Factors Explaining Medication Adherence of Older Adults with Hypertension: A Cross-sectional Study

Luu Thi Thuy, Supreeda Monkong, Renu Pookboonmee, Sirirat Leelacharas, Chukiat Viwatwongkasem*

Abstract: Medication adherence plays a crucial role to control hypertension especially in older adults who are confronted with several challenges to effective pharmacotherapy. However, medication adherence in older people varies widely because of the influence of many factors. This study examined the factors of medication regimen complexity, physical function, social support, health literacy, patient-provider communication, health belief, and self-efficacy in explaining medication adherence of older people with hypertension. Three hundred people aged 60 years and older diagnosed with hypertension were recruited from outpatient departments of four hospitals in Vietnam. Nine questionnaires were used for collecting data: a demographic data form, Hill-Bone Compliance Scale, Medication Regimen Complexity Index, Lawton Instrumental Activities of Daily Living Scale, Multidimensional Scale of Perceived Social Support, Short-Form Health Literacy Questionnaire, Communication subscale of the Interpersonal Processes of Care Survey, Health Belief for Hypertensive Patient Scale, and Medication Adherence Self-Efficacy Scale-Revised. Data analysis was conducted using descriptive statistics, Pearson's correlation, and hierarchical regression analysis.

The results indicated that self-efficacy, appropriate health belief, patient-provider communication, and medication regimen complexity jointly and significantly explained 39.9% of the variation in medication adherence. This finding suggests that nurses can develop interventions to enhance medication adherence by improving communication between patients and healthcare providers, providing instructions to clarify patients' understanding regarding hypertension and medication, and increasing their confidence in medication administration.

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Introduction

Hypertension (HTN) is a highly prevalent disease in older people with at least 60% being diagnosed HTN globally.[1] It stands as the main cause of stroke and cardiovascular diseases, contributing to premature mortality and disability.[1] Because antihypertensive medication therapy is the key approach for effectively controlling HTN, adherence of patients is of the utmost importance for the treatment success.[2] Despite the

global improvements in the treatment, controlling this disease in the older age group is still a big challenge for many countries, including Vietnam where HTN is one of the major burdens of disease but only one-third of older people can reach a targeted blood pressure control.[3] The literature on HTN has highlighted that not taking medication as prescribed is the major cause responsible for uncontrolled high blood pressure among the older population.[4] Whilst the adherence rate reported ranged from 39.0% to 48.0% in other countries,[5-7] it was 49.8% in Vietnam.[8]

Medication adherence of older adults with HTN varies considerably due to the influence of several factors. Understanding of factors explaining medication adherence is a prelude to the development and refinement of interventions for enhancing older adults' adherence which then leads to better HTN control.[4] Multiple international studies have documented the factors affecting medication adherence of older people with HTN,[4-7,9-15] including medication regimen complexity;[4,5] physical function;[9] social support;[4,10] health literacy;[6,11] patient-provider communication;[12] health belief;[7,9,13-15] and self-efficacy.[7,9,10,13,14] Whilst plenty of the published literature has reported determinants of medication adherence around the world, very little is known about this issue in Vietnam. Thus, the researchers need to examine factors explaining medication adherence of older adults with HTN that would be useful for designing programs to better medication adherence for this group of people.

Conceptual Framework and Review of Literature

Medication adherence is described as the degree to which patients take their medication as prescribed.[16] The Five Dimensions Model of Adherence (FDMA) proposed by the World Health Organization (WHO)[17] was used to guide this study in explaining medication adherence. According to this model, adherence is affected by the five groups of factors, named as dimensions, including therapy-related factors (e.g., the complexity of medication regimens); condition-related factors (e.g., physical health); social and economic factors (e.g., social support, health literacy); healthcare team and system-related factors (e.g., patient-provider communication); and patient-related factors (e.g., health belief, self-efficacy).[17] This model has been highlighted as comprehensive because it addresses multiple factors associated with adherence.[4,17] Moreover, the model was specifically developed for adherence to long-term treatment; thus, it is useful for systematically investigating adherence-related factors that would be valuable for health professionals to design strategies in boosting adherence behavior of patients.[4,18]

In the FDMA, many factors are unable to be tailored by health professionals' roles, particularly nurses', or controlled by patients such as some demographic factors (e.g., education, income, marital status).[17] Focusing on modifiable factors is advisable as these factors can be integrated into interventions to make the greatest effect on improving adherence.[9,18] In this study, seven modifiable factors were selected to examine their influence on medication adherence in the Vietnamese community as the literature has clearly presented the linkage between these factors and medication adherence.

