

COMPLIANCE TO ANTIHYPERTENSIVE THERAPIES AMONG OUTPATIENTS IN A HYPERTENSION CLINIC

Chua SS¹, YK Lee¹, CT Chua² and Abdullah MS¹

¹Department of Pharmacy, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia

²University of Malaya Medical Centre, 59100 Kuala Lumpur, Malaysia

ABSTRACT: Many studies have shown that failure in the control of hypertension with oral antihypertensives could be associated with noncompliance. The present study was conducted to assess the compliance rate to antihypertensive therapies and also to determine factors related to any noncompliance. The study was conducted in a teaching hospital in Kuala Lumpur. Data was collected from patients' medical records and via personal interview using a structured questionnaire.

Out of a total of 175 respondents recruited in the study, 49.1% missed at least a dose of their antihypertensive agents during a one-month period. The most common reason given by respondents who were not compliant to their antihypertensive therapies was forgetfulness (91.8%), followed by too busy (20.0%) and insufficient medication supplied to them (18.8%). None of the factors analysed, including the demography of the respondents, their knowledge about hypertension and the types of antihypertensive therapies they were on, had any statistically significant influence on the compliance behaviour of the respondents to their antihypertensive therapies. However, more than 80% of the respondents kept their appointment to see their doctor and only this factor appeared to be related to the medication compliance behaviour although it still did not reach any statistical significance. (*JUMMEC 2002; 2:100-106*)

KEYWORDS: Compliance, antihypertensive agent, blood pressure, knowledge

Introduction

Hypertension is an important risk factor for cardiovascular and cerebrovascular disease (1-3). Therefore, the attainment of target blood pressure is an important health objective. However, the Joint National Committee (4) reported that blood pressure is inadequately controlled in a large population of hypertensive patients on medical treatment. Failure to achieve the therapeutic goal may be attributed to various factors such as behavioural factors that are related to the way patients complied with the prescribed regimen; biologic factors that are related to the disease and its intersubject and intrasubject variability; pharmacologic factors that are related to the pharmacokinetic and pharmacodynamic differences of the regimen and, combinations of the factors mentioned (5). In the past, many clinicians tend to focus on biologic and pharmacologic factors as the causes of antihypertensive treatment failures (6). Non-compliance to antihypertensive therapies has also been associated with uncontrolled hypertension (6-11).

Noncompliance rate to antihypertensive therapies has been reported to be between 40 and 60% (10, 12-18). The most common form of noncompliance was

underuse (81%), followed by overuse (17%) and misuse (2%). Additionally, 54% of all noncompliance was reported as being intentional, and 46% as being unintentional (19).

The most commonly stated cause of noncompliance among patients was forgetfulness, followed by unpleasant side effects and that the medication being perceived as unnecessary (8). In some patients, noncompliance is attributed to unclear or inadequate instructions, cost of treatment, dislike of taking medications, feelings of futility, feeling well without therapy and the misconception that they were cured or that they should not take their medications if they were seeing their doctor (8, 20, 21). Patients who were aware that well-controlled hypertension could prolong life expectancy tend to be more compliant to their antihypertensive therapies than patient without such knowledge (12, 22, 23).

Complex dosage regimen seemed to reduce the compliance of patients to their medications (12, 15, 24, 25).

Correspondence:

Chua Siew Siang
Department of Pharmacy, Faculty of Medicine
University of Malaya
e-mail: chua_ss@hotmail.com

Therefore, most drug formulations now are focused on the pursuit of once-daily dosing (5). Positive and negative correlation had been shown between treatment compliance and demographic variables such as age of the patients (7, 26, 27). Generally, women are more compliant than men (28). Compliance with therapy is lower in black than in white patients, particularly in young black men (7). Support from spouse, family members or social support has a positive impact on medication compliance (29). Practitioner-patient interaction may affect the manner in which information is communicated to the patient and consequently may also affect medication compliance (30). The patient's health beliefs and level of satisfaction with the consultation could also determine the patient's compliant behaviour to medication.

Apart from medications, compliance with appointments is essential. Approximately 50% of hypertensive patients in the United States failed to keep follow-up appointments (10). High patient dropout rates caused inconvenience to providers and also led to unnecessary morbidity (31). Nonattendance may also be associated with patient's noncompliance to drug therapy (32).

Noncompliance can also lead to unnecessary overprescription of drugs or unnecessary changes from one medication to another due to treatment failure (18). It can also reduce the cost-effectiveness of treatment. Cost effectiveness may include the costs of medication, office visits, laboratory tests and other treatment costs. Additionally, an improvement in medication compliance among hypertensive patients may help to prevent avoidable hospitalisation, length of stay, increased rate of coronary events and resulting health care expenditure (33).

