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MEDICATION KNOWLEDGE AND ADHERENCE IN NEPHROLOGY PATIENTS

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ABSTRACT

Medication adherence is vital in patients with chronic disorders. The number of medications taken and its complexity has proved to be a challenge. Therefore, it is critical to ensure that patients have adequate knowledge about their medications in order to improve adherence. This study was performed to investigate the extent of medication knowledge and adherence in nephrology patients in a local tertiary hospital. This work focuses on ensuring that patients understand and adhere to their medications. The medication was grouped into: anti-anaemic, anti-diabetic, anti-hypertension, diuretic and lipid lowering drugs. The study, in which 70 patients were included, was performed prospectively. From the results it was found that, patients had a lower knowledge score of both anti-anaemic and lipid lowering agents compared to the other drug groups tested (F=12.84, p=0.0001). Interestingly, adherence was also low for both these groups of drugs compared to other medication groups such as the anti-diabetic, anti-hypertensive and diuretics (F=3.65, 0=0.0001). Patient factors that were found to associate with differences in both medication knowledge and adherence comprised of the levels of education (F=6.38, p=0.0001 and F=10.54, p=0.0001 respectively). Therefore, evidence from this work supports the fact that the level of knowledge could possibly influence the levels of adherence to medications in nephrology patients. More importantly, this work demonstrates that pharmacists can play a more active role in ensuring proper information is disseminated based on the education levels of the patients. Further research could be performed to understand the differences in information required for different groups of patients.

KEY WORDS

Medication knowledge, adherence, nephrology, renal

INTRODUCTION

Medication regimens prescribed to patients have become more complex and complicated. If a patient is prescribed more than one medication, complex and complicated medication regimens may affect their adherence. Those afflicted with chronic illness such as nephrology patients have been demonstrated to take less than the amount of medications prescribed to them [1]. The number of drugs taken by this group of patient is notably high. Adherence is vital in ensuring effectiveness of treatment. However, poor adherence with medications is a major problem as the benefits get undermined [2, 3]. It has also been identified as a major concern amongst the public as it imposes a considerable burden to health care costs [4].

Non adherence relates to many factors such as forgetting to take medication, adverse drug effects, number of medications received, lack of symptoms, high cost and efficacy [5, 6, 7]. Nonetheless, limited knowledge and understanding of medications remains a major

contributor [8, 9, 10] to the issue. A basic knowledge of a patient's medication such as the name, indication, dosage, frequency and side effects are considered vital information [8]. An understanding of medications taken is usually approximated based on the extent of the patient's ability to recall all of these basic information. Nonetheless, approximately two-thirds of the information provided by a health care provider to a patient has been shown to be forgotten immediately [11]. Complexity of drug regimens and lack of communication are often contributors towards the lack of understanding towards treatment. This is especially true in elderly patients that are unable to follow complicated instructions [3,4,11]. This is a particular concern as better knowledge of medications may improve the patient's adherence. Therefore, this study was performed to investigate the extent of medication knowledge and adherence in nephrology patients and identify the groups of medication in which patients were more likely to not comply.

METHODS

Study design and procedure

It was a cross sectional, prospective study performed in a local tertiary hospital. Approval was obtained from the Committee of Medical Research and Ethics. Patients admitted into the nephrology ward within the six months of the study period were eligible for the study. Patients were interviewed with informed consent, for knowledge and adherence of their medications prior to admission. Demographic data such as gender, race, age, duration of illness, and past medication history were obtained from patient medical records. Patients included in the study comprised of those above 18 years of age who were already on medication before admission to the hospital. Patients, who refused to be interviewed, were unable to communicate or dependent on a caregiver were excluded. Patients were also excluded if they were readmitted within the duration of the study.

