Reliability

The questionnaires including literacy skills, knowledge about HTN and sodium restriction, health professional communication, and HL-SR were originally developed in this study from the relevant literature review. A panel of 5 experts including 3 nurse educators and 2 nurse practitioners evaluated the content validity of the questionnaire. Thirty-one patients with HTN (10% of the accessible of sample size) served as volunteers to evaluate the reliability of the questionnaire.

1. Literacy skills section had an item-level content validity index (I-CVI) ranged from 0.8 to 1 with an average scale-level CVI (S-CVI/Ave) of .88. The Cronbach's alpha coefficient of .98 demonstrated good internal consistency of this instrument.

2. Knowledge about HTN and sodium restriction section had the I-CVI ranged from 0.8 to 1 with S-CVI/Ave of .96. The Kuder-Richardson Formula 20 (K-20) was calculated to assess reliability of this dichotomous instrument. The KR-20 value of .70 confirmed acceptable reliability of this questionnaire.

3. HL-SR section had the I-CVI ranged from 0.6 to 1. And S-CVI/Ave of .94 (FHLSR = .92, IHLSR = .97, and CHLSR = .97). The Cronbach's alpha of .89 (FHL-SR = .70, IHL-SR

= .82, and CHL-SR = .84) approved good internal consistency of the HL-SR instrument.

4. Health professional communication section had both I-CVI and S-CVI/Ave of 1.0. However, the Cronbach's alpha of .72 confirmed acceptable internal consistency of this instrument.

Translation Process

The research instrument was used in Cambodia with participants who spoke Khmer as their first language, therefore; was translated from English into Khmer language. An authorized bilingual translator performed backward translation of this instrument after the first researcher (MS) did forward translation. Two English versions of the instrument were compared for language and meaning compatibility under professor's supervision.

Ethical Considerations

The Ethical Committee of Human Right Research at Khon Kaen University (reference number HE612350) approved this study. Additionally, approval from the National Ethics Committee for Health Research, Ministry of Health of Cambodia (reference number 062 NHCHR) as well as the Khmer-Soviet Friendship Hospital ethical committee (reference number 115 K.S.F.H) were obtained for this study.

Data Collection

After obtaining approval, data were collected from March to May 2019. At the beginning of the data collection, the staff nurses at OPD helped identify the potential participants who met the inclusion criteria. The study detail was informed to the patients who were interested to participate. Subsequently, the participants who agreed to participate gave their consent in the form before receiving the questionnaire completion instruction. Overall, each participant spent approximately 15 minutes to complete the questionnaire.

Data Analysis

Descriptive statistics was performed to describe demographic characteristics, literacy skills, knowledge about HTN and sodium restriction, HL-SR, and health professional communication scores. Linear regression analysis was conducted to investigate factors associated with HL-SR variable. Assumptions of linear regression analysis were tested and met including multivariate normality, no multicollinearity, and no autocorrelation and homoscedasticity.

Findings

The findings showed that the study participants' age ranged from 21 to 72 years old with the mean age of 54 years old (SD = 8.95). All the participants were Cambodian with 42.9% males and 57.1% females. Approximately, three-quarters of respondents spent only 1 to 6 years for their formal education. Only 34.4% of participants identified their definite incomes that ranged from 40,000 riels (10 dollars) to 12,960,000 riels (3,240 dollars) per month. Nevertheless, 65.6% of participants were unable to identify their certain incomes.

The average score of literacy skills of participant was 14.64 (SD = 5.86) ranging from 5 to 25. Regarding the components of literacy skills, mean scores were 5.63 (SD = 2.4) and 9.00 (SD= 3.54) for reading and understanding skills, respectively.

The total score of knowledge about HTN and sodium restriction among participants ranged from 0 to 10 points with the mean of 5.45 (SD = 2.15). The finding illustrated that the participants had limited knowledge about HTN and sodium restriction.

The total score of health profession communication ranged from 3 to 14 points with the mean of 6.04 (SD = 1.97). The findings revealed that, as perceived by the participants, the healthcare professional provided enough information for them. However, this finding was opposed to previous finding of their limited knowledge about HTN and sodium restriction.

The overall score of HL-SR among respondents ranging from 17 to 77 points with the mean of 35.38 (SD = 9.60). The mean scores of three HL-SR subscales including FHL-SR, IHL-SR, and CHL-SR were 5.34 (SD = 1.88), 13.91 (SD = 4. 31), and 16.13 (SD = 5.21), respectively (as seen in Table 1).

Table 1: Levels of HL-SR

Variable	n (%)	$\overline{X}$ (SD)	Minimum	Maximum
Overall Score of HL-SR	317 (100)	35.38 (9.60)	17	77
Score of FHL-SR	317 (100)	5.34 (1.88)	3	15
Score of IHL-SR	317 (100)	13.91 (4.31)	6	28
Score of CHLSR	317 (100)	16.13 (5.21)	8	37

Some demographic characteristics including age (p = .35), sex (p = .742), income (p = .30), visual (p = .94) and hearing problem (p = .12) were not significantly associated with HL-SR.

However, the findings revealed that participants who finished tertiary school had the mean HL-SR of 44.07 comparing to 38.87 and 34.03 of participants who finished secondary school and primary school, respectively. Additionally, the participants who did not have a formal education had the mean HL-SR of 32.36. In conclusion, this finding demonstrated that formal education level positively associated with HL-SR. Statistics analysis showed that educational level factor explained 11.1% of HL-SR in this study.

The HL-SR increased by .279 (p < .001) when the participants increased 1 score of their literacy skills including both reading and understanding skills. Literacy skills explained 7.8% of the variance in HL-SR.

The HL-SR increased by .359 (p < .001) with every increase on knowledge about HTN and sodium restriction score. The knowledge about HTN and sodium restriction explained 12.9% of the variance in HL-SR.

