ORIGINAL ARTICLE

Prevalence and Factors Associated with Medication Non-Compliance among Patients with Hypertension in a Tertiary Hospital: A Cross-Sectional Study in Malaysia

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ABSTRACT

Introduction: Hypertension contributes to major cardiovascular morbidities and mortalities worldwide and medication compliance is crucial in achieving target blood pressure control. This study aimed to determine the prevalence and factors associated with non-compliance towards anti-hypertensive medication in Malaysia. **Methods:** This is a cross-sectional study among hypertensive patients who were attending the medical outpatient department, Hospital Serdang from March until May 2018. Systematic random sampling was used to recruit patients and a structured self-administered questionnaire was used to collect information. Non-compliance is defined as attaining a score of 26 and below from the Medication Compliance Scale. Data analysis was done using SPSS v. 23. Multiple logistic regression was used to determine the predictors of medication non-compliance among hypertensive patients. **Results:** A total of 120 respondents were recruited into this study with a response rate of 60.9%. Mean age of the study respondents was 60.82 ± 11.25 years old. They were predominantly female (60.8%), Malay (58.3%) and attained at least secondary educational level (75.0%). The prevalence of non-compliance towards anti-hypertensive medication was 25%. Multiple logistic regression showed that side effects of medication (OR=5.59; 95% CI=1.29-24.21, p=0.021), traditional medications usage (OR=19.19; 95% CI=3.90-94.45, p=<0.001), health advice counsellors (OR=35.31; 95% CI=2.03-35.31, p=0.003) and duration of hypertension (OR=3.38; 95% CI=1.05-10.91, p=0.042) were predictors of non-compliance to anti-hypertensive medications among hypertensive patients **Conclusion:** Our study reported that those with longer duration of hypertension, suffered from side effect of medication and have experience in usage of traditional medicine are the predictors of medication non-compliance.

Keywords: Hypertension, Compliance, Blood Pressure, Hospital, Malaysia, Prevalence

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INTRODUCTION

Hypertension was defined as persistent elevation of systolic blood pressure (BP) of 140 mmHg or greater and/or diastolic BP of 90 mmHg or greater (1). It is known to be the most common public health problem worldwide (2). In Malaysia, the latest National Health and Morbidity Survey (NHMS) done in 2015 has shown steady increase in the prevalence of hypertension in Malaysia for adults 18 years and above from 33.6% in 2011 to 35.3 in 2015% (3). Its capability of causing various morbidities such as coronary artery disease, stroke, renal failure and premature death has made hypertension to be the leading risk factor for global disease burden (4). As such, it is of pivotal importance to treat hypertension in order to reduce the risks of end-organ damage and complications.

To achieve reduction of morbidity and mortality of hypertension, compliance to antihypertensive medication is necessary in order to control blood pressure (5). Medication compliance is defined as the extent of a patient to follow recommendation from a health care provider in term of their medication-taking behavior (6). WHO had reported only around 50% compliance rate among developed countries and they are lower in developing countries which have poor health care services accessibility and medication availability (6). In Malaysia, studies on medication compliance are fairly limited. In few studies that had been identified, the compliance rate of hypertensive patients in Malaysia is not satisfying as few studies had demonstrated that the prevalence rate of non-compliance were pretty high,

ranging from 46.6% to 56% (5, 7, 8).

Patients' compliance to antihypertensive therapy has been known to influence blood pressure control (5). Poor compliance to medication can lead to serious mortality and morbidity and subsequently increasing the cost burden on health care of one country (9). Thus, it is important for physicians to look into medication non-compliance in order to work hand-in-hand with patients to ensure good blood pressure control (10). Therefore, this study is conducted to determine the prevalence of non-compliance of antihypertensive medication and its associated factors.

MATERIALS AND METHODS

Setting

This is a cross-sectional study of patients registered with the medical outpatient department, Hospital Serdang, Malaysia. The study was conducted over a 3-month period, which was from March until May 2018.