Therefore, the aim of this study is to assess the compliance rate to antihypertensive therapies and also to determine factors related to any noncompliance.

Method

Current methods for assessing treatment compliance could be classified as direct and indirect measures (5). Direct measures are those using biologic markers, tracer compounds, and biologic assay of body fluids. Indirect measures include self-reporting, analysing the therapeutic outcome, using pill count, change in the weight of metered-dose inhaler canisters, medication-refill rate, and computerized compliance monitors. In the present study, self-reporting via personal interview using a structured questionnaire was chosen as this method of assessing treatment compliance is simple and has been found to be fairly reliable in several other studies (13, 30, 34).

Data was collected from the patient's medical records followed by a personal interview using a structured questionnaire. The questionnaire was developed based on the literature review and a pilot study. Patients were

recruited while attending the hypertension clinic at a teaching hospital in Kuala Lumpur every Wednesday morning, between the periods of June 1998 to November 1998. Inclusion criteria in this study were patients who have been diagnosed as having hypertension and have been on antihypertensive agents. Whereas, patients who were newly diagnosed as hypertensives or were not on any antihypertensive agent or have incomplete medical records or refused to participate or had already participated in the pilot study were excluded from the study.

The Queue Management System was utilised in this clinic. The medical records of the patients registered at the clinic were arranged in one of the clinician's room, according to the order of queue number given to the patients during registration. Patients were selected based on the sequence of the medical folders such that the study would not disrupt the operation of the clinic, while adequate randomisation was attained.

The researcher checked the patient's medical record to obtain the required information. After that the selected patient was called to a room to be interviewed. The researcher explained the objective, procedure and the significance of the study to the patient. The patient's consent was obtained before the commencement of the interview. Approval from the Ethical Committee of the teaching hospital was also obtained.

Data collected was analysed using the Statistical Package for Social Sciences (SPSS 9.05 for Windows). χ^2 tests were used to test the differences between categories and a P value < 0.05 was considered as statistically significant.

Results

Sample Characteristics

A total of 175 respondents were interviewed in this study. The demographic data of the respondents is as shown in Table 1. The age of the respondents ranged from 23 to 82 with a mean of 55.5. Almost two-thirds of the respondents (63.4%) were unemployed, including pensioners and housewives. This explains the 41.1% of the respondents with no income.

Blood Pressure of Respondents

At the time of interview, it was found that only 16.9% of the respondents had their blood pressure under control, SBP less than 140 mm Hg and DBP less than 90 mm Hg (Table 2). SBP of the respondents ranged from 110 to 220 mmHg with a mean of 150.5 mmHg while the DBP ranged from 70 to 140 mmHg with a mean of 91.2 mmHg. Almost half of the respondents (36 out of 71) classified under Stage I hypertension had either SBP = 140 mmHg or DBP = 90 mmHg.

Antihypertensive Agents

Respondents were taking an average of two types of antihypertensive agents with 25.7% on one type, 51.4% on two types, 18.9% on three types, 3.4% on four types and one respondent was on six types of antihypertensive agents. Types of antihypertensive agents taken by the respondents were classified into 5 main groups as shown in Table 3. The most common combination of antihypertensive agents was a beta-adrenergic blocker with a calcium channel blocker (42 respondents). This involved mainly propranolol or atenolol with nifedipine. Nifedipine was the most commonly prescribed antihypertensive agent in this study (84 respondents), followed by propranolol, atenolol or hydrochlorothiazide (54 respondents each).

Medication Compliance

Slightly more than half of the respondents (50.9%) claimed that they had never missed a dose of their antihypertensive agents during the one-month period prior to the interview. Of the 49.1% who missed at least one dose of their antihypertensive agents, 58.3% missed one or two doses, 28.6% missed between 3 to 5 doses, 8.3% between 6 to 10 doses and 4.8% missed more than 10 doses in the one-month period prior to the interview. This gives a mean of 1.9 doses per respondent per month. One respondent admitted deliberately missing one dose everyday to reduce the dosage regimen from three to twice daily. Another respondent claimed that he was taking only a quarter of the prescribed drugs while two other respondents admitted that they did not take any of their medications. Defining compliance