Medication knowledge and adherence

Patients were interviewed on admission based on a set of questions to assess for knowledge of medications. The questions were based on a Patient Medication Knowledge Assessment Form [12]. Medication knowledge was assessed for name, dose, frequency and indication of medication. There was a four-tiered grading scale that graded the patients as 0, 1, 2 and 3 according to their response. The expected responses were: 3=answering the questions correctly, 2=answering the questions partially, 1=answering when prompted and 0=not answering the questions correctly. A total scale score of 12 was given if the patient answered all components in the medication knowledge form, correctly.

Adherence was assessed by interviewing patients based on a set of questions using the Medication Adherence Report Scale (MARS) [13, 14]. An instance of the questions is mentioned here: "Some people forget to take their medicines. How often does this happen to you?" The response scale was reported based on a five-point scale where 5=never, 4=rarely, 3=sometimes, 2=often and 1=very often. The scores were then summed up to a scale range of 4-25 in which the higher scores reported adherence.

Data analysis

Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 15.0 for MS Windows and was tested with the appropriate inferential and descriptive statistics. Parametric tests such as t-tests and ANOVA were also used, whereas categorical data were determined by non-parametric tests such as the Whitney U test and Kruskal Wallis. Probability values of less than

0.05 ($p < 0.05$) were accepted as statistically significant.

RESULTS AND DISCUSSION

Patient demographics

A total of 70 patients were included in this study. There were a higher number of females (n=44, 63%) in the study population compared to males (n=26, 37%). The mean age of patients was 51.71 ± 15.74 years. A total of 56 (80%) patients were between 18–65 years of age, whereas the remaining 14(20%) patients were above 65 years in age. In terms of racial distribution, a majority of the patients were Malay (n=40, 57%), followed by the Chinese (n=27, 39%), the Indians (n=2, 3%) and others (n=1, 1%). Most of the subjects were educated till the secondary levels (n=32, 46%). The average duration of disease was 3.74 ± 5.74 years. Patients were on medications which were divided into the anti-diabetic, anti-hypertensive, anti-anaemic, diuretics and lipid modifying agents. It was demonstrated that 17(24%) patients admitted to taking alternative medications in addition to those prescribed.

Table 1: Demographic characteristic such as gender, age, race, level of education and duration of disease of patients included in the study.

Parameter	N=70
Gender (n, %)	
Male	26 (37%)
Female	44 (63%)
Age (mean ± SD)	51.71 ± 15.74
18-35 years old	17 ± 5.4
36-65 years old	39 ± 8.6
>65 years old	69 ± 2.1
Race	
Malay	40 (57%)
Chinese	27 (39%)
Indian	2 (3%)
Others	1 (1%)
Educational level	
Primary	19 (27%)
Secondary	32 (46%)
Tertiary	12 (17%)
Illiterate	7 (10%)
Duration of disease (mean ± SD)	3.74 ± 5.74

Medication knowledge score

Table 2 summarizes the average medication score for different type of medications taken. When comparing the group of medications taken, patients scored highest in their knowledge of anti-hypertension agents compared to the anti-anaemia and lipid lowering agents ($F=12.84$, $p=0.0001$). Interestingly, in this present study, most patients found it a challenge to remember the names and indications of the anti-anaemia drugs that they were taking when compared to the frequencies and dosages of these agents ($F=44.91$, $p=0.0001$). This was similarly reflected in previous studies that demonstrated that patients had trouble remembering drug names [15]. Alibhai et al. [16] also stated that less than

half (43%) of their patients were able to recall the names of all their medications. The anti-anaemic agent consists of oral ferrous fumarate, vitamin B complex and folic acid. Patients found it difficult to remember the names of these medications in view of the generic packaging provided by the pharmacy. Although appropriate labelling was provided on each package, patients were found to forget names of anti-anaemic drugs more often than any other group of drug. This was compared to the boxed original packaging of lipid lowering agents and anti-diabetic drugs which were easily identified by the patients.

Table 2: Medication knowledge between different groups of medication (N=70). Medication taken by patients were divided into 5 main groups; anti-anaemia, anti-diabetic, anti-hypertensive, diuretics and lipid-modifying agents. Results are calculated as knowledge score and represented as mean ± SD (N=70).

