Factors Associated with Medication Adherence among Patients with Hypertension in USM Hospital

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ABSTRACT

Hypertension is a chronic medical condition which remains inadequately managed. Drug adherence is a critical parameter in achieving optimal blood pressure control in patients undergoing antihypertensive therapy. This study was aimed to determine the proportion of hypertensive patients who were adherent to antihypertensive treatment regime and to identify the predictors of drug adherence in patients with hypertension in USM Hospital. A cross-sectional study was conducted and simple random sampling was performed to select 114 subjects. Subjects were interviewed using a structured validated Medical Adherence Questionnaire (MAQ) on their demographic background and drug taking behaviour. SPSS version 22 was used for data entry and analysis. Multiple binary logistic regression was used to identify the factors associated with drug adherence among the patients. Out of the 114 subjects, 71 (62.3%) were adherent to their antihypertensive treatment regime (95%CI 0.53, 0.71). The statistically significant independent factors were marital status (married/divorced or widowed) [AOR 0.31, 95% CI 0.10, 0.99, p=0.057] use of traditional medicines [AOR 0.19, 95% CI 0.07, 0.57, p=0.03] and household income (middle) [AOR 9.72, 95% CI 2.89, 32.67, p<0.001]; (high) [AOR 6.23, 95% CI 1.18, 32.96, p=0.031]. Patients who were married, have middle or high income and did not take traditional medicines were more likely to adhere to their antihypertensive medication.

Key Words: hypertension, adherence, USM Hospital
1.0 Introduction

Hypertension is defined as having persistent, elevated systolic blood pressure of 140 mmHg or above and/or diastolic blood pressure of 90 mmHg or above\textsuperscript{1}. Untreated or sub-optimally treated hypertension could lead to increased risk of morbidity and mortality due to cardiovascular, cerebrovascular, or renal diseases\textsuperscript{2}. Hypertension affects almost one billion individuals worldwide. It is estimated to cause 4.5\% of the global disease burden and is as prevalent in many developing countries as in developed countries\textsuperscript{3}.

In Malaysia, the prevalence of hypertension among adults aged 30 years and above has increased from 32.9\% in 1996 to 40.5\% in 2004\textsuperscript{4}. The number is continuously rising due to the progressive aging of the population. Successful treatment of hypertension is vital in reducing morbidity and mortality, as well as in controlling health care costs associated with these conditions. Unfortunately, blood pressure control is poor, especially in patients with other chronic conditions. In the same survey, it was also reported that only 26.6\% (95\% CI: 24.2–29.0) of those taking antihypertensive had their hypertension under control (defined as having blood pressure [BP] of below 140/90 mmHg)\textsuperscript{4}. It was estimated that only 60\% of the patients consume their medication as prescribed\textsuperscript{5}, and this rate seems to decline further when the studies focus on underdeveloped areas. Some studies project this ratio ranging from 50\% to 75\%\textsuperscript{6}.

Medication adherence is defined as “the extent to which the medication-taking behaviour of a patient corresponds with agreed recommendations from a health care provider”\textsuperscript{7}. It is an important factor in achieving blood pressure control. Patients that were adherent to the full regimen of their hypertension treatment were significantly less likely to have elevated blood pressures\textsuperscript{8}. As reported by the World Health Organization, adherence to medication in patients with chronic diseases averages only around 50\% in developed countries. The situation is reported to be worse in developing countries due to poor accessibility to medications and health care services. The asymptomatic nature of the condition intensifies the problem of non-adherence in hypertension\textsuperscript{7}.

Many methods have been suggested for measuring patients’ drug adherence\textsuperscript{9}. Drug assays of blood or urine, use of drug markers with target medication and direct observation of the patient receiving the medication are the direct measures of adherence. The indirect measures include various forms of self-reporting by the patient, pharmacy refill rates, medication measurement (pill count), use of electronic monitoring devices and review of prescription records and claims\textsuperscript{10}. Each method has its advantages and disadvantages but no method is regarded as the gold standard\textsuperscript{9}.

Interviewing patients with questionnaires or using patients’ self-reports has the advantage of being simple and inexpensive to be carried out. Self-reporting questionnaires have been developed to measure patients’ adherence to prescribed medicines. The objectives of this study were to determine the proportion of patients with hypertension who were adherent to their antihypertensive treatment regime and to identify the factors associated with adherence among patients with hypertension at USM Hospital.
2.0 Methods

Simple Random Sampling was applied to select 114 patients with essential hypertension from the Family Medicine Clinic of USM Hospital. Patients were interviewed using a checklist and Medical Adherence Questionnaire (MAQ).

The MAQ was developed by Dr Norul Badriah Hassan (senior lecturer in Department of Pharmacology, USM) in 2005. It was developed and validated in two separate pilot studies involving 60 patients each. Internal consistency reliabilities (Cronbach’s alpha) were 0.67 and 0.84. Test–retest single measure intra-class correlation coefficients were 0.78 and 0.93, respectively, for each domain. The MAQ consists of 10 statements for the patients to respond. Each statement has a score of 1 to 5. Statements 2 to 10 were negatively worded statements and hence their scores were reversed. The total scores were converted to percentage. Patients were categorized as ‘adherent’ if they scored more than 75%.