Table 1. Demographic Data of Respondents

Demographic Data	Total Number Freq. (%; n = 175)	Compliant to Medication Freq. (%)	Non-Compliant to Medications Freq. (%)	χ^2	P values
Age:					
< 40	14 (8.0)	5 (35.7)	9 (64.3)		
40 – 59	36 (20.6)	21 (58.3)	15 (41.7)		
50 – 59	64 (36.6)	30 (46.9)	34 (53.1)		
60 – 69	40 (22.8)	18 (45.0)	22 (55.0)		
≥ 70	21 (12.0)	15 (71.4)	6 (28.6)	6.601	0.159
Gender:					
Male	91 (52.0)	50 (54.9)	41 (45.1)		
Female	84 (48.0)	39 (46.4)	45 (53.6)	1.268	0.26
Race:					
Malay	43 (24.6)	20 (46.5)	23 (53.5)		
Chinese	97 (55.4)	48 (49.5)	49 (50.5)		
Indian	34 (19.4)	21 (61.8)	13 (38.2)	2.011	0.366
Others	1 (0.6)	*	*		
Marital Status:					
Single	8 (4.6)	5 (62.5)	3 (37.5)		
Married	167 (95.4)	84 (50.3)	83 (49.7)	0.455	0.5
Employment Status:					
Unemployed	111 (63.4)	56 (50.5)	55 (49.5)		
Employed	64 (36.6)	33 (51.6)	31 (48.4)	0.02	0.887
Education Level:					
None	16 (9.2)	9 (56.3)	7 (43.8)		
Primary	52 (29.7)	22 (42.3)	30 (57.7)		
Secondary	79 (45.1)	41 (51.9)	38 (48.1)		
Tertiary	28 (16.0)	17 (60.7)	11 (39.3)	2.83	0.419
Monthly Income:					
None	72 (41.2)	33 (45.8)	39 (54.2)		
≤ RM 1000	48 (27.4)	25 (52.1)	23 (47.9)		
RM1001–3000	45 (25.7)	25 (55.6)	20 (44.4)		
≥ RM3000	10 (5.7)	6 (60)	4 (40)	1.488	0.685

* Not included in the computation of χ^2 and P values

Table 2. Classification of the Respondents' Blood Pressure Levels (mmHg)*

Category	Systolic	Diastolic	Frequency (n=171) %	
Normal	<130	<85	10	5.8
High normal	130-139	85-89	19	11.1
Hypertension				
Stage 1 (mild)	140-159	90-99	71	41.5
Stage 2 (moderate)	160-179	100-109	42	24.6
Stage 3 (severe)	180-209	110-119	22	12.9
Stage 4 (very severe)	>210	>120	7	4.1

*According to the classification recommended by the Fifth Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (4).

to antihypertensive therapy as taking more than 95% of the prescribed doses, the compliance rate in this study is 78.6% since 37 respondents did not take 5% or more of their antihypertensive agents.

Among respondents who did not comply to their antihypertensive treatment, the most common reason given was forgetfulness (91.8%), followed by too busy (20.0%) or have run out of medication (18.8%). Eleven respondents said that they had no more medications because of insufficient supply from the hospital while 4 other respondents reported that the hospital had no stock of the medication. Two respondents did not comply due to the occurrence of side effects and two others did not understand the instructions given for taking the medications. Other reasons for noncompliance include an assumption of a normal BP (1 respondent), fear of taking medication (1 respondent) while one respondent said that the medications were too costly. One respondent switched to herbal treatment while another thought that taking medications was not helpful.

Factors Associated with Noncompliance

Demographic data of the respondents were analysed for possible factors associated with noncompliance to the antihypertensive therapies. Statistical significance was tested using Pearson's χ^2 at $P < 0.05$. It was found that none of the characteristics of the respondents was significantly related to the noncompliance behaviour. These include the respondents' age, gender, race, marital status, education level, employment status and the respondent's monthly income (Table 1).

The types of antihypertensive therapy were also compared but none of the factors were significantly related to the noncompliance behaviour. These include the num-

Table 3. Types of antihypertensive agents used

Antihypertensives	Total	
	Freq.	% (n=175)
Diuretics:		
Yes	55	31.4
No	120	68.6
Beta-Blockers:		
Yes	111	63.4
No	64	36.6
ACE Inhibitors:		
Yes	61	34.9
No	114	65.1
Calcium Channel		
Yes	102	58.3
No	73	41.7
Alpha-Blockers:		
Yes	19	10.9
No	156	89.1

ber of antihypertensive agents ($\chi^2 = 2.977$, $P = 0.395$) and the daily dosage regimen of antihypertensive agents ($\chi^2 = 0.449$, $P = 0.799$). The total number of prescription drugs the respondent was taking also did not affect the medication compliance ($\chi^2 = 0.987$, $P = 0.804$).

The respondents' knowledge on hypertension or their medications did not affect their medication compliance significantly (Table 4). Additionally, whether the respondents reported any side effects that may be associated with their antihypertensive agents or how the respondents felt after taking their antihypertensive agents were not significantly related to whether the respondent were compliant to his/her antihypertensive therapy (Table 4).

