Adherence To Antihypertensives Among Haemodialysis Patients At Five Non-Governmental Organisation Centres In Malaysia

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Abstract

Background: Uncontrolled hypertension is associated with increased cardiovascular mortality among haemodialysis (HD) patients. Poor adherence to antihypertensive regimens was found to contribute to inadequate control of blood pressure. The study is aimed to investigate the adherence to antihypertensives and factors affecting adherence among HD patients at non-governmental organisation (NGO) dialysis centres at the vicinity around Kuala Lumpur

Methods: Cross-sectional surveys using questionnaires were conducted in five NGO dialysis centres and Statistical Package for the Social Sciences (SPSS) was employed to conduct all statistical analyses. Patients who took at least 80% of the prescribed antihypertensives were considered as adherent.

Results: Two hundred and thirty-one respondents were interviewed; of which, 68% of patients were adherent. Patients' socio-demographic characteristics did not show any correlation to their adherence ($p>0.05$). On the other hand, the setting of dialysis centres did influence drug adherence significantly ($p=0.033$). Medication cost influenced adherence in a way that those who received medication for free and who had no difficulty paying for their medications were more adherent when compared to their counterparts ($p=0.004$ and $p=0.016$, respectively). The number of prescribed medications also showed significant relationship with adherence ($p=0.032$). Furthermore, patients who did not experience major side effects from antihypertensives revealed better adherence ($p=0.019$). **Conclusions:** Adherence to antihypertensives was suboptimal among HD patients at the NGO dialysis centres studied. Thus, all potential barriers to adherence should be taken into consideration in the treatment of hypertension among these patients.

Keywords: haemodialysis; drug adherence; antihypertensives

Introduction

Cardiovascular disease is the main cause of death in haemodialysis (HD) patients. In Malaysia, it accounted for 26% of death in dialysis population in year 2004¹. Hypertension is one of the risk factors to increased cardiovascular mortality^{2,3} while antihypertensive therapy was found to decrease the risk³.

Prevalence of hypertension in HD patients is very high and in the United States it was found to be 86%⁴. Tozawa and colleagues⁵ reported that antihypertensives were the second most commonly prescribed group of drugs in HD patients with 71% of patients were prescribed at least one antihypertensive agent.

Despite advanced development of effective antihypertensive drugs and treatment guidelines, pharmacological treatment of hypertension in HD patients continue to be a great challenge to healthcare providers partly because HD patients are known to be poor compliers to their medications⁵⁻⁷. Drug adherence is now recognised globally as the foundation to the success of medical therapy, because patients will only obtain the full benefit of the medications provided they follow the prescribed regimens reasonably closely. More than one

studies found that poor adherence to antihypertensives was one of the major factors to uncontrolled hypertension^{8,9}.

Very few studies, if any, regarding drug adherence among HD patients have been carried out in Malaysia. In view of the importance of adherence to antihypertensives on blood pressure (BP) control, the need for a research to study adherence to antihypertensives and factors affecting adherence among HD patients in Malaysia either as a whole population or in subgroups of population is clear and warranted. Non-governmental organisation (NGO) dialysis centres became the focus of this study because over the years, the NGOs have been playing an increasing role in dialysis provision in this country. A recent report showed that 34% of dialysis patients in Malaysia were receiving their HD treatment in NGO dialysis centres in year 2004¹. These centres are mostly non-profit, charitable organisations which provide subsidized treatment to patients from low-income groups.

The aims of this study are to assess the degree of adherence to antihypertensive regimens among HD patients at various NGO dialysis centres, to examine adherence according to socio-demographic characteristic and to identify various

factors affecting adherence to antihypertensive(s).

who could not recall their drug regimens were also excluded.

Methods

Data collection

Study population

NGO dialysis centres located in the vicinity of the University of Malaya were identified. Subsequently, ethical approval to interview consenting patients and to review their medical records was obtained from the respective authorities. All adult HD patients who were prescribed at least one antihypertensive agent were eligible to participate in this study. Subjects were recruited by convenience sampling.

A pilot study was conducted to check the clarity and reliability of the questionnaire. Amendments were made to the questionnaire before the actual study was carried out. Interviews were conducted from October, 2005 to February, 2006. Patients were interviewed using structured questionnaires while they were receiving their dialysis treatment. The questionnaire included questions on socio-demographic characteristics, the patient's renal disease and drug treatment. Information obtained was corroborated with their medical records. Four questions used to assess adherence to antihypertensives were adopted from the Brief Medication Questionnaire developed by Svarstad and colleagues¹¹. These questions focused in the past one week to minimise recall bias.