Medication regimen complexity classified under the therapy-related factors has recently emerged as a significant factor contributing to adherence of older adults who often take multiple medications for treating their comorbidities compared to younger people.[4,12] The complexity of the regimens is manifested by the number of medications, dosing frequency, dosing pharmaceutical form, and specific information on medication use.[19] Basically, a high number of daily medications coupled with high dosing frequency may raise the risk of unexpected drug interactions and side effects which may result in medication non-adherence

of patients.[5,20] The complexity of the regimens is an important barrier to medication adherence. The more complex the medication regimen is, the more likely older people discontinue their medications.[12,20]

Physical function refers to the extent to which people perform necessary activities for independent living.[21] Although this factor was not clearly pointed out in the FDMA, the study which applied the FDMA as a conceptual framework categorized this variable under condition-related factors.[22] Older people who were more independent in doing activities of daily living had better medication adherence.[6,9] Physical function was the strongest positive predictor of adherence to HTN treatment among Thai people.[9] However, it was negatively linked to medication adherence among Chinese.[22] It is possible that receiving more support from family or caregivers might have helped older people with poorer physical function adhere to medication more than those with higher physical functioning.[22]

In relation to social support, a modifiable social and economic factor, this is defined as the perception of the availability of support that people receive from their family, friends, and others.[23] Previous studies highlighted its considerable influence on medication adherence of people with HTN.[4,9-11,24] Specifically, support from family is very important to assist older adults in performing recommended behaviors for HTN control. This source of support was positively directly correlated with medication adherence of Thai older adults.[9] Moreover, social support indirectly influenced medication adherence via self-efficacy,[9,24] health belief, patient-provider communication,[9] and health literacy.[11]

Health literacy reflects the ability of people to access, understand, appraise, and use the information for making decisions so as to enhance their quality of life.[25] In the FDMA, health literacy is grouped into the dimension of social and economic factors.[17] As older adults often have many chronic diseases and polypharmacy, health literacy is important for them to understand health information and follow instructions on medication use.[26] Adequate health literacy facilitated medication adherence of older adults with HTN in Thailand and Pakistan.[6,11] By contrast, low health literacy was linked with misinterpreting medication instructions, forgetting the medications, and taking less medication than instructed.[26] Besides a direct effect, health literacy indirectly affected medication adherence via communication with physicians[27] and health belief.[28]

With regard to healthcare team and system-related factors, patient-provider communication is the perception of patients about communication behaviors of their health professionals in relation to clarity during dialogue, active listening and responsiveness to the patient's problems, and explanation of the disease and its treatment.[29] It is a predictive factor of medication adherence among people with HTN.[4,9,24] Thai older adults who had better communication with their healthcare providers had higher medication adherence than those with poorer communication.[9,24] Moreover, patient-provider communication had an indirect influence on medication adherence via health belief and self-efficacy.[9]

Researchers have commonly believed that patients take the main responsibility for adherence behavior; thus, they have paid attention to exploring the contribution of patient-related factors to adherence behavior such as health belief, which is the perceptions about susceptibility to the illness, the severity of the illness, the benefits of taking particular health actions to avoid the illness or lead to other positive outcomes, and the barriers to control the illness.[30] Health belief has been recognized as a significant factor in explaining and predicting medication adherence in HTN.[13] It had not only a direct effect[7,9,14,15] but also an indirect influence on medication adherence via self-efficacy.[9,24] However, the influence of health belief on medication adherence varies from country to country. For instance, medication adherence was significantly related to perceived benefits of medication among Chinese.[15] Inversely, perceived severity and perceived barriers significantly predicted medication adherence of Thai people.[9] The researchers supposed that older adults

from different countries with different cultural backgrounds might have different perceptions of HTN which then differently influenced their medication adherence.[10,13]

Self-efficacy, another patient-related factor, describes the belief of individuals in their ability to do something.[30] It is well known as a powerful factor explaining adherence to medication because numerous published studies have consistently reported a direct influence of self-efficacy on medication adherence of older adults with HTN.[7,9,10,13,14] The more confident older people were in their ability to take medication for HTN control, the more likely they were to be adherent to the treatment therapy.[7,9,10,14]

From the literature review, multiple factors affecting medication adherence of older adults living with HTN have been identified, particularly the factors described above. However, understanding of this topic is still limited in Vietnam; thus, this study aimed to examine the ability of medication regimen complexity, physical function, social support, health literacy, patient-provider communication, health belief, and self-efficacy in explaining medication adherence of older adults with HTN in Vietnam.