Selection of Participants

The inclusion criteria for the study are Malaysian, patients who were attending the medical outpatient department, Hospital Serdang during the period of data collection and patients who were on at least 1 type of antihypertensive medication. The exclusion criteria comprise of those who has mental health issues. The estimated sample size was 79 with 90 percent power, 95 percent confidence interval (CI), and statistical significant level (6) at 5 percent. The total number of respondents needed was 94, after taking into account a non-respondent rate of 20 percent. Systematic random sampling method was used to recruit respondents in this study. Those who fulfilled the inclusion criteria were taken as respondents in this study.

Ethical approval

Ethical approval were obtained from Ethics Committee for Research Involving Humans (JKEUPM), Universiti Putra Malaysia prior to the study and Medical Research & Ethics Committee (MREC), Ministry of Health Malaysia. A written permission was obtained from the director of the Hospital Serdang.

Data Collection

A self-administered questionnaire was used to obtain the data on compliance towards antihypertensive agents. This Medication Compliance Scale was validated by Ramli et al(5). The questionnaire is divided into two parts. The first part includes patients' sociodemographic characteristics and clinical status related factors. The second section is a total of 7 questions that form the Medication Compliance Scale with each question employing Likert-type response carrying scores ranging from 1 to 4. Total scores was added for each patient. The total score for each patient could range from 7 (minimum score) and 28 (maximum score).The respondents need to take approximately about 10 to 15 minutes to complete all the questions in the questionnaires. A written informed consent was taken before the process of data collection started. All information of the respondents remain confidential and is solely for research purpose. No information of respondents' identity was collected and each questionnaire was coded. The pre-test questionnaire was done at Hospital Serdang presented 10% from the sample size which is 20 respondents and the Cronbach's Alpha of this Medication Compliance Scale was 0.805, showing good internal reliability and consistency.

Practical Definition

Non-compliance is defined as attaining a score of 26 and below from the Medication Compliance Scale (5). Uncontrolled hypertension is defined as having blood pressure more than 140/90 mmHg in those hypertensive patients during measurement of blood pressure by the nurses upon registration in the medical outpatient department.

Operational Definition

The independent variables for this study are:

1. Sociodemographic characteristics which include age, gender, ethnicity, educational status, marital status, occupation and monthly income.
2. Medication related factors which include the length of time of hypertension, length of time on antihypertensive medications, number of antihypertensive medications prescribed, number of daily dose antihypertensive medications and usage of traditional medications.
3. Clinical factors which include counselling sessions and measurement of blood pressure.

In this study, health advice counsellors included medical doctors, pharmacists and registered nurses.

Data Analysis

For data analysis of the raw data this study, Statistical Package for Social Sciences (SPSS for window version 23.0) was used. Descriptive analysis was used to analyze the data distribution normality, frequencies, means and standard deviation. Chi-square test (or Fisher Exact Test) was used to determine the association between socio-demographic characteristics, medication related factors and clinical factors with non-compliance to anti-hypertensive medications among hypertensive patients at the medical outpatient department of a public hospital in Selangor with significance level of 0.05 ($p<0.05$). Multivariate logistic regression was used to identify the predictors of non-compliance of to anti-hypertensive medications. All variables with the p value < 0.25 in the univariate analysis as well as those clinically significant variables were entered into the multiple logistic regression.

RESULTS

A total of 120 respondents were recruited into this study with a response rate of 60.9%. Table I shows the sociodemographic characteristics of the study respondents. Our study mainly consists of elder age group with the mean age of the study respondents was 60.82 ± 11.25 years old. The respondents were predominantly female (60.8%), Malay (58.3%) and from secondary educational level (75.0%). 70.8% of the study respondents were unemployed and 75.0% of them were married.