The only factor that may be related to the respondents' medication compliance behaviour appeared to be their compliance to keeping their appointment to see the doctors. However, this difference also did not reach as any statistically significant level (Table 4).

Discussion

Most of the respondents in this study were more than 40 years old (92.0%). This is as expected since hypertension is a chronic problem that is more predominant among the older generation. The study results also showed that only 16.9% of the respondents had their blood pressure under control although these respondents were on antihypertensive agents. This indicates a need for more aggressive treatment of hypertension. Most of the respondents were on more than one antihypertensive agent (73.7%) with two agents being the most common (51.4%). These results are comparable to that reported by Enlund and colleagues (13).

It was found that 49.1% of the respondents had missed at least a dose of their antihypertensive agent during a

Table 4. Factors that may be associated with medication noncompliance

Variables	Total Freq. (%)	Compliant to medication Freq. (%)	Noncompliant to medication Freq. (%)	χ^2	P-value
Knowledge of hypertension:					
Yes	28 (16.0)	15 (53.6)	13 (46.4)		
No	147 (84.0)	74 (50.3)	73 (49.7)	0.098	0.754
Knowledge of own BP:					
Do not know	83 (47.4)	41 (49.4)	42 (50.6)		
Correct BP	14 (8.0)	7 (50.0)	7 (50.0)		
Wrong BP	36 (20.6)	22 (61.1)	14 (38.9)		
Not told	42 (24.0)	19 (45.2)	23 (54.8)	2.12	0.548
Perception of own BP:					
Normal	108 (61.7)	56 (51.9)	52 (48.1)		
Not normal	60 (34.3)	29 (48.3)	31 (51.7)		
Do not know	7 (4.0)	4 (57.1)	3 (42.9)	0.306	0.858
Hypertension leads to complications:					
Yes	149 (85.1)	79 (53.0)	70 (47.0)		
No	14 (8.0)	7 (50.0)	7 (50.0)		
Do not know	12 (6.9)	3 (25)	9 (75.0)	3.493	0.174
Hypertension can be cured/controlled:					
Controlled	132 (75.4)	69 (52.3)	63 (47.7)		
Do not know	43 (24.6)	20 (46.5)	23 (53.5)	0.431	0.512
Drug to be taken long term:					
Yes	175 (100)	91 (52.0)	84 (48.0)		
No	0 (0)			-	-
Knowledge on drug indication:					
Yes	166 (94.9)	84 (50.6)	82 (49.4)		
No	9 (5.1)	5 (55.6)	4 (44.4)	0.084	0.772
Knew the name of drug used:					
Yes	44 (25.1)	22 (50.0)	22 (50.0)		
No	131 (74.9)	67 (51.1)	64 (48.9)	0.017	0.895
Ability to recognise drug used:					
Yes	134 (76.6)	67 (50.0)	67 (50.0)		
No	41 (23.4)	22 (53.7)	19 (46.3)	0.168	0.682
Sense of well being after taking medications:					
Better	69 (39.4)	34 (49.3)	35 (50.7)		
Worse	6 (3.4)	2 (33.3)	4 (66.7)		
No difference	100 (57.2)	53 (53.0)	47 (47.0)	0.99	0.61
Compliant to appointment:					
Yes	143 (81.7)	77 (53.8)	66 (46.2)		
No	32 (18.3)	12 (37.5)	20 (62.5)	2.796	0.095
Side effects reported:					
Yes	47 (26.9)	21 (44.7)	26 (55.3)		
No	128 (73.1)	68 (53.1)	60 (46.9)	0.981	0.322

one-month period. However, 58.3% of these respondents missed only 1 to 2 doses and this may not have any clinical impact. The most common reason given by respondents who were not compliant to their antihypertensive therapies was forgetfulness, followed by too busy and insufficient medication supply. These reasons are similar to that of other studies (8, 20).

None of the factors analysed, including the demography of the respondents, their knowledge about hyper-

tension, how the respondents felt after taking the antihypertensive agents, had any statistically significant influence on the compliance behaviour of the respondents to their antihypertensive therapies. However, the low percentage of respondents who knew about their own BP or could explain the meaning of high BP indicate a need for more extensive patient education. More than 80% of the respondents kept their appointment to see their doctor and only this factor appeared to be related to the medication compliance behaviour although it still did not reach any statistical significance.

Further investigations to evaluate the effect of noncompliance to antihypertensive therapies on blood pressure control are warranted to understand the impact of such behaviour to the treatment of hypertension. However, it should be noted that the issue of noncompliance (nonadherence) to prescribed medications is gradually shifting to the concept of concordance that focuses on the relationship between the patient and the health care professionals.

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