Methods

Research Design: A cross-sectional design

Sample and Setting:

The study was conducted in a city in central Vietnam, which has one provincial hospital, one central hospital, seven district hospitals, and some private hospitals. Data were collected from a provincial hospital, a central hospital, and two district hospitals which were randomly selected by simple random sampling among seven district hospitals.

Potential participants were conveniently selected from outpatient departments of each hospital if they satisfied all the inclusion criteria, including aged 60 years or older; being diagnosed with HTN and undertaking antihypertensive drug for at least 6 months; able to administer medication independently; and able to communicate Vietnamese. The exclusion criterion was cognitive impairment which was screened by the Six-item Cognitive Impairment Test.[31] Those who had a score higher than 7 were eliminated from the study.

The sample size was calculated using the Statistical Power Analysis.[32] To estimate sample size, an effect size from the previous study of .056,[33] an alpha of .05, a power of .80, a noncentrality parameter of 15.1, and 7 predictors were used for calculation. The estimated sample size was 270 individuals. To minimize missing data, an attrition rate of 10% was added; thus, the sample size was rounded to 300 individuals.

Ethical Considerations: The current study was approved by the Ethical Committee, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand (ID 01-60-29), and the directors of four hospitals. All participants received explanations about the study and had their rights protected throughout, including confidentiality and the right to refuse or withdraw from the study. All participants signed an informed consent form before data collection.

Instruments: Nine instruments were administered for data collection. Except for the demographic data form, eight instruments were used with permission from the developers. Among these, two instruments (Multidimensional Scale of Perceived Social Support and Short-Form Health Literacy Questionnaire) were already available in Vietnamese whereas the five instruments in English and one in Thai were translated from the original language to Vietnamese and then back-translated using the user-friendly guideline proposed by Sousa and Rojjanasrirat.[34] Five instruments in English were translated to Vietnamese by four independent translators who were fluent in both English and Vietnamese (two people forward translated and the other two back-translated). Similarly, translating the instrument in Thai (Health Belief for Hypertensive Patient Scale) was conducted by four Vietnamese-Thai bilingual translators. Seven experts including two

physicians, two nursing lecturers, two registered nurses, and one pharmacist verified the content validity of the translated Vietnamese versions of the instruments. The content validity index (CVI) and reliability of the scales in previous studies, the pilot study (30 participants), and the actual study (300 participants) along with the example of items were shown in **Table 1**.

Table 1 Item example, content validity index and reliability of the instruments

Instruments	CVI	KR-20		Cronbach' alpha reliability			Example item
		Pilot study	Actual study	Previous studies	Pilot study	Actual study	
HBCS	.90	-	-	.74 - .84 [35]	.61	.66	How often do you forget to take your antihypertensive medication?
MRCI	.97	-	-	-	-	-	Take the medications at specified times.
Lawton IADLs	.99	.60	.65	-	-	-	How do you prepare meals at home?
MSPSS	-	-	-	.85 [24]	.85	.88	My family really tries to help me.
HL-SF12	-	-	-	.87 [37]	.74	.88	How easy is it to understand the leaflets that come with your medication?
CS-IPC	.94	-	-	.85 [29]	.69	.82	How often did your doctors/nurses speak too fast?
HBHS	1.00	-	-	.85 -.89 [9,24]	.73	.77	Hypertension can lead to a stroke.
MASES-R	.93	-	-	.90 - .92 [39]	.88	.90	How confident are you that you can take your antihypertensive medication when you feel well?

Note: CVI = Content Validity Index, KR-20 = Kuder-Richardson's method, HBCS = Hill-Bone Compliance Scale, MRCI = Medication Regimen Complexity Index, Lawton IADLs = Lawton Instrumental Activities of Daily Living Scale, MSPSS = Multidimensional Scale of Perceived Social Support, HL-SF12 = Short-Form Health Literacy Questionnaire, CS-IPC = Communication subscale of the Interpersonal Processes of Care, HBHS = Health Belief for Hypertensive Patient Scale, MASES-R = Medication Adherence Self-Efficacy Scale-Revised.

Demographic Data Form was developed by the primary investigator (PI) to obtain information about age, gender, marital status, education, duration of HTN, comorbidity, and medication.

