Discordance between medication adherence and blood pressure control in primary care clinics in Negeri Sembilan, Malaysia: The problem of therapeutic inertia

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Introduction: Poor adherence to anti-hypertensive agents may be a major contributor for suboptimal blood pressure control among patients with hypertension. This study was conducted to assess the adherence to antihypertensive agents using Morisky Medication Adherence Scale (MMAS-8) among primary care patients, and to determine whether the blood pressure control is associated with the level of adherence.

Methodolgy: This cross-sectional study was conducted between June 2011 and August 2011. Adults with hypertension older or equal to aged 30 with or without diabetes were recruited from two public primary care clinics in Negeri Sembilan, Malaysia. Medication adherence was assessed using MMAS-8.

Results: Data from 231 patients were analysed, whereby 68% of them had good medication adherence but only 38.1% of the patients had their blood pressure under control. Statistical analysis failed to find correlation between adherence and blood pressure control. Twenty per cent of hypertensive subjects were on beta-blocker alone, and 37.1% of patients with either diabetes or proteinuria were not prescribed either angiotensin-converting enzyme inhibitors (ACEI) or angiotensin receptor blocker (ARB). Above half the patients (51.5%) were on monotherapy.

Conclusion: Discordance between adherence to anti-hypertensive agents and hypertension control is clearly shown in this study, and the likely explanation for the discordance is therapeutic inertia.

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Introduction

Hypertension is a common co-morbidity amongst Malaysians and it has been on the rise. Among adults aged 30 years and above, the prevalence of hypertension has increased from 32.9% in 1996 to 40.5% in 2004.[1] Although the methodology used in this national survey may overestimate the true prevalence of hypertension[2], the rise of the disease is evident. Poorly controlled hypertension is a known major risk factor causing cardiovascular diseases like coronary heart disease, stroke, and congestive heart failure. Therefore, treating hypertension successfully is crucial in preventing, as well as curbing the rising health care costs associated with its complications. Unfortunately, among hypertensive patients who were on anti-hypertensive agents, only 26.8% had their hypertension controlled.[1] The failure of treatment has been largely attributed to non-adherence.[3-6]

Some authors defined adherence as "the extent to which a patient's behaviour (in terms of taking medications, following a diet, modifying habits or attending clinics) coincides with medical or health advice".[7-8] On the other hand, non-adherence is used in regard to a patient not taking a prescribed medication or following a prescribed course of therapy and constant negligence rather than just temporary forgetfulness or neglect of treatment. Patients who take 80% or more of their prescribed antihypertensive medications are considered adherent as it requires this amount of medication to produce a systemic reduction of blood pressure.[7]

Medication non-adherence is a serious and challenging issue concerning many healthcare providers. However, despite considerable effort to improve patient adherence, this continues to be a significant problem. It would be a waste of healthcare resources when medications are not taken appropriately or incorrectly. Furthermore, being non-adherent may impair patient's quality of life and make the condition more difficult to treat. It may even lead to further complications such as cardiovascular and renal diseases, and pose a financial strain to health management as well.

Medication adherence can be measured by chemical markers, surrogate reports, pill counting, electronic

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medication event monitoring system, patient self-report and prescription refill. Self-report measures of adherence have generally fared well in adherence measurement when comparing to other methods.[9] Eight-item- Morisky Medication Adherence Scale (MMAS-8) was developed in 2008. This scale has a reliability of 0.83 as well as good concurrent and predictive validity.[10] MMAS-8 has been widely used to assess medication adherence in other countries for different diseases. Malay version of MMAS-8 was validated by Al-Qazaz et al in their type 2 diabetes mellitus study.[11] The present study was conducted to assess the adherence to antihypertensive agents using MMAS-8 among primary care patients, and to determine whether the blood pressure control is associated with the level of adherence.

Methodology

This cross-sectional study received Ethics approval from International Medical University (IMU) Ethics Committee prior to data collection. Written informed consents were also obtained for all patients participating in this study.

Hypertensive adults were recruited by convenient sampling from the non-communicable disease clinics of two public primary care centres in Negeri Sembilan, Malaysia. Data was collected from the subjects between June 2011 and August 2011. The subjects were eligible if they have been followed up for at least a year at the clinics. All subjects were at least 30 years of age and had been prescribed with one or more antihypertensive medications.