Patients who had received haemodialysis therapy for less than three months were excluded from the study because their clinical conditions and their drug regimens were yet to be stabilised¹⁰. Patients who could not be interviewed because they were too ill, had difficulties with communication or had severe physical or mental disabilities were excluded. Those

Percentage of adherence in the past seven days was calculated as follows:

Percentage of adherence

$$= \frac{\text{Total number of antihypertensive pills consumed by the patient in the past week}}{\text{Total number of antihypertensive pills that was to be consumed in the past week}} \times 100\%$$

Data analysis

For the purpose of statistical analysis, adherence was defined as taking at least 80% of the prescribed antihypertensives dose within the past seven days^{12,13}. All statistical analyses were performed using Statistical Package for the Social Sciences (SPSS Inc., Chicago IL, USA.). Chi-square tests were used to analyse the relationships between adherence to antihypertensive(s) and (i) patients' socio-demographic characteristics and (ii) patients' clinical characteristics. The variables were considered to be significantly related to adherence to antihypertensives if p values were less than 0.05.

Results

Patient characteristics

Of 252 eligible patients approached by the investigators, 21 refused to participate (response rate of 92%), resulting in a total of 231 patients from five NGO dialysis centres participated in this study. These five centres were labelled as Centre A, B, C, D and E for the purpose of confidentiality. The age of HD patients in this study population ranged from 26 to 82 years (mean = 52.82 years; SD = 12.54 years). Male patients accounted for 57.6% and 42.4% female. More than half of the patients were Chinese (61%),

21.4% of Malay, 17% of Indian and one Portuguese. These patients had been dialysed from a minimum of 3 months up to a maximum of 15 years (mean = 3.49; SD = 3.00). The number of concurrent diseases (other than end stage renal failure) ranged from one to five (mean = 2.36; SD = 0.91); whereas the number of prescribed medications taken by them ranged from three to eleven (mean = 6.44; SD = 2.06).

Degree of adherence

There were 57% of patients admitted 100% adherence to their antihypertensives, 11% achieved adherence rate at least 80% (but not to 100%) and 32 % showed an adherence rate less than 80%.

Patient socio-demographic characteristics and non-adherence

As seen in Table 1, socio-demographic characteristics did not show significant relationships with adherence to antihypertensive(s).

Clinical characteristics of non-adherent patients

Table 2 summarises the correlations between adherence to antihypertensives and patient clinical characteristics. A few significant relationships were observed between patients' clinical characteristics and non-adherence to antihypertensives.

Table 1: Socio-demographic characteristics and non-adherence to antihypertensive(s)

Characteristics	Number of patients interviewed	Number of non-adherent patients (%)	(p)
Total	231	74	
Gender			(0.495)
Male	133	45 (33.8)	
Female	98	29 (29.6)	
Age (in years)			(0.735)
26-45	65	22 (33.8)	
46-65	136	41 (30.1)	
66-85	30	11 (36.7)	
Race			(0.301)
Chinese	144	43 (29.9)	
Indian	46	14 (30.4)	
Malay	40	16 (40.0)	
Portuguese	1	1	
Marital status			(0.608)
Married	171	52 (30.4)	
Never married	42	14 (33.3)	
Divorced/ separated	10	5 (50.0)	
Spouse deceased	8	3 (37.5)	
Education			(0.666)
Illiterate	27	9 (33.3)	
Primary school	79	29 (36.7)	
Secondary school	105	31 (29.5)	
Tertiary education	20	5 (25.0)	
Employment			(0.496)
Unemployed	184	57 (31.0)	
Employed/self-employed	47	17 (36.2)	