Hill-Bone Compliance Scale (HBCS): This scale developed by Kim et al.[35] was used to measure medication adherence. It includes three domains; however, in this study, only the two domains relevant to medication adherence (medication taking and appointment keeping) with 11 items in total were used. Responses to the items can be chosen from 1 (never) to 4 (all the time). The total score is from 11 to 44 with the lower score reflecting better adherence.

Medication Regimen Complexity Index (MRCI): This tool was developed by George et al.[19] for healthcare professionals to elicit information about medication regimen complexity. It is an open index with 65 items covering three components: dosage formulations, dosing frequencies, and specific directions for using the drugs. Each dosage form, dosing frequency, and specific direction is assigned a weighted value ranging

from 1 to 5, from 0.5 to 12.5, and 1 or 2, respectively, depending on the difficulty in administration. The PI who had been experienced in assessing medication in older people reviewed the participants' prescriptions and then marked the items related to dosage formulation, dosing frequency, and the instruction present in the regimen. The MRCI score is obtained by summing the weighted scores of the three components and the higher scores mean more complex medication regimens. A previous study reported the stability of the scale with inter-rater and test-retest correlation coefficients higher than 0.90.[19]

Lawton Instrumental Activities of Daily Living Scale (Lawton IADLs): This 8 item scale was administered to measure eight tasks of physical function, including using telephone; shopping; cooking; doing house maintenance work; doing laundry; traveling; handling medications; and managing money.[22] The participants were asked about their independence in doing particular tasks. A score of 1 was given to the item if the participants were independent; otherwise, the item got a score of 0. The total score ranges from 0 to 8 with the higher score meaning higher physical function.

Multidimensional Scale of Perceived Social Support (MSPSS): This scale consists of 12 items which measured support that the participants get from their family, friends, and others. It was developed in English [24] and already translated to Vietnamese.[36] Items are rated using seven options, from 1 (very strongly disagree) to 7 (very strongly agree). The sum score is between 12 and 84 with the higher score indicating higher perceived social support.

Short-Form Health Literacy Questionnaire (HL-SF12): This tool was developed by Duong et al.[37] with 12 items to measure the competencies of a person when processing health-relevant information. All items are rated from 1 (very difficult) to 4 (very easy). The total score is then standardized to obtain a value from 0 to 50, and the higher scores reflect higher health literacy.

Communication subscale of the Interpersonal Processes of Care Survey: This scale was developed by Stewart et al.[29] to assess participants' perceptions of communication with their physicians/nurses. It has 12 items with three sub-domains, clarity of communication; elicitation of and response to concerns; and explanation of results and medications. Response to the positive items is from 1 (never) to 5 (always) while five negative items are reverse-scored. The total score is from 12 to 60 with the higher score showing better communication between the participants and their physicians/nurses.

Health Belief for Hypertensive Patient Scale (HBHS): This scale was modified by Pinprapapan[24] from the Health Belief Questionnaire developed by Riounin[38] to measure health belief of people with HTN. There are 26 items covering perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. The positive items are rated using four options from 1 (mostly disagree) to 4 (mostly agree) while scores for the seven negative items are reversed. The total scores are from 26 to 104 with the higher score indicating more appropriate health belief.

Medication Adherence Self-Efficacy Scale-Revised (MASES-R): This scale was developed by Fernandez et al.[39] to evaluate self-efficacy. The first 12 items ask about the confidence to take antihypertensive drugs in different situations while the last item evaluates the confidence in taking medication as a daily routine. Response to all items ranges from 1 (not sure) to 4 (very sure). The sum score is from 13 to 52 with the higher score meaning higher self-efficacy.

Data Collection: The PI collected the data from February 2018 to June 2018. Potential participants were approached at the clinic after they met the physicians for follow-up. Those who satisfied the inclusion criteria were invited and scheduled for collecting data at their home. At the appointment time, the PI worked privately with the participants and interviewed them with the structured questionnaires. The PI also reviewed their medical record book to collect information on

HTN and medication use. During the interview, the participants were given a break when they felt tired. On average, each interview took approximately 30 minutes. After the completion of the interview, the PI gave the participants a small gift to thank for their participation.

Data Analysis: The SPSS version 18.0 was conducted to analyze data. Descriptive analysis was used for demographic characteristics and all study variables. Because the original dependent variable (medication adherence) was positively skewed, it was transformed using Box-Cox transformation.[40] The natural logarithm (Ln) of medication adherence was selected to use as the dependent variable for multiple regression analysis because it provided the best improvement of normality compared with other transformations and with the original in terms of the value of z-score of Skewness and Kurtosis, the p-value of the Shapiro-Wilk test, and the histograms of standardized residual. The normality of the Ln of medication adherence was also verified by the Normal P-P plot of standardized residual. Additionally, assumptions of linearity, homoscedasticity, multicollinearity, and autocorrelation were also checked for satisfaction.