Patients were categorized as ‘adherent’ if they scored 75% or greater. Data was analysed using SPSS version 22. Variables were screened using simple logistic regression. Variables associated with good adherence were tested using multiple logistic regression analysis. P-values of < 0.05 were considered statistically significant.

This research was approved by the Human Research Ethics Committee of Universiti Sains Malaysia. Permission from Director of USM Hospital was obtained.

3.0 Result

Out of the 114 subjects, 71 (62.3%) were adherent to their anti-hypertensive treatment regime. We were 95% confident the proportion of hypertensive patients in KRK, USM Hospital who were adherent to their anti-hypertensive treatment regime would be between 53% and 71% (95% CI 0.53, 0.71).

The independent variables included into the final model were marital status, use of traditional medicines and household income. Table 1 shows the final model from multivariable analysis of factors associated with good adherence among patients with hypertension in USM Hospital.

Patients with hypertension who were divorced or widowed had 69% decreased the odds of good adherence to medication, compared to patients who were married (AOR 0.31, 95% CI 0.10, 0.99, p=0.047).

Hypertensive individuals who consumed traditional medicines had 81% decreased the odds to be adherent compared to those who did not consume traditional medicines (AOR 0.19, 95% CI 0.07, 0.57, p=0.03).

Hypertensive patients from the middle income group had almost 10 times the odds to be adherent to medication compared to those from the low income group; while those from the high income group had about 6 times the odds to be adherent to medication compared to those
from the low income group where the respective adjusted odds ratios, 95% CI and \( p \) value were as follows: (AOR 9.72, 95% CI 2.89, 32.67, \( p < 0.001 \)); (AOR 6.23, 95% CI 1.18, 32.96, \( p = 0.047 \)).

Other independent variables (i.e. age, gender, ethnicity, education status, occupation, cost of treatment and frequency of medication) were not significant.

**Table 1: Factors Associated with Medication Adherence among Hypertensive patients in USM Hospital**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Crude OR(^a) (95% CI)</th>
<th>Adjusted OR(^b) (95% CI)</th>
<th>Wald statistic(^b) (df)</th>
<th>( p)-value(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced / Widowed</td>
<td>0.18 (0.08, 0.41)</td>
<td>0.31 (0.10, 0.99)</td>
<td>3.94 (1)</td>
<td>0.047</td>
</tr>
<tr>
<td>Household Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>12.13 (4.06, 36.22)</td>
<td>9.72 (2.89, 32.67)</td>
<td>9.72 (1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>High</td>
<td>18.95 (4.00, 89.82)</td>
<td>6.23 (1.18, 32.96)</td>
<td>6.23 (1)</td>
<td>0.031</td>
</tr>
<tr>
<td>Traditional Medicines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Yes                | 0.09 (0.04, 0.22)        | 0.19 (0.07, 0.57)          | 8.96 (1)                  | 0.03              

\(^a\)Simple logistic regression, \(^b\)Multiple logistic regression

Hosmer-Lemeshow \( p = 0.859 \)

Classification table 85.1%

ROC area under the curve 0.871 (95% CI 0.802, 0.941)

The model fitted well. Model assumptions were met. There was no interaction and multicollinearity problem.

**4.0 Discussion**

This study showed that the proportion of patients with hypertension who were adherent to their antihypertensive treatment regime was 62.3%. This proportion is generally higher compared to other studies as shown in Table 2. This could be due to the fact that this study was conducted in a tertiary referral hospital affiliated with USM as the medical teaching campus. Furthermore, the hospital is located in Kubang Kerian, Kota Bharu which is an urban area. Thus, most of the patients here were from the higher social class (35.1% had received tertiary education; 51.8% were from the middle and high income groups).
On the other hand, the other studies carried out in Melaka, Penang and Selangor were conducted in health clinics, district hospitals or the entire state/country itself. This study mainly focused on the adherence of hypertensive patients in a university hospital. Almost all the other studies used self-administered questionnaires which were less accurate as patients may misinterpret the statements or may not respond to all the statements. Some of the questionnaires might be filled by the patients’ relative/friend instead. In this study, the patients were interviewed individually to gather information regarding their socio demographic profiles and drug taking behaviour. Table 2 portrays similar studies conducted in Malaysia and other countries.