Table 2: Clinical characteristics and non-adherence to antihypertensives

Characteristics	Number of patients interviewed	Number of non-adherent patients (%)	p value
Total	231	74	
Dialysis centres			(0.033*)
Centre A	96	25 (26.0%)	
Centre B	70	32 (45.7%)	
Centre C	35	9 (25.7%)	
Centre D	21	4 (19.0%)	
Centre E	9	4 (44.4%)	
Length of time on dialysis			(0.781)
≤ 2 years	109	33 (30.3%)	
> 2-5 years	74	26 (35.1%)	
> 5 years	48	15 (31.3%)	
Cause of renal failure			(0.812)
Diabetes	109	37 (33.9%)	
Hypertension	35	10 (28.6%)	
Others	87	27 (31.0%)	
Number of co-morbidities			(0.992)
1	40	13 (32.5%)	
2	96	31 (32.3%)	
≥ 3	95	30 (31.6%)	
Number of prescribed medications			(0.032*)
3-5	79	32 (40.5%)	
6-8	110	26 (23.6%)	
9-11	42	16 (38.1%)	
Number of antihypertensives			(0.618)
1	106	35 (33.0%)	
2	79	27 (34.2%)	
3-5	46	12 (26.1%)	
Monthly medication expenses			(0.021*)
Free (Government subsidized)	122	29 (23.8%)	
RM 1-RM 50	27	13 (48.1%)	

RM 51-RM 100	49	21 (42.9%)	
> RM 100	33	11 (33.3%)	
Difficulty paying for medications			(0.016*)
Had difficulty	58	26 (44.8%)	
No difficulty	173	48 (27.7%)	
Side effects			(0.019*)
Experienced side effects	27	14 (51.9%)	
No side effect	204	60 (29.4%)	

* Significant difference

The locations of dialysis centres influenced adherence to antihypertensives significantly ($p = 0.033$). Patients from Centre B were more likely to be nonadherent compared to those from Centre A ($p=0.008$), C ($p=0.048$) and D ($p = 0.028$). No significant difference was found among Centre A, C and D. Centre E was not included in the comparison because its sample size was too small. The number of prescribed medications, rather than the number of prescribed antihypertensives was found to influence non-adherence to antihypertensives. Those patients who took six to eight medications

daily were significantly more adherent than those taking three to five medications ($p = 0.013$). In general, patients whose medications were fully subsidised showed significantly better adherence than those paying for their medications ($p = 0.004$).

Contradictorily, when a medicine with a higher cost was prescribed, the adherence rate was also higher (Figure 1). Finally, patients who had difficulty paying for their medications and those who experienced side effects from their antihypertensives were significantly less adherent than their counterparts

Figure 1: Comparison of adherence to antihypertensives according to monthly medication expenses

Discussion

As has been found in previous research, an adherence rate of at least 80% is required to achieve a desired reduction in BP^{12,13}. With this cut-off point, 68% of patients were found to have adequately complied with their antihypertensive regimens. The degree of adherence to antihypertensive medications in this study was found to be higher compared to a study by Curtin and colleagues¹⁴, where only 52% to 57% of patients acquired at least 80% of adherence. This difference could be due to the variation in methods that were employed in carrying out the research¹⁵. In their study, Medication Event Monitoring System (MEMSTM) was used to

monitor patients' adherence over a period of six weeks. Furthermore, interview method is known to overestimate adherence rate because patients tend to underreport their non-adherent behaviour and some may be unwilling to disclose this medically unacceptable behaviour¹¹.

Socio-demographic characteristics were not found to be associated with adherence to antihypertensives. Multiple studies have been conducted to study the relationship between drug adherence and demographic characteristics. So far the results are inconclusive^{6,14,16}. This study was unable to assess the relationship between household income and adherence to

antihypertensives as about 10% of patients did not know or were unwilling to disclose their household income and some admitted underreporting their household income. Enrolment for most NGO dialysis centres in Malaysia gives priority to those from a lower income group. Hence, it is understandable why patients refused to disclose their actual household income.

The setting of dialysis centres was found to significantly influence patients' adherence to antihypertensives. This observation is probably closely related to the nature of healthcare provider-patient relationship. Centre A is the only centre in this study which has an in-house nephrologist and doctors. Medical consultation is readily accessible whenever patients experience any doubt or problems regarding their antihypertensive regimens. Constant availability of doctors to patients provides a sense of security and nurtures a trusting doctor-patient relationship and subsequently promotes patient adherence^{17,18}. On the other hand, the other dialysis centres are affiliated to nearby hospitals and patients are followed-up by visiting doctors. In these centres, the ratio of staff nurse to patients seemed to influence patient adherence. The ratio of staff nurse to patients in Centre B, C and D were 1:10, 1:5 to 7 and 1:5, respectively. It is evident that the lower the ratio of staff nurse

to patients, the higher the adherence rate was observed. This could be due to a better quality and quantity of time spent between nurses and patients facilitating drug adherence.

