

Medication Adherence of Patients with Uveitis in Thailand

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Objective: To evaluate the medication adherence of patients with uveitis and their related factors associated with medication non-adherence.

Methods: A cross-sectional study conducted in uveitis clinic, Thammasat university hospital, Thailand, during June 2018 to January 2019. The questionnaires were collected from the patients.

Results: One hundred and fifty-one patients were enrolled. Forty-five patients (29.8%) demonstrated medication non-adherence. Factors significantly associated with medication non-adherence included lack of knowledge regarding proper medication use ($P<0.001$), forgetfulness ($P<0.001$), experiencing side effects from medications ($P=0.025$), difficulties in travelling to the doctor's office ($P=0.001$) and difficulties in using eye drops ($P=0.025$). However, it was not significantly associated with age ($P=0.377$), gender ($P=0.861$), education level ($P=0.069$), occupation ($P=0.191$), healthcare coverage ($P=0.189$), underlying diseases ($P=0.727$), regular medications ($P=0.930$), patient's knowledge of own diagnosis ($P=0.283$), duration of the disease ($P=0.089$), number of eye drops (bottles/day, $P=0.061$), number of oral medications ($P=0.328$), administration of medications by self/caregiver ($P=0.726$) and duration between medical visits ($P=0.870$).

Conclusion: This study showed that 29.8% of patients did not adhere to their uveitis medications. Factors associated with medication non-adherence included lack of knowledge regarding proper medication use, forgetfulness, experiencing side effects from medications, difficulties in travelling to the doctor's office and difficulties in using eye drops. The most significant factor was forgetfulness.

Keywords: Adherence; Compliance; Medication; Questionnaire; Uveitis

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Introduction

Uveitis is a form of intraocular inflammation which can be a sight threatening condition. Medical therapy is generally a mainstay of treatment in many cases therefore medication adherence is an essential key of treatment

success. In the past, physicians usually focused on medication compliance which was a doctor-centered term, referring to the degree to which patients properly followed the instructions or recommendations provided by their health care providers¹. Currently, physicians value medication adherence which is a patient-centered term, describing the extent to which a patient continues the agreed-upon mode of treatment

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under limited conditions when faced with conflicting demands, for example, the patients can choose their own treatment^{2, 3}. The outcome of this mode will give the better result of treatment.

Many studies reported problems associated with medication non-adherence in patients with glaucoma including forgetfulness, young age, the large numbers of eye drops, education, life entourage, monthly income and duration between medical visits^{4, 5}.

To date, there were no reports about medication adherence in patients with uveitis. The objective of this study was to evaluate the medication adherence in this particular group and their related factors associating with medication non-adherence.

Materials and Methods

Patients

This was a cross-sectional study conducted in an outpatient department, uveitis clinic, Thammasat university hospital, Thailand during June 2018 to January 2019. The subjects were diagnosed with uveitis, aged 13 years or older, and received medications for at least 2 weeks. We excluded patients who supervised the medications by caregivers but caregivers did not come to the hospital. Patients who did not speak Thai were also excluded. This research was approved by the human research ethics committee of Thammasat university.

During the patients' regular visit, the investigator selected and enrolled the subjects from those who met all the selection criteria and expressed interest in participating in the research. The patients signed an informed consent. All questionnaires were collected from the patients via an interviewer using 10 minutes

in a private and quiet room in a uveitis clinic.

Data collection

The questionnaire comprised of four parts:

The first part included questions evaluating the adherence to ocular medication. We used the 8-item Morisky Medication Adherence Scale (MMAS-8). This instrument was popularly applied in chronic diseases such as hypertension⁶. It was also used in ocular disease especially in glaucoma⁴. We translated the original English version into the Thai language. This questionnaire was composed of eight questions which were answered as yes or no. Questions 1, 2, 3, 4, 6, 7 were worth 1 point if answer was no. Question 5 was worth 1 point if the answer was yes and the answer for question 8 was divided into 5 scales started with score 1 to zero, divided into increments of 0.25. Finally, a sum of all scores were made, scores of 6 to 8 qualified as medication adherence.

The second part included questions of demographic characteristics such as age, gender, education level, occupation, healthcare coverage, underlying diseases and regular medications.

The third part included questions related to diseases and treatment such as patient's knowledge of own diagnosis, duration of the disease (defined as the time from the first diagnosis to data collection), number of eye drops (bottles/day), number of oral medications, whether the medication was administered by self/caregiver, and knowledge regarding proper use of medications (defined as knowing the drug administration correctly), and lastly,

duration between medical visits.

The fourth part consisted of questions regarding the problems affecting the patients' adherence, such as forgetfulness, experiencing side effects from medications, discouragement or stress, believing in uselessness of medications, difficulties in travelling to the doctor's office, difficulties in using eye drops (being unable to instill eye drops as prescribed, or imprecise instillation of eye drops), whether they feel overwhelmed by the amount of medications to take and financial issues. The patients can answer more than 1 choice in this part.