Health professional communication was statistically significantly with HL-SR (p < .001). The HL-SR increased by 0.401 with every increased score on health professional communication. Health professional communication described 16.1% of the variance in this study (as shown in Table 2).

Table 2: Factors associated with HL-SR in univariate analysis

Variable	B	β	p	R^2
Age	- .056	- .053	.350	.030
Sex				.000
- Female[a]				
- Male	- .001	- .190	.742	
Educational level				.111
- Tertiary education (13 to higher)[a]				
- No formal education	-11.711	- .329	< .001	
- Primary education (1-6 years)	-10.040	- .475	< .001	
- Secondary education (7-12 years)	-5.200	- .178	.022	
Income	.005	.122	.300	.150
Visual problem	- .115	- .004	.940	.000
Hearing problem	5.649	.087	.120	.007
Literacy skills	.457	.279	< .001	.078
Knowledge about HTN and sodium restriction	6.891	.359	< .001	.129
Health professional communication	1.953	.401	< .001	.161

[a] = reference group

As shown in Table 3, the result found that educational level (no formal education, β = - .145, p = .030; primary education, β = - .252, p = .002; and secondary education, β = - .122, p = 007), literacy skills (β = .125, p = .019), knowledge about HTN and sodium restriction (β = .266, p < .001), and health professional communication (β = .359, p < .001) were significantly associated with HL-SR. These 4 factors altogether explained 32.6% of the variance in HL-SR in this study.

Table 3: Factors associated with HL-SR in multivariate analysis

Variable	B	β	p	95%Cl	
				Lower	Upper
Constant	16.538		< .001	18.270	29.379
Educational level					
- Tertiary education (13 to higher) a					
- No formal education	-5.168	- .145	.030	-9.837	- .499
- Primary education (1-6 years)	-5.334	- .252	.002	-8.651	-2.018
- Secondary education (7-12 years)	-3.552	- .122	.007	-7.464	.361
Literacy skills	.205	.125	.019	.061	.406
Knowledge about HTN and sodium restriction	5.095	.266	< .000	3.314	7.001
Health professional communication	1.749	.359	< .001	1.240	2.152

[a] = reference group, adjusted R square .326

Discussion

The findings demonstrated that the participants had an inadequate HL-SR that might lead to an adverse effect on their health. The participant had a limited understanding about sodium restriction advice from their healthcare providers. The finding of the study was consistent with other studies that hypertensive patients did not comprehend the recommended amount of salt and sodium intake in daily living[19].

Previous studies showed that many people viewed that sodium content written on the food label was difficult to read, understand, and interpret[20]. Likewise, this study found that the participants did not comprehend whether the processed food contains high sodium when they read the food labels. In Cambodia, all imported food products required to re-print the nutritional facts in local language according to the reconstructed food label regulation in 2000[21]. A study of maternal and child nutrition found that current labelling practices of commercially produced foods in Cambodia did not follow national legislative requirements[22]. This fact could explain the reason of inability to understand food label among the participants. However, this study was unable to clearly explain whether participants did not habitually read the food labels or labels did not provide comprehensible information for them.

The participants in this study identified poor communication with family members, friends, and health professional to discuss and solve their sodium restriction issue. In addition, the participants were not aware of the effect on their health condition when they did not restrict sodium in their food. Many participants identified that they avoided high sodium in their favorite foods "sometimes" rather than "always". Moreover, three-quarters of participants did not know how to choose low-sodium food from the label. Similarly, a study in India found that Indian people did not know about the harmful effects of salty diet, had wrong information about salt, and considered reducing salt in diet as unnecessary[19].

Age, sex, income, visual, and hearing

problem was not statistically associated with HL-SR in this study. On the contrary, educational level, literacy skills, knowledge about HTN and sodium restriction, and health professional communication had significantly positive associations with HL-SR.

The HL-SR increased in association with an increase level of education. This finding was supported the study in African American that HL and diet quality choice was strongly associated with education level[23].

The HL-SR score increased by .125 with every 1 score increased in literacy skills in this study. A systematic review supported this finding that people with poor literacy skills tended not to pay attention to health education and, therefore; were unlikely to manage their disease[14].

The finding of this study showed that HL-SR score increased by .266 when knowledge about HTN and sodium restriction increased 1 score. This finding illustrated relationship between these 2 variables. Various studies confirmed that people with sufficient knowledge about health condition and salt intake were likely to reduce salt consumption for benefits on their health[19,24].

Lastly, the association between HL-SR and health professional communication was found in this study. Participants who received sodium restriction advice from their providers were more likely to take action to reduce sodium intake comparing to those who did not receive advice, which was similar to previous study[25]. However, healthcare providers who gave advice shortly to "cut down salt" might not be adequate to assist their patients lower their sodium consumption[26].

Conclusion and Recommendations

The participant with HTN in this study had poor HL-SR. Conclusively, educational level, literacy skills, knowledge about HTN and sodium restriction, and health professional communication explained poor HL-SR among patients with HTN in this study. Based on the findings of the study, to promote HL-SR among patients with HTN in Cambodia, it is suggested that:

1. Healthcare providers in Cambodia should provide low sodium diet education for patients with HTN and family members to promote their knowledge related to HTN and sodium intake. In addition, the providers should encourage their patients to read the food labels and provide guidance to read and understand the information. Additionally, healthcare providers should evaluate the patients' literacy skills and consider their education level to provide information that fit with their literacy level.

2. Communication between patients and providers should be promoted in the way that supports patients understanding of provider's advice. According to the participants' response, healthcare provider should determine how much and how well the patients comprehend and recall what they were advised. Consequently, teach-back method is suggested to monitor patients' understanding of given information, especially for complicated content.

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