Table 2: Similar studies conducted in Malaysia and other countries

<table>
<thead>
<tr>
<th>Place</th>
<th>Adherence</th>
<th>Citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melaka</td>
<td>44%</td>
<td>Aziz et al., 1999</td>
</tr>
<tr>
<td>Kelantan</td>
<td>44.2%</td>
<td>Hassan et al., 2006</td>
</tr>
<tr>
<td>Penang</td>
<td>48.7%</td>
<td>Turki et al., 2010</td>
</tr>
<tr>
<td>Selangor</td>
<td>53.4%</td>
<td>Azuana Ramli et al., 2012</td>
</tr>
<tr>
<td>Sudan</td>
<td>59.6%</td>
<td>Elzubier et al., 2000</td>
</tr>
<tr>
<td>Nepal</td>
<td>35.4%</td>
<td>Gulam et al., 2013</td>
</tr>
</tbody>
</table>

Marital Status

In this study, married patients were found to be more adherent compared to widowed/divorced patients ($p=0.047, 95\%\ CI 0.10, 0.99$). This finding was in line with the studies carried out in Nepal and Sudan (Elzubier et al., 2000; Gulam et al., 2013). It is likely that married patients were more adherent due to the presence of their spouses who could remind them to take their medication as prescribed. The latter also may give them moral support and a sense of accountability to manage their disease and health properly. Married patients also felt that they have to control their disease in order to remain healthy to care for their spouses and family.

Household Income

Household income was another significant factor for good adherence in this study. Hypertensive patients from the middle income group had 9.7 times the odds to be adherent to medication than those from the low income group ($p<0.001, 95\%\ CI 2.89, 32.67$). Hypertensive patients from the high income group had 6.2 times the odds to be adherent to medication than those from the low income group ($p=0.047, 95\%\ CI 1.18, 32.96$).
This finding is similar to other studies done in Malaysia as well as overseas. Patients with higher income usually have better awareness about the complications and management of their disease. Therefore, they put in more effort (pharmacological and non-pharmacological) to optimise their blood pressure control.

The lower income group usually focused more on income generation rather than their disease. Besides, they might be unaware of the complications that they may face from uncontrolled blood pressure. From our interviews with patients from the lower income group, we came to know that quite a number of them frequently defaulted on their appointments due to various reasons. Among the main reasons given were inability to obtain leave from employers, insufficient funds to pay for their transportation fares and having to take care of their sick child or relative. These led to interruptions in the supply of their medicine resulting in non-adherence.

**Traditional Medicines**

The third significant factor in this study was the use of traditional medicines among patients with hypertension. Hypertensive patients who used traditional medicines had decreased odds to be adherent by 81% than those who did not use traditional medicines ($p=0.03$, 95% CI $0.07$, 0.57). This finding was consistent with the study carried out in Pakistan (Saleem et al., 2012).

There were about 35.1% of patients in this study who used traditional medicines. Out of those patients, 72.5% of them were not adherent to their prescribed antihypertensive. All the traditional medicines used by patients in this study were ingested therapies which comprised of plants and animal sources.

From this study, we also realised that most of the patients who used traditional medicines were those who did not attain tertiary education and from the lower income group. Therefore, they might be unaware about the danger of the disease per se or they could not afford to visit the hospital regularly.

Most of the patients in this study used traditional medicines recommended by their friends or relatives. They were told by their traditional healers that traditional medicines must not be taken together with the prescribed antihypertensive. This made them non adherent to their prescribed antihypertensive.

**Study Limitations**

This study was performed on a sample of patients diagnosed with hypertension undergoing treatment at Family Medicine Clinic in USM Hospital. It was noted that a majority of them were either government servants or government pensioners. Therefore, there was a limited variety of occupation among them. Besides, most of the patients were mostly from the middle and higher income groups. Moreover, a large proportion of the patients were from the Malay ethnic group. There were only 11.4% of non-Malay patients in this study.

The investigated subjects in this study were not representative of all the patients with hypertension in Kota Bharu, Kelantan. This was because there were many other easily...
accessible health care centres in Kota Bharu such as private general practitioners, private hospitals, Ministry of Health Hospital and government health clinics.

With regards to the use of traditional medicines and supplements, we faced many difficulties in obtaining specifics regarding the exact type and quantity of the traditional medicines or supplements. For instance, a large majority of the patients taking traditional medicines only knew whether they were from plant or animal sources. They did not know the specific type of plant or animal concerned. Indeed, some patients consumed traditional medicines without having a slightest clue on their effects or side effects. They seemed to hold great trust on the products because they were recommended by their relatives or friends.

Another shortcoming in this study is the study design and data collection method. This is a cross sectional study which only allows associated factors to be identified; but not for the identification of causal relationships. We were not certain whether the associated factors (marital status, household income and the use of traditional medicines) occurred before the patients were adherent.

5.0 Conclusion

This study has discovered that a majority of 62.3% of patients with hypertension in USM Hospital were adherent to their antihypertensive. A total of 11 factors were analysed in this study. They comprised of seven socio demographic factors, use of traditional medicines and supplements, the cost of treatment and lastly the frequency of dose. It was seen that marital status, use of traditional medicines and household income were significant factors influencing patients’ adherence. Therefore, health care staff should focused more on patients who were widowed / divorced, using traditional medicines and those from the lower household income group. Ultimately, efforts ought to be aimed towards increasing the proportion of patients who were adherent, thus directly decreasing morbidity and mortality among patients with hypertension. This will eventually reduce the cost burden of managing complications of uncontrolled hypertension.

References