The correlation between medication adherence and the seven factors was examined using Person's correlation. Hierarchical regression analysis was then conducted to determine significant factors explaining medication adherence. Based on the FDMA and literature, five blocks of variables were entered into the hierarchical regression analysis. Medication regimen complexity (a therapy-related factor) was entered in the first block while physical function (a condition-related factor) was added in the second block. In the third block, social support and health literacy (social and economic factors) were entered. Patient-provider communication (a healthcare team and system-related factor) was put in the fourth block. And in the last block, health belief and self-efficacy (patient-related factors) were entered.

Results

Characteristics of the participants

As shown in **Table 2**, the mean age of the participants was 68.11 years and 58% were male. Most participants were married (80.7%) and living with their husband/wife and children (65.7%). Approximately half of participants had an educational level above high school. The average duration of HTN was 9.18 years. Most participants had comorbidities with the most frequent being cardiovascular and osteoarthritis disease. They took an average of 1.63 tablets of antihypertensive drug per day and mostly once or twice daily. The most commonly prescribed type of antihypertensive drugs was angiotensin II receptor blocker, followed by calcium channel blockers.

Table 2 Characteristics of the participants (N = 300)

Demographic characteristics	N (%)
Age (Mean = 68.11, SD = 6.34)	
60-69 years	193 (64.3)
70-79 years	89 (29.7)
80-89 years	18 (6.0)
Gender	
Male	174 (58.0)
Female	126 (42.0)
Marital status	
Married	242 (80.7)
Divorced/Widowed/Separated	48 (16.0)
Single	10 (3.3)

Table 2 Characteristics of the participants (N = 300) (Cont.)

Demographic characteristics	N (%)
Educational level	
Primary or secondary school	95 (31.7)
High school	69 (23.0)
College/ University Graduate	136 (45.3)
Living arrangement	
Living with spouse and children	197 (65.7)
Living with spouse or children or relatives	96 (32.0)
Living alone	7 (2.3)
Duration of HTN (Range = .50 - 40.0, Mean = 9.18, SD = 6.74)	
6 months - 5 years	116 (38.6)
6 - 10 years	95 (31.7)
> 10 years	89 (29.7)
Number of comorbidity (Range = 0 - 5, Mean = 1.37, SD = .99)	
No disease	54 (18.0)
1- 2 diseases	207 (69.0)
> 2 diseases	39 (13.0)
Total number of medications taken per day (tablet and/or packet) (Range = 1 - 19, Mean = 4.71, SD = 3.11)	
Number of antihypertensive medications taken per day (tablet) (Range = .5 - 4.5, Mean = 1.63, SD = .79)	
Number of time of antihypertensive medication used per day	
1 time	190 (63.3)
2 times	107 (35.7)
3 times	3 (1.0)
Types of antihypertensive medication*	
Angiotensin II receptor blocker	154 (51.3)
Calcium channel blocker	148 (49.3)
Diuretic	76 (25.3)
Beta-adrenergic blocker	76 (25.3)
Angiotensin-converting enzyme inhibitor	39 (13.0)
Combination type of antihypertensive medication	
1 type	155 (51.7)
2 types	99 (33.0)
3 or 4 types	46 (15.3)

Note: *Participants answered more than one

Descriptive characteristics of the study variables

Medication adherence had a mean score of 16.37. When comparing the mean score with the mid-possible score of the scale, medication adherence of the participants was at a high level. Similarly, the participants showed high levels of appropriate health belief, self-efficacy, and physical function. However, they had moderate levels of social support, health literacy, and patient-provider communication. For medication regimen complexity, most of the regimens were not complex as the majority of medications were tablets given twice/day in the morning and afternoon (see **Table 3**).