After completing the questionnaire, the researcher classifies participants into 2 groups by using the score in the first part. If the MMAS-8 score was ≥ 6 , this group was classified as medication adherence. If the MMAS-8 score was < 6 , it was classified as medication non-adherence. Afterwards, all items in part 2, 3 and 4 were interpreted and assessed for statistical associations.

Calculation of sample size

In order to estimate the sample size, we used two independent proportions (two-tailed test) based on data from a previous study⁴. The participants were divided into 2 groups: medication adherence ($N = 105$) and medication non-adherence ($N=45$, ratio 0.43) with a statistical power of 80%.

Statistical analysis

The data was collected in a standardized form, and stored in an electronic datasheet (Microsoft Excel). We used mean and standard deviation for continuous variables. Mann-Whitney U test was chosen for comparison. We used frequency and percentage for categorical variables and chi-square was chosen for comparison. The significant level was set at $P < 0.05$. Statistical analysis was conducted

using SPSS software version 22.

Results

Of a total of 151 cases, 79 patients (52.3%) were male and 72 patients (47.7%) were female. One hundred and six patients (70.2%) were adherent to uveitis medications, and 45 patients (29.8%) were medication non-adherent (table 1). The average age of the medication adherent group (51.6 ± 16.4) was older than the medication non-adherent group (48.9 ± 15.1). However, it was not statistically significant ($P=0.29$).

Patients' demographic characteristics were summarized in table 2. Patients' adherence to medication were not significantly associated with age ($P=0.377$), gender ($P=0.861$), educational level ($P=0.069$), occupation ($P=0.191$), healthcare coverage ($P=0.189$), underlying diseases ($P=0.727$) and regular medications ($P=0.930$).

Questions related to ocular diseases and treatment were concluded in table 3. Patients' adherence to medication was significantly associated with the patients' knowledge regarding proper use of medications ($P<0.001$). However, medication adherence was not significantly associated with patient's knowledge of own diagnosis ($P=0.283$), duration of the disease ($P=0.089$), number of eye drops ($P=0.061$), number of oral medications ($P=0.328$), administration of medications by self/caregiver ($P=0.726$) and duration between medical visits ($P=0.870$).

Table 4 summarized questions about problems affecting the patients' adherence. There were four statistically significant factors associated with patients' adherence to medications including forgetfulness ($P<0.001$), experiencing side effects from

medications ($P=0.025$), difficulties in travelling to the doctor's office ($P=0.001$) and difficulties in using eye drops ($P=0.025$). The most significant reason was forgetfulness answered by 60 patients (39.7%). The

side effects of medications that patients suffered were burning sensation, itching and irritation of the eye. Two patients experienced difficulties in using eye drops (1.3%) because they could not follow the

Table 1. Table shows questions evaluating the adherence to the ocular medications (8-item Morisky Medication Adherence Scale).

Questions	Yes					No
1. Do you sometimes forget to take your medications over the past two weeks?						
2. Do you sometimes miss taking your medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicines?						
3. Have you ever cut back or stopped taking your medicines over the past two weeks because you felt worse when you took it?						
4. When you travel or leave home over the past two weeks, do you sometimes forget to bring along your medicines?						
5. Did you take all your medicines yesterday?						
6. When you feel like your symptoms are under control, do you sometimes stop taking your medicines over the past two weeks?						
7. Taking medicines every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan over the past two weeks?						
8. How often do you have difficulty remembering to take all your medicines over the past two weeks?	Never (0%)	Once in a while (1-19%)	Sometimes (20-49%)	Usually (50-99%)	All the time (100%)	

frequency of the eye drops as prescribed by ophthalmologist.

Discussion

Medication non-adherence was one of the main problems aggravating uveitis disease which led to poor prognosis. This study showed 29.8% (45/151) of patients who did not adhere to their own medications. There were no significant

differences with age and gender, consistent with a study on patients with glaucoma⁷. Young age may be the factor involving medication adherence. However, the patients aged less than 13 were excluded in this study.

This study showed that education levels were not significantly associated with patients' adherence to medication. This was different from a previous study⁸ showing that

Table 2. Table shows demographic characteristics of participants.

Demographic characteristics		Medication adherence (%)	Medication non-adherence (%)	<i>p-value</i>
Age(years)	<50	50(66.7)	25(33.3)	0.377
	≥ 50	56(73.7)	20(26.3)	
Gender	Male	56(70.9)	23(29.1)	0.861
	Female	50(69.4)	22(30.6)	
Education level	≤ High school	69(65.7)	36(34.3)	0.069
	Bachelor degree	37(80.4)	9(19.6)	
Occupation	Self-employed	52(68.4)	24(31.6)	0.191
	Government officer	21(60.0)	14(40.0)	
	Student	5(83.3)	1(16.7)	
	No work	28(82.4)	6(17.6)	
Healthcare coverage	Universal coverage scheme	33(84.6)	6(15.4)	0.189
	Social security scheme	19(63.3)	11(36.7)	
	Government officer	31(63.3)	18(36.7)	
	Life insurance	1(100.0)	0(0.0)	
	Spend money	22(68.8)	10(31.2)	
Underlying diseases	no	54(67.5)	26(32.5)	0.727
	1 disease	22(78.6)	6(21.4)	
	2 diseases	17(68.0)	8(32.0)	
	≥3 diseases	13(72.2)	5(27.8)	
Regular medications	no	55(67.9)	26(32.1)	0.930
	1 drug	11(73.3)	4(26.7)	
	2 drugs	11(73.3)	4(26.7)	
	≥3 drugs	29(72.5)	11(27.5)	

Table 3. Table summarizes the questions about problems affecting the patients' adherence.