The subjects were interviewed face-to-face prior to their consultation with their doctors using structured questionnaires. Patient compliance to antihypertensive drug therapy was assessed using the MMAS-8 (where appropriate using the English, Malay and Mandarin versions). The most recent three blood pressure readings of the subjects were extracted from their clinic records to explore the extent of blood pressure control.

SPSS version 19.0 was used for statistical analysis. Where appropriate we recorded continuous variable into categorical variables. MMAS-8 score, categorized as poor adherence (score <6) and good adherence (score ≥6)[7], was the dependent variable. Level of blood pressure control was based on Malaysian Clinical Practice Guidelines for the Management of Hypertension (2008) (i.e. good control was BP <140/90 for non-diabetic, and BP <130/80 for diabetic patients).[12] We compared independent and dependent variables using chi-square test. Independent variables that were associated with MMAS-8 score were entered into a logistic regression model. We determine linear relationship of three blood pressure readings using Pearson correlation. Statistical significance was set at $p<0.05$.

Results

Response rate

Of the 244 patients approached for this study, 12 patients refused to participate giving a response rate of 95.1%. One respondent did not complete the MMAS-8 and was excluded from the analysis. Total number of respondents available for analysis is 231.

Socio-demographic and lifestyle data

Table I shows the characteristics 231 study subjects, 98 of them also suffered from diabetes. Their mean age was 59 years (SD=10, age range 33 – 90 years). Smoking was reported by 28 subjects (12.1%), use of alternative medicine for blood pressure control by 34 subjects (19.7%), daily vegetable intake by 201 subjects (87.0%), daily fruit intake by 114 (49.4%), and 67 subject (29.0%) reported using home blood pressure monitor.

Table I: Socio-demographic correlates of good adherence

Characteristics	Number (%)	Good adherence	P value	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Gender					
Male	100 (43.3)	62.0%	0.090		
Female	131 (56.7)	72.5%			
Age Groups					
<60	119 (51.5)	58.8%	0.002	2.44 (1.37 to 4.33)	2.20 (1.19 to 4.09)
≥60	112 (48.5)	77.7%			
Ethnicity					
Malay	96 (41.6)	67.7%	0.655		
Chinese	64 (27.7)	65.6%			
Indian	68 (29.4)	69.1%			
Others	3 (1.3)	100%			
Education Level					
Secondary or more	109 (47.2)	59.0%	0.002	2.46 (1.38 to 4.39)	2.40 (1.32 to 4.39)
Primary or less	122 (52.8)	78.0%			
Employment Status					
Employed	72 (31.2)	54.2%	0.002	2.44 (1.36 to 4.37)	1.73 (0.92 to 3.25)
Unemployed / Retired	159 (68.8)	74.2%			

Blood pressure control, medication adherence and associated factors

The blood pressure (BP) of subjects, for both hypertension alone and hypertension with diabetes, is shown in Table II. Systolic blood pressure readings over the last three visits showed some correlation (r=0.31 to 0.40, p<0.05). Diastolic blood pressure readings over the last three visits showed moderate correlation (r=0.47 to 0.51, p<0.05). Slightly more than half of the patients with hypertension without diabetes achieved good blood pressure control (BP <140/90), while only 15% of subjects with hypertension and diabetes achieved good blood pressure control (BP <130/80). Overall, 38.1% of all hypertension subjects achieved good blood pressure control (Table III).

Patients' MMAS-8 scores ranged from 1-8 (median=6.75); 74 subjects (32.0%) had poor adherence, and 157 subjects (68%) had good adherence.

As shown in Table I, elderly subjects (aged ≥60), those with lower educational level (primary or less) and subjects who were unemployed or retired were shown to have better medication adherence in univariate analysis. In the logistic regression, only elderly and those with lower educational level were independently associated with good adherence.

We found that good blood pressure control was not associated with good adherence (Table III). We found also that only half of all study subjects received two or more antihypertensive agents. Blood pressure control and medication adherence were not associated with lifestyle

(smoking, daily fruit intake, daily vegetable intake), usage of home blood pressure monitor and consumption of alternative medicine (analysis not shown).

With regards to antihypertensive drug choices, we found that 20% of hypertensive subjects on monotherapy were prescribed beta-blocker alone. We also found that 37.8% of subjects with hypertension and diabetes were taking beta-blocker. Furthermore, 37.1% of hypertensive subjects who also have diabetes or proteinuria were not prescribed angiotensin-converting enzyme inhibitors or angiotensin receptor blocker.

