A PHARMACIST INTERVENTION ON KNOWLEDGE AND ADHERENCE IN PATIENTS WITH OPEN-ANGLE GLAUCOMA

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ABSTRACT

Objective: The objective of the study is to assess the pharmacist's intervention on knowledge and adherence in patients with open-angle glaucoma therapy.

Methods: The study was conducted at the glaucoma outpatient department of Shree Rana Ambika Shah Eye Hospital, Rupandehi, Nepal. Census sampling was performed among the glaucoma patients meeting the inclusion criteria from August 2018 to November 2018. Data were collected using a structured questionnaire that included questions about demography, knowledge of glaucoma, medication adherence, and factors associated with medication non-adherence to glaucoma therapy. Each patient was counseled by a pharmacist, and the relevant information was provided in the form of an information leaflet. Knowledge level and adherence level were re-assessed during the follow-up visit after 1 month. The Morisky–Green–Levine medication adherence scale was used to assess adherence.

Results: A total of 103 patients were enrolled in the study, and the majority of the patients were of age ≥59 years. After intervention by the pharmacist, the knowledge level on glaucoma improved from poor to good. Before intervention, about 31% of patients were adherent to the medication therapy, but after intervention, about 73% of patients were adherence to the medication therapy. There was a significant difference in the mean of the knowledge level score and the mean of the medication adherence score before and after intervention. The common causes of non-adherence were reported to be forgetfulness, a stressful life, and difficulties with medication time.

Conclusion: The study demonstrates that pharmacist intervention is effective in improving both knowledge and medication adherence to open-angle glaucoma therapy.

Keywords: Open-angle glaucoma, Medication adherence, Morisky–Green–Levine medication adherence scale.

INTRODUCTION

An eye disease with high intraocular pressure (IOP) is called glaucoma [1]. Although it is one of the most common causes of blindness in the world, it is often overlooked until it turns into a serious condition [2]. In addition to high IOP, other risk factors include greater susceptibility to optic nerve ischemia, decreased or decreased blood flow, excitotoxicity, the immune system, and other adverse effects [3]. OAG accounts for at least 90% of all glaucoma cases and is the most common type. Primary open-angle glaucoma (POAG) and secondary open-angle glaucoma are the two types of OAG [4]. Treatment remains the mainstay of therapy because of the risk of complications, the likelihood of failure, and the high cost associated with laser therapy and surgery [5]. Prostaglandin analogs, adrenergic antagonists, beta-blockers, alpha-2-adrenergic agonists, carbonic anhydrase inhibitors, miotics, and oral carbonic anhydrase inhibitors are common glaucoma drugs [6]. Patient compliance has long been recognized as an important factor in the treatment of glaucoma. If the patient does not comply with the medical policy, the chance of preserving vision will decrease [7].

According to research, glaucoma is the second most common cause of blindness in the world, with 74% of glaucoma patients having POAG [8,9]. The highest prevalence of primary angle-closure glaucoma (PACG) and POAG occurs in Asia and Africa, respectively. In 2013, approximately 64.3 million people worldwide were living with glaucoma; In 2020, this number will increase to 76 million; and it is estimated to reach 111.8 million by 2040 [10,11].

According to a population survey conducted in Nepal, glaucoma affects 1.9% of the population, of which 68% is PAAG and 22.67% is PACG. In this study, secondary glaucoma affected 9.33% of participants [12]. The most common type of glaucoma in Nepal is POAG [13].

To our knowledge, there is no large-scale study of medication adherence and cognitive level in patients with open-angle glaucoma in Nepal. We planned to conduct this study to better understand the causes of glaucoma treatment non-adherence and how to promote patient compliance and to guide glaucoma treatment for better outcomes.

METHODS

This study was conducted at the glaucoma outpatient department of Shree Rana Ambika Shah Eye Hospital, Nepal. Patients who met the inclusion criteria (e.g., all genders, age >18 years, diagnosed with OAG, and at least one visit) were included in study. The census was conducted between August 22, 2018, and November 22, 2018, and a total of 103 patients agreed to participate in this study. Patients who did not have an appointment and did not agree to participate were excluded from the study. Monitoring began on September 23, 2018.