Medication	Anti-anaemia	Anti-diabetic	Anti-hypertensive	Diuretics	Lipid modifying agent
Name	1.28 ± 1.36	2.82 ± 1.48	2.82 ± 1.36	2.81 ± 1.41	2.79 ± 1.35
Frequency	2.77 ± 0.63	2.89 ± 0.57	2.79 ± 0.72	2.77 ± 0.76	2.78 ± 0.79
Indication	1.72 ± 1.22	2.64 ± 1.19	2.78 ± 1.24	2.76 ± 1.39	1.41 ± 1.20
Dose	2.93 ± 0.53	2.83 ± 0.64	2.81 ± 0.71	2.80 ± 0.54	2.85 ± 0.65
Total Score	8.70 ± 2.18	11.18 ± 2.80	11.20 ± 2.80	11.14 ± 2.79	9.83 ± 2.51

Table 3: Adherence score of patients taking medication amongst nephrology patients. Results are calculated as knowledge score and represented as mean ± SD (N=70).

Adherence	Anti-anaemic	Anti-diabetic	Anti-hypertensive	Diuretics	Lipid modifying agent
I forgot to take my medicines	4.82 ± 0.41	4.81 ± 0.67	4.87 ± 0.55	4.87 ± 1.05	4.02 ±0.34
I alter the dose for my medicines.	4.72 ± 0.93	4.93 ± 0.93	4.83 ± 0.52	4.87 ± 0.96	4.83 ±0.42
I stop taking my medicines for a while.	4.01 ± 0.12	4.81 ± 0.43	4.83 ±0.93	4.83 ± 0.79	4.83 ±0.33
I decide to miss out a dose for my medicines.	4.98 ± 0.52	4.96 ± 0.77	4.82 ±0.83	4.83 ± 1.33	4.83 ±0.33
I take less medicine than instructed.	4.93 ±0.93	4.82 ± 0.23	4.87 ±0.76	4.92 ± 0.83	4.81 ±0.44
Total Score	23.46±3.11	24.33 ± 2.12	24.12 ±1.31	24.32 ± 1.11	23.32 ±2.33

Table 4: Patient factors associated to medication knowledge and adherence in nephrology patients. Results are calculated as knowledge score and represented as mean ± SD (N=70).

Factor	Medication knowledge score (mean ± SD)	p value	Medication Adherence Report Scale (mean ± SD)	p value
Gender				
Male	2.22 ± 0.51	p>0.05	4.98 ± 0.43	p>0.05
Female	2.42 ± 0.11		4.87 ± 0.34	
Age				
18–35 years old	2.33 ± 0.73	p = 0.0001 [a]	4.89 ± 0.23	p>0.05
36–65 years old	2.01 ± 1.03	F = 8.74	4.92 ± 0.55	
>65 years old	1.12 ± 0.29		4.85 ± 0.46	
Race				
Malay	2.11 ± 0.88	p>0.05	4.83 ± 0.54	p>0.05
Chinese	2.13 ± 0.49		4.87 ± 0.85	
Indian	1.99 ± 1.07		4.78 ± 0.83	
Others	1.91 ± 0.00		4.91 ± 0.33	
Educational level				
Primary	1.92 ± 0.92	p = 0.0001[a]	4.74 ± 0.31	p = 0.0001[a]
Secondary	2.01 ± 0.51	F = 6.38	4.87 ± 0.45	F=10.54
Tertiary	2.81 ± 0.59		4.92 ± 0.33	
Illiterate	1.44 ± 1.08		4.02 ± 0.21	

[a] ANOVA test with level of significance p<0.05

Overall, patients were able to remember the dosages and frequencies of all the medications taken. However, a significant number of patients found it difficult to remember the indications for lipid lowering agents compared to the name, frequency and dose (F=31.75, p=0.0001). Interestingly, previous work among nephrology patients has shown that knowledge on medication doses was the lowest compared to factors like name, indication and frequency [10]. However, in this present work, it was identified that although patients were able to name the drug, most were unaware that they were taking lipid lowering agents. Patients were more likely to relate obesity to lipid lowering agents and therefore, did not understand the need for these drugs. The lack of symptoms therefore led patients to believe that the lipid-lowering agents were not necessary.