Table 3 Descriptive statistics of the study variables (N = 300)

Variables	Possible range	Actual range	Mean ± SD	Interpretation by mean
Medication adherence*	11 – 44	11 – 31	16.37 ± 3.57	High
Medication regimen complexity		3 –39	10.02 ± 5.87	Not complex
Physical function	0 – 8	3 – 8	7.72 ± .76	High
Social support	12 – 84	20 – 84	55.38 ± 12.10	Moderate
Health literacy	0 – 50	8.3 – 50.0	32.44 ± 8.68	Moderate
Patient-provider communication	12 – 60	20 – 51	37.07 ± 6.08	Moderate
Health belief	26 – 104	67 – 104	88.08 ± 7.32	High
Self-efficacy	13 –52	13 –52	45.54 ± 6.67	High

Note: *Lower score means better adherence

Factors explaining medication adherence

A correlation matrix between the study variables is showed in **Table 4**. Overall, multicollinearity was not present in this study. Five variables (medication regimen complexity, health literacy, patient-provider communication, health belief, and self-efficacy) were significantly associated with medication adherence. Physical function and social support were not significantly related to medication adherence.

Table 4 Correlation between the study variables (N = 300)

Variable	1	2	3	4	5	6	7	8
Medication regimen complexity	1.00							
Physical function	-.136*	1.00						
Social support	-.114*	.213**	1.00					
Health literacy	-.058	.313**	.488**	1.00				
Patient-provider communication	-.003	.138*	.144*	.158**	1.00			
Health belief	-.022	.217**	.310**	.586**	.210**	1.00		
Self-efficacy	.019	.053	.049	.215**	.229**	.356**	1.00	
Transformed medication adherence***	-.114*	-.017	-.073	-.206**	-.270**	-.334**	-.595**	1.00

Note: * $p < .05$ ** $p < .001$ ***Lower score means better adherence

In the 1st model, medication regimen complexity was significant and explained 1.3% of the variance in adherence. The addition of physical function in the 2nd model did not significantly change the variance in medication adherence after controlling therapy-related factors. In the 3rd model, health literacy was a significant factor and explained an extra 4.6% of the variance in medication adherence after controlling therapy-related factors and condition-related factors. When controlling therapy-related factors, condition-related factors, and social and economic factors in the 4th model, patient-provider communication significantly explained an additional 6.0% of the variance in medication adherence. And in the final model, all factors significantly explained 39.9% of the variance in medication adherence. Health belief and self-efficacy additionally contributed 27.9% in explaining medication adherence (see **Table 5**).

Table 5 Hierarchical regression analysis of factors explaining medication adherence (N = 300)

Model*	b	S.E (b)	Beta	t	p-value
Model 1					
(Constant)	2.814	.023		120.524	.000
1. Medication regimen complexity	-.004	.002	-.114	-1.972	.049
$R = .114$, $R^2 = .013$, Adjusted $R^2 = .010$, R^2 change = .013, $F_{(1,298)} = 3.890$, p = .049					
Model 2					
(Constant)	2.884	.125		22.983	.000
1. Medication regimen complexity	-.004	.002	-.118	-2.029	.043
2. Physical function	-.009	.016	-.033	-.572	.568
$R = .118$, $R^2 = .014$, Adjusted $R^2 = .007$, R^2 change = .001, $F_{(2,297)} = 2.104$, p = .124					
Model 3					
(Constant)	2.903	.127		22.805	.000
1. Medication regimen complexity	-.004	.002	-.120	-2.096	.037
2. Physical function	.010	.016	.036	.592	.555
3. Social support	.000	.001	.020	.302	.763
4. Health literacy	-.006	.002	-.234	-3.499	.001
$R = .244$, $R^2 = .060$, Adjusted $R^2 = .047$, R^2 change = .046, $F_{(4,295)} = 4.678$, p = .001					
Model 4					
(Constant)	3.128	.133		23.500	.000
1. Medication regimen complexity	-.004	.002	-.114	-2.048	.041
2. Physical function	.016	.016	.060	1.021	.308
3. Social support	.001	.001	.041	.643	.520
4. Health literacy	-.005	.002	-.211	-3.260	.001
5. Patient-provider communication	-.008	.002	-.251	-4.496	.000
$R = .347$, $R^2 = .120$, Adjusted $R^2 = .105$, R^2 change = .060, $F_{(5,294)} = 8.029$, p = .000					
Model 5					
(Constant)	3.913	.153		25.559	.000
1. Medication regimen complexity	-.004	.002	-.101	-2.205	.028
2. Physical function	.013	.013	.048	.990	.323
3. Social support	-4.039E-5	.001	-.002	-.045	.964
4. Health literacy	-.001	.001	-.024	-.378	.706
5. Patient-provider communication	-.004	.002	-.129	-2.711	.007
6. Health belief	-.003	.002	-.120	-2.036	.043
Self-efficacy	-.016	.002	-.518	-10.457	.000
$R = .631$, $R^2 = .399$, Adjusted $R^2 = .384$, R^2 change = .279, $F_{(7,292)} = 27.659$, p = .000					

Note: *Dependent variable: Transformed medication adherence. Lower score means better adherence.