The impact of healthcare provider-patient interaction on patient care is always a topic of interest among researchers¹⁹⁻²¹. In the management of patients with chronic diseases, in this case, HD patients, a multidisciplinary involvement of healthcare team is essential (Joy et al. 2005). Pharmacists in Malaysia do not yet have rapport with HD patients as compared to rapport of doctors and nurses to HD patients. Pharmacists can provide counselling to HD patients regarding their medications and benefits of being adherent to prescribed regimens. They can also help in addressing patients' feedbacks about their medications. Throughout the years, many studies have successfully proven the positive impact of pharmacist's involvement in the care of HD patients²²⁻²⁵.

A linear relationship between the number of prescribed medications and adherence to antihypertensives was not found. The exact reason behind this observation is unclear. Nevertheless, it is worth noting that the use of pillbox was found to be beneficial in facilitating drug adherence especially for patients with polypharmacy.

High medication cost adversely affects drug adherence ^{26,27}. Drug affordability is always a concern among HD patients because other than monthly medication expenses, they have to pay for their HD treatment and other medications such as erythropoietin and calcitriol. In this study, it was found that patients received their subsidized medication were more likely to be adherent to antihypertensives than those who have to pay the full cost for their medications. This could mean that if HD patients received their medications partially subsidized, their adherence may be improved.

Patients who admitted having difficulty paying for their medications appeared to be less adherent than their counterparts. This was possible that financial tension forced them to adopt strategies such as reducing or skipping doses of their antihypertensives in order to make the medications last longer ²⁶. There were patients in this study who admitted being unable to refill their prescriptions in time due to financial constraint.

Piette and colleagues ²⁸ concluded in their study that problems associated with cost of medication are rather complex. Patients can react to cost of medication differently. Some would continue taking their medication despite the cost, but some would forgo treatment even

though they could afford it. In order to have a better view about the effect of medication cost on individual patients, Heisler and colleagues ²⁹ suggested that healthcare providers should discuss about this issue with their patients as part of the assessment of drug adherence. Identifying patients with financial difficulty and subsequently appropriate actions such as recruiting financial aid from welfare bodies or prescribing less expensive alternatives would probably be helpful in promoting drug adherence.

Side effects associated with antihypertensives such as dizziness, general weakness, a 'weak heart' and a slow heart rate were identified by patients. In this study, less than half of the patients told their doctors about their drug problems. This phenomenon agreed with the finding by Kjellgren and colleagues ¹⁷ that patients are usually reluctant to tell their doctors about the side effects they experienced if these side effects can be alleviated by altering the dosage themselves. Furthermore, patients did not have ready access to doctors in most dialysis centres in this study. Failure of patients to tell their doctors about the side effects of drugs they experienced may actually endanger their wellbeing especially if these side effects occur frequently ¹⁸. In view of this, healthcare providers have the responsibility to constantly seek feedbacks from patients on whether they experience

any side effects from their current therapy¹⁷. These feedbacks help reveal their non-adherent behaviour.

As reported by Horne and Weinman³⁰, there were patients who did not experience side effects from the current antihypertensive regimens, yet due to previous hypotensive episodes, they pre-empted by intentionally reduce the doses of their medications. In the present study, many patients withheld their antihypertensive doses on own accord before dialysis due to the concern of intradialytic hypotension. This action has been identified in previous studies as one of the major factors contributing to inadequate control of blood pressure among HD patients^{8,9}. It was suggested that re-evaluation of blood pressure profiles and antihypertensive regimens of these patients is warranted.

The interpretation of results in the present study should take into account the limitations. This study was conducted in only 5 out of 93 NGO dialysis centres in Malaysia¹. In addition, the degree of adherence to antihypertensives might be overestimated because patients who were at risk of non-adherence, for example those who were confused with their drug regimens, cognitively impaired, unable to recall their drug regimens and those who were too

sick to be interviewed, were excluded from this study.

Conclusion

Adherence to antihypertensives among HD patients at NGO dialysis centres appeared to be suboptimal. Socio-demographic characteristics did not predict adherence. Other factors such as healthcare provider-patient relationship, medication cost, drug affordability and side effects of medications seemed to be the stronger determinants of adherence.

The understanding regarding drug adherence among HD patients in Malaysia is still lacking. It is hope

that this study will serve as a stimulus to further studies in drug adherence among HD patients. By understanding the factors that predispose to non-adherence, specific interventions can be developed to enable patients to gain optimal benefits from their medications.

The inherent limitation of interview method to accurately measure drug adherence can be overcome by assessing the laboratory test results and examining the clinical features of the patients.

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