Demographic characteristics		Medication adherence (%)	Medication non-adherence (%)	<i>p-value</i>
Patient's knowledge of own diagnosis	Correct	97(68.8)	44(31.2)	0.283
	Incorrect	9(90.0)	1(10.0)	
Duration of the disease	< 1 year	33(66.0)	17(34.0)	0.089
	1-5 years	48(80.0)	12(20.0)	
	>5 years	25(61.0)	16(39.0)	
Number of eye drops	≤ 1 eye drop	76(75.2)	25(24.8)	0.061
	> 1 eye drop	30(60.0)	20(40.0)	
Number of oral medications	≤ 1 oral medicine	78(72.9)	29(27.1)	0.328
	> 1 oral medicine	28(63.6)	16(36.4)	
Administered medications by	self	99(69.7)	43(30.3)	0.726
	caregiver	7(77.8)	2(22.2)	

Demographic characteristics		Medication adherence (%)	Medication non-adherence (%)	p-value
Knowledge regarding proper use of medications	Yes	106(73.6)	38(26.4)	<0.001
	No	0(0.0)	7(100.0)	
Duration between medical visits	< 1 month	22(66.7)	11(33.3)	0.870
	1 – 3 months	63(71.6)	25(28.4)	
	>3 months	21(70.0)	9(30.0)	

Table 4. Table shows the questions about problems affecting the patients' adherence.

Problems affecting the patients' adherence		Medication adherence (%)	Medication non-adherence (%)	p-value
Forgetfulness	Yes	19(30.2)	44(69.8)	<0.001
	No	87(98.9)	1(1.1)	
Experiencing side effects from medications	Yes	0(0.0)	3(100.0)	0.025
	No	106(71.6)	42(28.4)	
Discouragement or stress	Yes	0(0.0)	2(100.0)	0.087
	No	106(71.1)	43(28.9)	
Believing in uselessness of medications	Yes	0(0.0)	2(100.0)	0.087
	No	106(71.1)	43(28.9)	
Difficulties in travelling to the doctor's office	Yes	2(20.0)	8(80.0)	0.001
	No	104(73.8)	37(26.2)	
Difficulties in using eye drops	Yes	0(0.0)	3(100.0)	0.025
	No	106(71.6)	42(28.4)	
Feel overwhelmed by the amount of medications to take	Yes	0(0.0)	2(100.0)	0.087
	No	106(71.1)	43(28.9)	
Financial issues	Yes	0(0.0)	0(0.0)	-
	No	106(70.2)	45(29.8)	

the higher education levels were associated with a higher understanding of the necessity for medication adherence. This study demonstrated that the patients' knowledge regarding proper use of medications was significantly associated with patients' adherence to medication. Improving patients' understanding regarding medication administration was the important key to enhancement of medication adherence. This study emphasizes the need for ophthalmologists and pharmacists to explain frequency and adverse effects of

medications to patients.

Regarding the number of eye drops and oral medicine in the adherent group, most patients used 0-1 eye drops, accounting for 71.7% of patients and used 0-1 oral medications accounting for 73.6% of patients. In the non-adherent group, 40% of cases used at least 2 eye drops compared to 24.8% of cases used less than 2 drops. These findings could explain the smaller number of medications resulted in better convenience for the patients. Nevertheless, these

findings showed no significant relationship which was not in line with the previous study⁹.

This study showed that forgetfulness, experiencing side effects from medications, difficulties in travelling to the doctor's office and difficulties in using eye drops were the reasons significantly affecting the patients' adherence. This was consistent with other studies^{4, 10}. The most important reason was forgetfulness. There were some techniques helping the patient remember how to take the drugs correctly such as an alarm device, automated text note^{11, 12} or application to remind on medical time. Strategies developed to promote medication adherence included providing clear instructions to the patients, modifying patient misunderstanding, enhancing patient communication, simplifying the treatment regimen and evaluating adherence³. Nowadays, there are many technological tools to increased efficiency of the patients' adherence such as online appointment and patient-doctor video conference.

Nonetheless, there were several limitations in this study. The participant could not represent all patients who came to the uveitis clinic, for instance, younger patients (< 13 years old) and patients who could not take the drugs without caregivers. We used MMAS-8 to assess the patients over two weeks. Therefore, it could not represent the patients' whole life. Lastly, our study did not examine the frequency of instillation which may impact the patients' adherence.

Conclusion

This study showed that 29.8% of patients did not adhere to their uveitis medications.

Factors associated with medication non-adherence included lack of knowledge regarding proper medication use, forgetfulness, side effects of medications, difficulties in travelling to the doctor's office and difficulties in using eye drops. The most common reason was forgetfulness.

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