Discussion

This study revealed four significant factors influencing medication adherence of older adults living with HTN. Among these factors, self-efficacy and health belief (patient-related factors) played a major role in explaining the variance of medication adherence. This finding reinforced previous reports

that self-efficacy is a powerful factor that is positively and directly correlated with medication adherence in people with HTN.[7,9,10,13,14] In this study, the participants showed high confidence in their ability to take the antihypertensive medication in different circumstances. This might have help them generate motivation and increase intention to take prescribed drugs which then resulted in their better adherence to medication.

With regard to health belief, similar results were found in previous studies reporting that this was positively associated with medication adherence of people with HTN.[7,9,13-15] Appropriate perceptions regarding HTN and its control are necessary to shape adherence behavior of older adults. They adhered to medication when they perceived that HTN is serious[7,9] and they are at a high risk of its complications if is not well controlled,[14] when they were aware of the benefits of antihypertensive drugs,[15] and when they were less concern about barriers to medication taking.[7,9,14] Moreover, appropriate belief about HTN and medication could create the initial motivation for older people to perform recommended behaviors for HTN control. Those who had appropriate health belief were more likely to be confident in taking medication, contributing to their adherence.[7,9,24]

In terms of healthcare team and system-related factors, patient-provider communication was found significant in explaining medication adherence in this study. This finding is similar to prior international studies which reported that good patient-provider communication was related to better medication adherence of older adults with HTN.[4,9] It is because of the fact that good patient-provider communication during the treatment can improve patients' understanding of HTN and its control, increase their trust and satisfaction with healthcare services, and cultivate their confidence in performing recommended behaviors, leading to better medication adherence.[9,24]

Regarding medication regimen complexity (a therapy-related factor), this significantly explained medication adherence of older adults in this study. However, contrary to prior studies that reported a linkage between medication regimen complexity and medication non-adherence,[4,5,12,20] this study found that the participants who received more complex medication regimens had better adherence. The attention of the participants may offer a possible explanation for this inconsistent finding. Taking a complicated medication regimen might make them understand that their condition is severe, especially when HTN is an asymptomatic condition. Thus, they might pay more attention to using daily medication to control HTN, and as a result, their adherence was enhanced. Another reason may relate to measuring the complexity of the regimens. In this study, the medication regimens included HTN-specific drugs and other medications. Taken together, the overall regimens might be complicated but antihypertensive medications itself were not complex as most drugs were prescribed in the tablet form taken once or twice per day. This may explain why the participants showed high adherence to antihypertensive medication.

Surprisingly, the last model presented that health literacy was insignificant in explaining medication adherence although it was significant in the prior models. This result is inconsistent with previous studies reporting the influence of health literacy on medication adherence in older adults with HTN.[6,11,26] A possible explanation is that health literacy was significantly positively correlated with health belief in the current study. Thus, when health belief was entered into the model, there was no more space left for health literacy to explain medication adherence.

Similarly, this study showed no significant correlation between social support and medication adherence. The result is different from prior studies documenting that social support significantly affected medication adherence in people with HTN.[4,9,11,22] It is possible that whilst previous studies measured support from family or caregivers,[9,22] this study assessed support not only from family but also from friends and others. Support from family or caregivers might be more significant to help older adults adhere to medication

than support from friends or others. Another reason may be that older adults in this study were independent in medication administration, thus, social support might not affect their adherence behavior.

As noted in previous studies, physical function (a condition-related factor) was a predictor of medication adherence of people with HTN.[6,9,22] However, in this study, this variable was insignificant in explaining medication adherence. A possible reason is that our participants had high scores of physical function. The very little variability in physical function score might account for the insignificant correlation between physical function and medication adherence in this study.

The findings from this study support the FDMA in that patient-related factors, healthcare team and system-related factors, and therapy-related factors contribute to explaining medication adherence of older adults diagnosed with HTN.

Limitations

The study was conducted at only four public hospitals of a city; thus, this might limit the generalizability of the findings. Moreover, measuring medication adherence was based on the participants' self-reported answers which might produce recall bias and social desirability bias, leading to overestimate of adherence rate. Furthermore, using the total score of the HBHS did not reflect the four dimensions of health belief including perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. This limited the interpretation of the findings in terms of which dimension of health belief is the best in explaining medication adherence.