Questionnaire was validated and translated into local language (Nepali) containing questions to assess patient data, glaucoma awareness, medication adherence, and reasons for non-compliance. Patient demographic information includes information such as age, gender, race, marital status, family type, and education level. Similarly, the glaucoma knowledge level questionnaire consists of 10 questions and a score is

given for each correct answer. A score of 7–10 is "good knowledge", 4–6 is "moderate", and scores below 4 are scored as "poor knowledge" [14]. The level of drug adherence was measured with the Morisky Green Levine drug compliance scale (MGLS) in 1986 and consists of four questions [15]. MGLS scores range from 0 to 4, and if the scores are 0, 1–2, and 3–4, respectively, the level of drug use is considered high, moderate, and low [16]. Nine multiple-choice questions were included to assess the causes of drug non-compliance [17]. A registered pharmacist (Nepal Pharmacy No. G 1598) was impressed by the newsletter containing general information about glaucoma and its symptoms, the proper use of glaucoma medications, the side effects commonly associated with glaucoma medications, and ways to manage side effects. In addition, patients are advised to set an alarm clock to increase drug compliance and lead a stress-free life. This document is based on the National Institute for Health and Care Excellence Glaucoma Guidelines: Diagnosis and Management and has been translated into Nepali with expert assistance. At the return visit 1 month later, patients were asked the same questionnaire to assess the effect of the pharmacist's intervention.

With the help of SPSS-16, descriptive statistics are used to show population data as percentages and frequencies. Knowledge and commitment scores are expressed as mean±standard deviation. Level of knowledge and adherence to medication before and after the intervention were assessed with paired t-tests and expressed as p-values. The relationship between the level of knowledge and the level of drug compliance was evaluated with the bivariate Spearman correlation test. The reason for the drug not meeting the two time points is shown as a percentage and p-value.

RESULTS

Study variables
A total of 103 patients were enrolled in the study, and only 88 patients were followed up after 1 month. The demographic and glaucoma-related variables are presented in Table 1. The highest percentage

Table 1: Demographic and glaucoma-related variables

Demographic variables	Percentage (frequency)	Glaucoma related variables	Percentage (frequency)
Age (Years)		**Duration of glaucoma**	
18–28	2.9 (3)	<1 month	14.6 (15)
29–38	9.7 (10)	1–6 month	24.3 (25)
39–48	18.4 (19)	6 month–1 year	14.6 (15)
49–58	25.2 (26)	1–2 years	8.7 (9)
≥59	43.7 (45)	>2 years	37.9 (39)
Gender		**Glaucoma examination**	
Male	68 (70)	Tonometry	0
Female	32 (33)	Ophthalmoscopy	0
Marital status		Perimetry	0
Married	80.6 (83)	Gonioscopy	0
Unmarried	1 (1)	Pachymetry	1.9 (2)
Widow/ widower	18.4 (19)	All of the above option	98.1 (101)
Ethnicity		**Vision Profile**	
Hindu	90.3 (93)	Bad	12.6 (13)
Muslim	9.7 (10)	Fair	56.3 (58)
Buddhist	0	Good	31.1 (32)
Christian	0		
Family type			
Nuclear	34 (35)		
Joint	66 (68)		
Education level			
Illiterate	35 (36)		
School level	49.5 (51)		
Intermediate	6.8 (7)		
Bachelor or above	8.7 (9)		

(about 44%) of enrolled patients was in the age group ≥59 years and males (about 68%). About 81% of the patients were married, and 66% lived in joint families. Most of the patients had acquired school-level education (50%), while the illiterate patients occupied 35% of the study. Less than 15% of the patients were educated up to intermediate (10+2) and bachelor level (undergraduate degree). The most common religion was found to be Hinduism (90%).

Most of the patients (38%) had a history of OAG for more than 2 years, with fair vision in about 56% of the patients. In the study site, glaucoma tests consisted of tonometry, ophthalmoscopy, perimetry, gonioscopy, and pachymetry in about 98% of cases.

