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Medication adherence and associated factors among elderly hypertension patients with uncontrolled blood pressure in rural area, Northeast Thailand

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Abstract

Purpose – Hypertension is a common disease among elderly. Adherence to antihypertensive medication is a key predictor of optimal blood pressure control that prevents the risk of cardiovascular disease and potentially death. The purpose of this paper is to assess adherence to antihypertension and identify associated factors among the elderly in a rural area, Buengkan province, Thailand.

Design/methodology/approach – A health facilities based cross-sectional study was conducted in Buengkan district. A simple random sampling method was used to select 408 participants. A structured questionnaire adapted from the World Health Organization STEPwise approach was used to collect data. The medication adherence level was identified by pill count with percentage ⩾70 defined as good adherence. Descriptive and summary statistics were used. Bivariate analysis was done using Pearson's χ^2 test, and multivariable analyses were also carried out.

Findings – A total of 408 (143 males and 265 females) elderly hypertension patients with uncontrolled blood pressure participated in this study. Most of the participants were found to have lower adherence to medication treatment (86.8 percent), whereas the remaining ones (13.2 percent) were found to have good adherence. The multivariable logistic regression analysis showed that having a daughter as a care taker (adjust odd ratio = 7.99, 95% confidence interval: 1.23–51.778) was significantly associated with high medical adherence.

Originality/value – Hypertension medication adherence among elderly patients with uncontrolled blood pressure was poor. Having a care taker, especially a daughter, is a key to improve adherence. Effective strategy to improve adherence should focus on and involve family participation into the program.

Keywords Hypertension, Elderly, Medication adherence, Medication management

Paper type Research paper

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Introduction

Hypertension is a major public health problem and is responsible for millions of deaths worldwide. World Health Organization (WHO) reports that globally there are 10m adults who suffer from hypertension. In 2025, it is predicted that the estimation of hypertension patients will increase to 1.56bn[1].

Each year worldwide, 45 percent of deaths are due to heart disease and 51 percent of deaths due to stroke cause by hypertension. In the Southeast Asian countries, high blood pressure is the leading risk factor for death claiming 1.5m lives each year[2]. Moreover, hypertension is also a quiet sign of danger that causes death, as it commonly does not show signs and symptoms[1, 3]. In Thailand, the results of the 5th National Health Exam Survey in 2008–2009 showed the prevalence of hypertension in Thailand was 24.7 percent especially among elderly group, and the prevalence of conditions continued to increase with age[4, 5]. Research statistics reported that half (51 percent) of elderly persons have hypertension[4, 6], and almost 50 percent of people in this group have lower adherence to their medication treatment and have uncontrolled blood pressure[7, 8].The study shows that a year after being diagnosed and receiving the medication, almost half of them stopped taking antihypertension drugs due to the absence of signs and symptoms. Then after two years, the drug adherence in more than half of patients was decreased and some of them completely stopped taking medication[9, 10].

Uncontrolled blood pressure is commonly reported in elderly, and it is a risk factor of cardiovascular diseases and mortality among elderly[10–12]. Among Thai hypertension patients, more than 30 percent of them found blood pressure remains uncontrolled[13]. Studies showed that antihypertensive medication adherence had significantly positive association with blood pressure control. Antihypertensive medication is an important key to manage hypertension and assist in blood pressure control[14].

The pieces of evidence from many studies described numerous factors that affect adherence, including life style, psychological issues, health literacy, support systems and side effects of medications and social economy[15, 16]. In Thailand to better understand the reason of poor adherence might be a key to determine an appropriate strategy to improve medical adherence[17]. There is limited information on the level of medical adherence and factors associate with medical adherence among elderly in the study area. This study aims to assess antihypertensive medical adherence and identify associated factors among elderly with uncontrolled blood pressure hypertension in the rural area, northeast of Thailand. The findings from this study can provide value information for health care providers and health policy maker for designing an appropriate strategy to improve antihypertensive medical adherence.

Methodology

Study design and setting

A cross-sectional study was conducted in four health promoting hospitals in Buengkan District, Buengkan province, Northeast Thailand. The study was conducted during October–November 2017. In Buengkan Province, patients with chronic diseases were referred from the health promoting hospitals to district or provincial hospitals for diagnosis and for receiving the and then were referred back to the health promoting hospitals for follow up. Hypertension patients whose blood pressure was under control (systolic blood pressure < 140 mm of mercury and diastolic blood pressure < 90 mm of mercury) were appointed to meet health personnel every three months and those patients with uncontrolled blood pressure were appointed for follow up every month either at Buengkan hospital or health promoting hospitals located in Buengkan districts.