Table II: Mean blood pressure level and prevalence of good blood pressure control

	Hypertension without diabetes	Hypertension with diabetes
Systolic blood pressure, mean in mm Hg (SD)	137 (17)	139 (16)
Diastolic blood pressure, mean in mm Hg (SD)	79 (10)	78 (9)
Good blood pressure control	73 (54.9%)	15 (15.3%)

Table III: Clinical factors and association with good adherence (n=231)

Characteristics	Number (%)	Good adherence (%)	P value
Blood pressure controlled			
Yes	88 (38.1)	64.8%	0.415
No	143 (61.9)	69.9%	
Number of medication			
1 only	119 (51.5)	66.0%	0.576
≥2	112 (48.5)	69.5%	

Discussion

In our study, two thirds (157/ 231) of the patients had good adherence rate, which is consistent with the studies conducted by Morisky *et al*[10] and Lee *et al.*[13] However, a study conducted by Ramli et al in Selangor, using self-developed questionnaire recorded 53.4% of good adherence rate.[14] The difference in adherence rates between the two studies may be due to the different questionnaires used or locality. The adherence rate could also vary with different setting, locality or methods used. Using pill count method, Lim *et al*[6] and Aziz *et al*[3] recorded good adherence rate of 74% and 44% respectively. Nonetheless, a self-reported measure of adherence is more reliable compared with other methods.[9]

It is commonly believed that elderly and less educated patients are less compliant to medications; however, our study has shown the reverse that elderly and those with lower educational level were independently associated with of good adherence. It is thought that as a person's age advances, one would be more careful or concerned about their health status. A study done by Weingarten et al showed that age is an important factor in determining adherence, whereby they noted patients under the age of 55 years or over 65 years had significantly lower adherence than those aged 55 – 64 years.[15] Since the mean age of our patients is 59, this could partially explain the high adherence rate seen in our study.

Another variable which could have contributed to the adherence rate is the level of education the study subjects has achieved. The results of our study show that those who have an education background up to primary school level have the highest percentage (53.8%) of adherence levels. This finding is consistent with the finding of Larsen *et al*, that those with a shorter duration of education (duration of 0 to 6 years, which is equivalent to the number of years to complete primary education level in Malaysia) recorded a significantly high adherence level.[16]

One would expect that high adherence rate should be accompanied by high percentage of blood pressure control among patients. However, our study did not show an association between the level of adherence and blood pressure control. In fact, in two thirds of patients with good adherence rate, only 38.1% of hypertensive patients with or without diabetes had their blood pressure under control. This finding is in contrast to previous studies.[10, 13] The lack of association between level of adherence and blood pressure control in our study could be secondary to therapeutic inertia. Therapeutic inertia, also known as clinical inertia, is defined as "failure of health care providers to initiate or intensify therapy when indicated".[17] This phenomenon is estimated to be present in more than two thirds of population with uncontrolled hypertension.[18] In the present study, we found that 20% of hypertensive subjects were on beta-blockers alone, and 37.1% of the patients with either diabetes or proteinuria were not prescribed either angiotensin-converting enzyme inhibitors (ACEI) or angiotensin receptor blockers (ARB). These findings reflect poor adherence of physicians to guidelines and problem of therapeutic inertia. The poor adherence of physicians to guidelines is most likely due to the lack of education, training, and practice organization aimed at achieving therapeutic goal.[17] The other reason contributing to therapeutic inertia is that physicians fail to intensify antihypertensive treatment when targets are not achieved, as many feel that a clear improvement in BP without reaching the goal is acceptable and that the full drug effect may take up to several weeks to be reached.[19]

As subjects were recruited during their doctor visits, only those who came in for visits could be selected. Patients who defaulted on their follow-ups are likely to be non-compliant to medical advice and treatment plan. This group of patients was not included in the study. Such selection bias may falsely increase the percentage of patients with good adherence.

Discordance between adherence to anti-hypertensive and hypertension control is clearly shown in this study, and the likely explanation for the discordance is therapeutic inertia. As shown in many studies, therapeutic inertia is a major factor that hinders the control of hypertension; therefore more studies need to be conducted locally to explore ways to overcome this problem.

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