Adherence score

Based on the Medication Adherence Report Scale, scores of 20 and above were categorized as high adherence [14]. This cut-off point represented 80% of the total adherence score. Overall, the nephrology patients in this study had a high level of adherence to their medication (n=69, 98.57%). There have been mixed results when it comes to adherence to drugs in patients with chronic diseases. A high non-adherence rate of 20–50% has been reported amongst patients with kidney diseases [1, 17, 18, 19]. However, there have also been reports of approximately 80% adherence rates in patients, which are comparable to results

demonstrated in this current work [15]. Nonetheless, the difference in reports of adherence levels amongst patients demonstrates that patients are able to follow appropriate drug regimens if given the right amount of guidance.

Table 3 summarizes the adherence score for each adherence item. Based on the total score, patients were observed to show a lower adherence level in anti-anaemic and lipid modifying agents compared to the anti-diabetic, anti-hypertensive and diuretic agents (F=3.65, 0=0.0001). The lower adherence to the anti-anaemic and lipid lowering agents was comparable to the lower knowledge scores of both drugs mentioned above (**Table 2**). A few patients displayed lower adherence to anti-anaemic agents by stopping the medication in view of its adverse effects (F=24.93, p=0.0001). These patients reported concerns of gastro-intestinal disturbances such as constipation caused by the anti-anaemic drugs. Patients were also shown to occasionally forget to take lipid modifying medications, which lowered their adherence to the medications (F=64.53, p=0.0001). Having to take the lipid lowering medications before bedtime was found to be the main cause. Most patients found that as most other drugs were taken with respect to the food intake, it was a challenge to remember to take the lipid lowering drugs later on during the night.

Association between medication knowledge, adherence and patient factor

Table 4 shows the relationship between medication knowledge and adherence with patient factors. It was demonstrated that age and education levels influenced the levels of medication knowledge amongst nephrology patients. Patients above the age of 65 years were shown to have lower medication knowledge (F=8.74, p=0.0001). Elderly patients have been demonstrated to have a lower understanding of their medications due to their dependence on a caregiver [20], which is further supported in this current work. Furthermore, lower adherence in elderly patients has been attributed to poor memory [21].

A higher educational background also determined a better knowledge of medication amongst nephrology patients (F=6.38, p=0.0001). Educational levels of the patients were also significantly associated with the adherence scores (F=10.54, p=0.0001). It was demonstrated that with a higher level of education, level of knowledge and adherence significantly improved. Indeed, the levels of education have similarly been determinants of medication knowledge in previous work [10]. Interestingly, this was also demonstrated amongst nephrology patients [1], which substantiated the findings from this current study.

CONCLUSION

Patients with chronic diseases receive a high number of medications. This proves a challenge for both the patients and the prescribers as adherence to medication is vital in this group of patients. The nephrology patients in this study demonstrated an overall high level of medication knowledge and adherence to their medications. Knowledge of medications has previously been shown to be an important determinant in affixing adherence [22]. Indeed, this was similarly demonstrated in this work. Interestingly, the slightly lower level in the understanding of anti-anaemic and lipid lowering agent in these patients was portrayed in terms of the lower adherence levels in the same group of drugs. The association of the level of education with both knowledge and adherence level provides additional insight into the cause for non-adherence amongst nephrology patients. To that

end, this provides a great opportunity for pharmacists and medical providers to target different groups of patients. Medication information could be tailored based on the levels of education in order to ensure a full understanding of the drugs taken. This could possibly lead to better adherence to medications amongst chronic disease patients.

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