Table I: Sociodemographic Characteristics of Study Respondents in Medical Outpatient Department, Hospital Serdang (n=120)

Characteristics	Frequency (n)	Percentage (%)
Mean Age (Years)	60.82 ± 11.25	
Gender		
Male	47	39.2
Female	73	60.8
Ethnicity		
Malay	70	58.3
Chinese	19	15.8
Indian	30	25
Others	1	0.8
Educational Status		
Primary	15	12.5
Secondary	90	75
High Education	10	8.3
No Formal Education	5	4.2
Marital Status		
Single	1	0.8
Married	85	70.8
Divorced	6	5
Widowed	28	23.3
Occupation		
Employed	30	25
Unemployed	90	75
Monthly Income (MYR)		
≤ 2050	60	50
> 2050	60	50

Table II showed the clinical status of the study respondents. 56.7% of the respondents had hypertension less than 10 years. Majority of them received treatment more than 5 years (81.7%). About three-fifth of the respondents had only one type of anti-hypertensive medication and had only one daily dose of medication (62.5% and 69.2% respectively). Only 10 of them suffered from side effects of antihypertensive medication. Out of these 10 respondents, 3 respondents had dizziness, 2 respondents had headache, another 2 respondents had nausea, and the remaining 3 respondents suffered from swollen legs, lethargy and drowsiness respectively.

Table II Clinical Status of the Study Respondents (n=120)

Characteristics	Frequency (n)	Percentage (%)
Duration of Hypertension		
≤ 10 years	68	56.7
≥ 11 years	52	43.3
Duration of Treatment		
< 5 years	22	18.3
≥ 5 years	98	81.7
Number of Medications		
1	75	62.5
2	38	31.7
≥ 3	7	5.8
Daily Dose Medications		
1	83	69.2
2	32	26.7
3	5	4.2
Side Effects of Medications		
Yes	10	8.3
No	110	91.7
Usage of Traditional Medication		
Yes	10	8.3
No	110	91.7
Health Counselling		
Doctor	109	90.8
Nurse	7	5.8
Pharmacist	4	3.3
Duration of counselling session		
< 5 minutes	34	28.3
≥ 5 minutes	86	71.7
Blood Pressure Reading		
BP controlled	30	25
BP uncontrolled	90	75

Exactly three-fifth of the respondents had their blood pressure uncontrolled. In our study, it was found that the prevalence of non-compliance in our study is 24.2% (n=29)

Table III shows the association between sociodemographic characteristics and non-compliance to anti-hypertensive medications among hypertensive patients. From our analysis, none of the sociodemographic characteristics have significant association with non-compliance to anti-hypertensive medications among hypertensive patients.

Table IV showed that duration of treatment, number of medication, daily dose of medication, side effects of medication traditional medications usage and health advice counsellors were significantly associated to compliance status.

Table V showed that side effects of medication, traditional

Table III: Association of Sociodemographic Characteristics with Non-Compliance to anti-hypertensive medications among Hypertensive Patients (n=120)

Factors	Compliance Status		p-value
	Compliance	Non-compliance	
	n (%)	n (%)	
Age			
<60	39 (42.9)	52 (57.1)	0.138
≥60	17 (58.6)	12 (41.4)	
Gender			
Male	36 (76.6)	11 (23.4)	0.88
Female	55 (75.3)	18 (24.7)	
Ethnicity			
Malay	51 (72.9)	19 (27.1)	0.37
Non-Malay	40 (37.9)	10 (12.1)	
Educational Status			
None/Primary	13 (65.0)	7 (35.0)	0.185
Secondary/Tertiary	78 (78.8)	23 (21.2)	
Marital Status			
Single	27 (77.1)	8 (22.9)	0.558
Married	63 (74.1)	22 (25.9)	
Occupation			
Employed	20 (66.7)	10 (33.3)	0.18
Unemployed	71 (78.9)	19 (21.8)	
Monthly Income (MYR)			
≤ 2050	44 (73.3)	16 (26.7)	0.52
> 2050	47 (78.3)	13 (21.7)	

Table IV: Association of Clinical Variables with Non-Compliance to anti-hypertensive medications among Hypertensive Patients (n=120)