Conclusions and Implications for Nursing Practice

This study found that self-efficacy, appropriate health belief, patient-provider communication, and medication regimen complexity significantly explained medication adherence of older adults with HTN. Thus, nurses and physicians should communicate and assess older adults with HTN to assure their understanding and appropriate beliefs about the disease and its treatment. Moreover, nurses should provide support to help older adults build up and increase their confidence in taking medication by providing adequate instructions on medication use.

As adherence behavior to medication may change from time to time, longitudinal studies should be conducted to determine the adherence rate and key determinants of medication adherence. Objective methods for measuring medication adherence should be included to guarantee the accuracy of data. Further studies should elaborate on how all significant variables work to influence medication adherence.

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ปัจจัยอธิบายการรับประทานยาอย่างต่อเนื่องในผู้สูงอายุที่มีภาวะความดันโลหิตสูง: การศึกษาภาคตัดขวาง

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บทคัดย่อ:การรับประทานยาอย่างต่อเนื่องเป็นบทบาทสำคัญในการจัดการกับภาวะโรคความดันโลหิตสูงที่มีความซับซ้อนในผู้สูงอายุ ผู้สูงอายุเผชิญกับความท้าทายหลายด้านที่จะให้การรักษาทางยามีประสิทธิภาพ อย่างไรก็ตามพบว่ามีความหลากหลายในการรับประทานยาอย่างต่อเนื่องในผู้สูงอายุ เกิดเนื่องจากปัจจัยหลายอย่าง การศึกษาครั้งนี้ศึกษาความซับซ้อนของการรักษาด้วยยา ความสามารถทางกาย แรงสนับสนุนทางสังคม ความรอบรู้ทางด้านสุขภาพ การสื่อสารระหว่างผู้ป่วยและบุคลากรสุขภาพ ความเชื่อทางด้านสุขภาพ และความเชื่อมั่นในตนเองในการอธิบายการรับประทานยาอย่างต่อเนื่องในผู้สูงอายุที่มีภาวะความดันโลหิตสูงกลุ่มตัวอย่าง จำนวน 300 รายเป็นผู้ที่มีอายุตั้งแต่ 60 ปีขึ้นไปที่ได้รับการวินิจฉัยว่ามีภาวะความดันโลหิตสูงที่มารับบริการที่หน่วยตรวจผู้ป่วยนอกในโรงพยาบาล 4 แห่ง ประเทศเวียดนาม เครื่องมือที่ใช้ในการเก็บรวบรวมข้อมูล ประกอบด้วย แบบสอบถามจำนวน 9 ชุด ได้แก่ แบบสอบถามข้อมูลส่วนบุคคล แบบสอบถามการรับประทานยาอย่างต่อเนื่องแบบสอบถามความซับซ้อนของการรักษาด้วยยาแบบสอบถามการปฏิบัติกิจวัตรประจำวันที่ซับซ้อน แบบสอบถามแรงสนับสนุนทางสังคม แบบสอบถามความรอบรู้ทางด้านสุขภาพ แบบสอบถามการสื่อสารระหว่างบุคคล แบบสอบถามความเชื่อทางด้านสุขภาพ และแบบสอบถามความเชื่อมั่นในตนเองในการรับประทานยาอย่างต่อเนื่อง วิเคราะห์ข้อมูลด้วยสถิติบรรยาย สถิติสหสัมพันธ์ของเพียร์สัน และการวิเคราะห์ถดถอยพหุแบบเชิงชั้น

ผลการศึกษาพบว่า ความซับซ้อนของการรักษาด้วยยา การสื่อสารระหว่างผู้ป่วยและบุคลากรสุขภาพ ความเชื่อทางด้านสุขภาพ และความเชื่อมั่นในตนเอง สามารถร่วมกันอธิบายความแปรปรวนการรับประทานยาอย่างต่อเนื่องได้ 39.9% พยาบาลสามารถพัฒนารูปแบบการดูแลเพื่อให้เกิดการรับประทานยาอย่างต่อเนื่องโดยพัฒนาการสื่อสารระหว่างผู้ป่วยและบุคลากรสุขภาพ ให้คำแนะนำเพื่อให้ผู้ป่วยเข้าใจภาวะความดันโลหิตสูงและการใช้ยาอย่างชัดเจน และสนับสนุนให้ผู้ป่วยมีความมั่นใจในการรับประทานยา

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คำสำคัญ: การรับประทานยาอย่างต่อเนื่อง ผู้สูงอายุ ภาวะความดันโลหิตสูง เวียดนาม

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