Sample size and sampling procedure

Participants in this study were hypertension patients between the age group of 60 and 79 years who had a history of uncontrolled blood pressure (systolic blood pressure ⩾140 mm.Hg. and/or diastolic blood pressure ⩾ 90 mm.Hg), continuously for three hospital visits. Participants were diagnosed with hypertension at least one year before the study was conducted. Participants were randomly selected to participate in this study.

A total of 984 patients with the history of uncontrolled blood pressure were screened from the database of the health promoting hospitals. The participants who met inclusion criteria were recruited, and these patients were hospitalized in the chronic diseases clinic during the period of October 2017–November 2017. The participants were recruited by face-to-face meeting at the out patient's chronic disease clinic when they visit hospital for follow up. The minimum sample size was calculated using the following formula:

$$n = z^2[p(1-p)]/d^2,$$

where n is the minimum sample size, z the standard normal variate for this study ($z = 1.96$), p the estimate of medication adherence of the patients in the study ($p = 0.5$) and d the sample error to be tolerated (5 percent). Predicted medication adherence of the patients was 50 percent, which were referred from the previous publication study concerning Thai elderly population[18].

We calculate a proportion with a 95 percent level of confidence and margin of error of 5 percent:

$$n = (1.96)^2/4(0.05)^2 = 384.16.$$

The minimum sample size required 384 participants adding another 10 percent for dropout or missing data. In total, 422 hypertension elderly patients selected by randomly sampling from a total of 984 patients who had the history of uncontrolled blood pressure were recruited in this study. In all, 14 participants dropped out in one month during the process of data collection. Remaining 408 participants completely participated in this study.

The inclusion criteria included hypertension patients who: were between 60 and 79 years old and diagnosed with hypertension at least one year before the study; who had the history of uncontrolled blood pressure (systolic blood pressure ⩾140 mm.Hg and diastolic blood pressure ⩾90 mm.Hg) continuously for three hospital visits in the last six months; who took at least one antihypertensive medicine; who managed their own medication; and who willing participated in this study. The exclusion criteria were hypertension patients: who cannot communicate due to physical or mental problems; who had diabetic and uncontrolled blood sugar (FBT ⩾ 130 mg% and BP $>$ 180/110 mm.Hg); and who had a severe health condition that could cause difficulty to participate in the study.

Data collection tools

A structured questionnaire was adapted from the WHO STEPwise approach for surveillance of non-communicable disease, sociodemographic characteristics, medication-related factors, behavior and life style factors and comorbidities.

Data collection

The patients' medical records from four health promoting hospitals (specific name primary health unity in Thailand), which coordinated with record in Buengkan hospital, were used to collect base sociodemographic factors, including blood pressure levels over the previous six months. Other clinical data, such as hypertensive medication, the experience of side effects,

blood pressure monitoring and medical adherence, were collected by three trained registered nurses, during October to November 2017.

A total of 408 patients participated in face-to-face interviews using questionnaire modified from the WHO STEPwise questionnaire. The interview lasted approximately from 10 to 15 min. The interview was conducted by three trained research assistants who had no relationship with patients. The researcher agreed on the follow-up dates with the health promoting hospital for the patients participating in the study, based on the patient's normal follow-up appointment every 30 days. The initial hypertension medications were given to participants in October 2017. After 30 days, participants returned to the health facilities for follow-up and were asked to bring their medication with them from the 30-day period. The pill count of medications consumed was performed and recorded in November 2017. Three research assistants performed the pill count and cross-checked with prior recordings the numbers of hypertension pills that were taken.

Blood pressure was measured using a manual sphygmomanometer and was measured two times in the sitting position and in a gap of two minutes from the same arm by three registered nurses who also checked and cross-checked the blood pressure measurements.

Total antihypertensive medication included all types of oral antihypertensive medication excluding all non-antihypertensive medications taken on a regular basis and prescribed by physicians. Antihypertensive medical adherence was measured by pill count[18]. In this study, we conducted pill count to identify the level of medical adherence, which has the advantage of minimizing recall bias[19].

Percentage of adherence is defined by counting the number of pills missing in a given time period (X) divided by the number of pills prescribed by the physician in that same time period[20]:

$$(\text{No. of pills missingin time } X / \text{No. of pills prescribed for time } X) \times 100.$$

For data analysis in this study, the level of pill count is categorized into two levels: higher adherence (pill count $\geqslant$ 70 percent) and lower adherence (pill count $\leqslant$ 69.9 percent); this cut point is based on studies and recommendation from WHO that the cut point for hypertension patients for adherence in hypertension treatment should be at least 70 percent[19–21].

Data analysis

Sociodemographic data including gender, education, marital status, occupation, living arrangement, care taker and medical characteristic data including co-morbidity, blood pressure, number of years being diagnosed of hypertension, number of medications taken and medical adherence were analyzed using descriptive statistics. Bivariate analysis was done to check which variables were associated with poor adherence. The multivariable logistic regression model was used for controlling possible effects of confounders. The variables that were significantly associated with lower adherence were identified based on the odds ratio with 95% confident interval and p-value < 0.05. Statistical analysis was performed using SPSS version 17 (SPSS Inc., Chicago, IL, USA).