Factors	Compliance Status		p-value
	Compliance	Non-compliance	
	n (%)	n (%)	
Duration of Hypertension			
≤ 10 years	48 (70.6)	20 (29.4)	0.125
≥ 11 years	43 (82.7)	9 (17.3)	
Duration of treatment			
< 5 years	13 (59.1)	9 (40.9)	0.042
≥ 5 years	78 (79.6)	20 (20.4)	
Number of medications			
1	63 (84.0)	12 (16.0)	0.011
≥2	28 (63.6)	18 (36.4)	
Daily dose medications			
1	68 (81.9)	15 (18.1)	0.033
>1	23 (76.5)	13 (23.5)	
Side effects of medications			
Yes	4 (40.0)	6 (60.0)	*0.013
No	87 (79.1)	23 (20.9)	
Traditional Medicine Usage			
Yes	3 (30.0)	7 (70.0)	*0.002
No	88 (80.0)	22 (20.0)	
Healthcare advice counsellors			
Medical practitioner	86 (78.9)	23 (21.1)	0.039
Non-medical practitioner	5 (50.0)	5 (50.0)	
Duration of counselling session			
< 5 minutes	23 (67.6)	11 (32.4)	0.188
≥ 5 minutes	68 (79.1)	18 (20.9)	
Blood Pressure Control			
Controlled	25 (83.3)	5 (16.7)	0.268
Uncontrolled	66 (73.3)	24 (26.7)	

*p-value was from Fisher's Exact Test (FET)
Significance level was measured at p<0.05

medications usage, health advice counsellors, duration of hypertension, were predictors of non-compliance to anti-hypertensive medications among hypertensive patients

DISCUSSION

In this study, the prevalence of non-compliance to anti-hypertensive medications found to be 24.2%. This is generally much lower than those studies from neighbouring countries, which are China, India, Pakistan, Korea and Hong Kong, which ranges from 24.9% up to 48.3% (9, 11, 12). However, this is still higher compared to United States which multiple studies had shown a very low non-compliance rate which ranges from 9.6% to 19.9% (13-15). However, our finding was surprisingly lower than a local study done in Malaysia which showed a non-compliance rate among hypertensive patients as high as 46.6% (5). This may be due to the fact that our study setting is in a tertiary health care hospital rather than primary care clinic which is more representative of the community population.

Another finding to be highlighted in this study is that having side effect of the medication was significantly associated with non-compliance to anti-hypertensive medications among hypertensive patients. This has been well-established in the literature (9, 16-18). Having side effects of the medications may cause discomforts to the patients as it will interfere with patients' activities of daily living and to a certain extent it may cause hospitalization (19). Medications such as thiazides-type diuretics, beta blockers and aldosterone antagonist have a well-established association with erectile dysfunction (20). Of greater concern is that studies had demonstrated that patients who have been attributing sexual dysfunction to antihypertensive medications are more likely to be non-adherent to the medication, ignoring the fact that controlling hypertension is one of the ways to reduce the risks of developing erectile dysfunction (21, 22). Excessive micturition due to diuretics was among the highest reported side

Table V: Multiple Logistic Regression of the associated factors of anti-Hypertensive Non-Compliance (n=120)

Variables	Adjusted OR	95% CI (Lower, upper)	P value
Side Effects of Medication		1.29-24.21	0.021
Yes	5.59		
No	1		
Traditional Medicine Usage		3.90-94.45	<0.001
Yes	19.19		
No	1		
Health Advice Counsellors		2.03-35.31	0.003
Medical Practitioner	1		
Non-Medical Practitioner	35.31		
Education level		0.88-10.10	0.078
Low	3.12		
High	1		
Duration of Hypertension		1.05-10.91	0.042
<11	3.38		
≥11	1		
Duration of Treatment		0.34-4.86	0.705
< 5 years	0.71		
≥ 5 years	1		
Number of Medication		0.74-5.78	0.164
1	1		
≥2	2.07		
Daily Dose of Medication		0.11-4.81	0.742
1	1		
>1	0.73		
Occupation		0.53-5.54	0.363
Employed	1.72		
Unemployed	1		
Duration of Counselling Session		0.51-4.30	0.471
< 5 minutes	1.48		
≥ 5 minutes	1		
Age		0.38-5.29	0.603
<60	1.42		
≥60	1		

OR= Odds ratio, CI=Confidence Interval

effects that hinder the compliance of antihypertensive medication among hypertensive patients as shown in a study done in Nigeria which accounts for the highest rate of medication discontinuation (23). Not to mention some other side effects such as coughing from angiotensin-converting enzymes inhibitors, dizziness from beta blockers, increased frequency of micturition due to calcium channel blocker may further contribute to patients' non-compliance towards anti-hypertensive medication as these are the common medication being prescribed and they are widely available (24). All of these sum up to the reason why some patients would rather not take the prescribed medications as they could not function normally. This explains why our results show that having side effects of medication serve as a predictor of medication non-compliance among hypertensive patients.

In parallel with Malaysia being a multiracial country which are rich of traditional medicinal culture, a rather interesting finding in this study is that despite few number of respondents to use traditional medicine to complement their anti-hypertensive regime, it was found that its usage was a strong predictive factor to medication non-compliance towards anti-hypertensive medications. This is further supported by a study in Nigeria where patients who took alternative medicine more likely to be non-compliance to medications compared to patients who did not (25). There are studies who had shown that most of the patients have preferred traditional medicine compared to conventional medicine because their perceived organic nature of traditional medicine, thus less side effects as perceived by this group of people (26, 27). Besides that, a study done among diabetic patients had demonstrated that they believed that complementary and alternative medicine were able to make them feel empowered in controlling the disease and its better value of money further consolidates their preference to complementary and alternative medicine rather than the conventional medicine (28).

Other than that, this study has demonstrated that hypertensive patients who have health advices received from non-medical practitioners is more likely to have medication non-compliance. However, despite having similar association, the finding was in line with a study from Zambia, where patients who were counselled by the nurse were more likely to be non-adherent (29). Nonetheless, this has shown that it is equally important for other health advices counsellor other than physicians to be specially trained in order to deliver health advices efficiently.

Despite not being conferred a significant association between education level and non-compliance to anti-hypertensive medications, it was found in our study that having lower education level serves as a predictor of medication non-compliance among hypertensive patients. This is similar to previous studies which had clearly demonstrated that high educational level was associated with greater knowledge to hypertension which led to better blood pressure control and medication compliance (30, 31). This shows the importance of health education among hypertensive patients to ensure medication compliance.

Again, logistic regression showed that those who had hypertension 10 years and below are more likely to develop medication non-compliance. This finding was supported by a study from Pakistan which clearly

demonstrated that non-compliance rate of anti-hypertensive medications was found to be higher among those whose hypertension were recently diagnosed compared to those who were not (9). This finding was also similar to a local study in which newly diagnosed hypertensive patients were usually less disciplined in medication compliance (5). This could be due to the fact that those recently diagnosed patients were more likely to have the assumption of their hypertensive status was mild and associated with less significant and disturbing symptoms or complication, which add up to frivolous attitude towards medication non-compliance among this group of patients (9).

The strengths of this study are since studies on investigating factors associated with medication non-compliance among hypertensive patients are limited, this study can serve as an addition to the literature for future studies usage. In addition, this study has not only identified socio-demographic factors, but also explored the medication and clinical-related factors to be associated with antihypertensive compliance, which is more comprehensive than other previous local studies, especially in the primary healthcare setting.

This study has some limitations. Firstly, we have no luxury to involve other health centers into our study due to time constraint. Our sample size is quite small, this may not represent the whole population of Malaysia. Future similar studies should consider multiple health centers with a higher sample size. Besides that, we are unable to identify the temporal association of non-compliance to anti-hypertensive medication as this is a cross sectional study.

Recommendation derived from this study includes to conduct health education regarding the importance of compliance to antihypertensive medications in order to help hypertensive patients to achieve the goal of treatment. Doctors and the hypertensive patients need to work together to identify reasonable and realistic measures and use a holistic approach to help the patients to comply to their antihypertensive medications. The communication technique during counselling sessions need to be improved by providing the appropriate training to the health advice counsellors. Lastly, support from the hypertensive patient's family is of utmost importance as it promotes compliance by encouraging optimism and self-esteem.

CONCLUSION

Our study reported a low prevalence of non-compliance of antihypertensive medication. Side effects of medication, traditional medicine usage and health advice counsellors given by non-health care providers and those with hypertension less than 11 years are significantly associated with noncompliance of antihypertensive medication.

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