Ethical consideration

This study was reviewed and approved by Chulalongkorn University Ethical Committee (141.1/60) and Buengkan Hospital ethical committee (BKHEC2018-01). The study protocol and objective of this study were explained to each participant, and participants in this study were voluntary. All participants provided written informed consent.

Results

Of initial 984 hypertension patients participating in this study, 576 were excluded for multiple reasons and remaining 408 patients were included. Participants mean age was

67.72 years (SD = 5.92). Of total participants, 265 were female (65 percent) and 143 were male (35 percent). The majority of participants (76 percent) were married, and most of them (88 percent) were working in agriculture (72.8 percent) and other fields (27.2 percent). All participants (100 percent) had health insurance from the Thai National Universal Coverage scheme and used it. Most participants' education was below the high school level (90.2 percent). In total, 384 (94.1) were living with family members and only 24 (5.9 percent) were living alone. In all, 404 (99 percent) had a care taker when sick, and only 4(1 percent) had no one taking care when they were sick. From the total of 408 participants, 70 (17.2 percent) had only hypertension, 212 (52 percent) had diabetes mellitus, 126 (30.9 percent) had cardiovascular disease and hypertension with chronic kidney disease (Table I).

Characteristic	Frequency (*n*)	Percentage
Gender		
Male	143	35
Female	265	65
Age (years)		
60–69	273	66.9
70–79	135	33.1
Mean = 67.72, SD = 5.30, min = 60, max = 79		
Education		
Primary school	368	90.2
High school and higher	40	9.8
Married status		
Single	3	0.7
Married	332	81.4
Divorced	67	16.4
Widowed	6	1.5
Occupation		
Agriculture	297	72.8
Other fields include not working	111	27.2
Living arrangement		
Live alone	24	5.9
Live with family	384	94.1
Care taker when sick		
No caretaker	4	1
Partner	193	47.3
Son	116	28.4
Daughter	85	20.8
Children in law	10	2.5
Co-morbidity		
Only hypertension	70	17.2
Diabetes mellitus	211	51.7
Cardiovascular disease	74	18.1
Chronic kidney disease	53	13
Health insurance		
Thai National Universal Coverage scheme for elderly	408	100

Table I. Sociodemographic characteristics of elderly with hypertension ($N = 408$), Buengkan Hospital and its connecting Health Promoting Hospital, 2017

Medical-related characteristic of participants

Among the participants, 224 (54.9 percent) were taking one or two medications per day, and 184 (45.1 percent) were taking more than two medications per day. In total, 266 (65.2 percent) participants were been taking hypertension medication from one to ten years, and 142 (34.8 percent) were taking hypertension medication for more than ten years. All participants had uncontrolled blood pressure (systolic ⩾140 mm.Hg. diastolic blood pressure ⩾90 mm.Hg). The mean systolic blood pressure was 155.64 mm.Hg (SD = 10.90) and diastolic blood pressure 90.02 mm.Hg (SD = 6.44).

Among all participants, most of them (86.8 percent) had low adherence to their hypertension medication and only 13.2 percent had high adherence. Mean medical adherence was 52.74 (SD = 16.03) (Table II).

Factors associated with medication adherence

The summary results from the multivariable binary logistic regression analysis showed that having a care taker, especially having a daughter as a care taker, was significantly associated with higher adherence among elderly in a rural area.

In this study, elderly patients who had a daughter as a care taker were approximately eight times more likely (adjust odd ratio (AOR) = 7.998, 95% confidence interval: 1.235–51.785) to adhere to their antihypertensive medication treatment compared to those patients who had no care taker (Table III).

Discussion

The primary objective of this study was to explore hypertension medication adherence and associated factors related to medical adherence among elderly hypertension patients in the rural area in northeast Thailand. Antihypertension adherence is associated with blood pressure control among hypertension patients. The results from our finding showed that adherence among the Thai elderly living in the rural area was unacceptably low. Only 13.2 percent of all participants were found to have higher adherence to their hypertension medication, whereas most elderly had lower adherence (86.8 percent) to their

Characteristic	Frequency	Percentage
Number of medications		
1–2 per day	224	54.9
> 2 per day	185	45.1
Mean = 2.89, SD = 1.57, min = 1, max = 22		
Number of years being diagnosed hypertension		
1–10 years	266	65.2
> 10 years	142	34.8
Mean = 9.34, SD = 4.23, min = 1, max = 21		
Percentage of medical adherence to antihypertension		
Higher adherence	54	13.2
Lower adherence	354	86.8
Mean = 52.74, SD = 16.03, min = 14.52, max = 100		
Blood pressure		
Blood pressureSystolic blood pressure (mmHg)		
Mean = 155.64, SD = 10.90, min = 140, max = 212		
Diastolic blood pressure (mmHg)		
Mean = 90.02, SD = 6.44, min = 65, max = 113		

Note: $n = 408$

Table II.
Medical characteristic of participants

Factors	Medical adherence level (%) Higher	Lower	COR (95% CI)	AOR (95% CI)	*p*-value
Gender					
Male	18.2	81.8	1	1	0.209
Female	10.6	89.4	1.75 (0.972–3.176)	1.49 (0.800–2.785)	
Care taker					
No care taker	25	75	1	1	1.60
Married partner	14.5	85.5	1.88 (0.186–19.106)	2.92 (0.656–12.998)	0.655
Son	16.4	83.6	1.56 (1.52–16.167)	1.43 (0.294–6.995)	0.029*
Daughter	3.6	96	7.859 (0.608–101.5569)	7.99 (1.235–51.78)	0.799
Child in law	30.0	70.0	0.65 (0.045–9.315)	1.44 (0.086–24.350)	
Number of medications					
1–2	9.8	90.2	1	1	0.155
⩾3	17.4	82.6	0.649 (0.331–1.273)	0.172 (0.816–3.589)	
Smoking					
Non-smoker	10.5	89.5	1	1	0.162
Smoker	20.4	79.6	0.595 (0.300–1.182)	0.171 (0.806–3.635)	

Notes: COR, Crude odds ratio; AOR, adjusted odd ratio; CI, confidence interval. *p-value < 0.05

Table III. Bivariate and multivariable logistic regression analyses of factors associated with good medical adherence among elderly hypertension patients with uncontrolled blood pressure

hypertension medication. The low adherence rate found in this study is in line with a study conducted in the Primary Care Unit of tertiary care hospital in Bangkok, Thailand that found hypertension medication adherence was low among Thai hypertension patients[22]. However, when results were compared with a study in Eastern Thailand, the studies were contradictory. The study was based on a questionnaire and relied on the memory of the patients. The adherence rate in our study was lower compared to other countries in Asia. A study showed in China an adherence rate of 35.23 percent[23], in India 39.4 percent[24] and in Vietnam 50 percent[25].

Adherence rates found in this study were much lower than that reported in developed countries. Previous studies show adherence rates of 51.3 percent in the USA, 56.3 percent in Germany and 58.4 percent in the UK[26, 27]. Cultural background and the belief that the medication provides tangible benefits in controlling high blood pressure and hypertension are possible factors to explain the difference in adherence levels[28, 29]. A study supported that the cultural backgrounds of Asians were more likely to perceive medicines as being harmful and they avoided continuous adherence to their drug regimen[30, 31]. The study results suggested policy makers or health care personnel should provide more attention to medical adherence among elderly in this part of country. Strategies to promote medical adherence among this group are urgently needed.

The studies conducted in Asia showed that there are several factors related to medical adherence among hypertension patients. Factors include age, gender, number of daily medications, alcohol consumption, smoking and knowledge of hypertension illness and treatments[32]. Our findings were contradictory to the aforementioned studies, in that age, gender, number of daily medications were not associated with having lower adherence by the elderly. This study showed that only the presence of a caretaker was the primary influencer of adherence to a patient's medication regimen. Our study found that patients who had a caretaker were more likely to adhere to their medication than those who had no care taker. Our findings are in line with studies which showed that patients who had a care taker are more likely to adhere to their medication than those who had no one taking care of them[33].

This study also pointed out a significant association between patients whose caretaker was a daughter. These patients were more likely to adhere to their antihypertensive drug treatment than those whose caretaker was not a daughter[1]. This is in line with the study conducted in Japan. A possible reason might be attributed to the nature of women as a caretaker. Women are more likely to carry out personal care tasks better than men, as women spend more time providing care[33].

Strengths and limitation

The strength of our study is that we used a pill count method to identify the level of adherence among the elderly patients which minimizes the bias of self-reporting of adherence. There are some limitations. First, all the patients are rural area residents. It cannot represent the total patients in the whole of northeast of Thailand. Second, having knowledge of the benefits of adhering to antihypertension medication was not included among factors to predict adherence in this study. Third, lifestyle-related factors with medicine adherence were seldom examined in this study. Larger studies covering wider areas and focusing more on the lifestyle or other risk factors should be carried out in future.

Conclusion

A large number of hypertension elderly patients were found to be poor adherent to medication treatment. Having a daughter as a care taker was significantly associated with good medical adherence. Encouraging family participation is crucial for increasing patient adherence to antihypertensive medication.

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