Influence of intervention on knowledge and adherence levels
The findings on knowledge level about glaucoma and adherence level to glaucoma therapy are shown in Table 2. The scoring of knowledge level and adherence level is different. A lower score of knowledge represents poor knowledge, while a lower score of medication adherence level indicates high adherence. Before intervention, it was found that only about 12% of patients had good knowledge about glaucoma, but after intervention, about 81% of patients showed a good level of knowledge. Similarly, only about 31% of patients showed high adherence to glaucoma therapy before intervention which improved to 73% after intervention. A significant difference was observed in both knowledge level and adherence level before and after the intervention (p<0.001) suggesting that an intervention by a pharmacist was effective.

Correlation between knowledge and adherence levels
The correlation between knowledge level and adherence level was studied with the help of the Spearman correlation coefficient (Table 3). It was observed that the Spearman correlation coefficients are negative for both before and after intervention, which means that when the score of knowledge is increased, the score of medication adherence is decreased, and a decreased medication adherence score represents high adherence. Even though the correlation coefficient was negative before intervention, there was no significant correlation between knowledge level and medication adherence level suggesting that a change in knowledge level did not improve medication adherence significantly. A similar correlation was also studied after the intervention, and a negative correlation was also observed in this case. Since the difference between the mean scores of knowledge and medication adherence was significant (p=0.045), improving the knowledge level through an intervention by a pharmacist improved medication adherence by reducing the score of medication adherence.

Causes of non-adherence to glaucoma therapy
Nine possible causes behind non-adherence to glaucoma therapy were proposed in the questionnaire, and the responses are given in Table 4. A study showed that the most common cause behind non-adherence was forgetfulness (57.3%), followed by a very stressful life (44.7%) before intervention. Similarly, about 26% responded that they experienced difficulty with the medication time as a cause of non-adherence. After a pharmacist intervention, forgetfulness (12.6%) and a very stressful life (1.9%) were the common responses as reasons behind non-adherence to glaucoma therapy. When the responses were compared before and after the intervention, most of the responses were significantly different.

DISCUSSION

The current investigation revealed that the majority of the patients fell into the 60–69-year age range, which was comparable with a study of a similar nature conducted in India [18]. The highest number of patients with OAG at age 59 may be due to the greater risk of OAG in people over 40 [14]. This study revealed that men (68%) have a higher risk of OAG, which was comparable with a study in which men made up 51% of the patient population [19]. About 80.6% of patients were married in this study because the majority of the participants were under 59 years old, and a similar finding was found in a study by Mbadugha and Onakoya [20].

Table 2: Knowledge and adherence levels before and after intervention

Knowledge level, percentage (frequency)					
Intervention	Good knowledge (7–10)	Fair knowledge (4–6)	Poor knowledge (<4)	Mean score (SD)	p
Before intervention	11.7 (12)	28.2 (29)	60.2 (62)	3.36 (2.55)	<0.001*
After intervention	80.6 (83)	4.9 (5)	0	8.57 (1.28)	
Medication adherence level, percentage (frequency)					
Intervention	High adherence (0)	Medium adherence (1–2)	Low adherence (3–4)	Mean score (SD)	p
Before intervention	31.1 (32)	60.2 (62)	8.7 (9)	1.19 (1.06)	<0.001*
After intervention	72.8 (75)	12.6 (13)	0	0.15 (0.36)	

*Statistically significant (p<0.05). SD: Standard deviation

Table 3: Correlation between knowledge and adherence levels

Parameters	Spearman correlation coefficient	Frequency	p
Before intervention			
Score of knowledge level	−0.113	103	0.257
Score of medication adherence level			
After Intervention			
Score of knowledge level	−0.214	88	0.045*
Score of medication adherence level			

*Statistically significant (p<0.05)

Table 4: Causes of non-adherence to glaucoma therapy

Reasons of non-adherence	Percentage (frequency)		p
	Before intervention	After intervention	
I believe that the glaucoma does not cause vision loss	3.9 (4)	1.9 (2)	0.417
I cannot believe these medications are effective	1 (1)	0	0.320
I do not have much knowledge about this disease	5.8 (6)	0	0.014*
Forgetfulness	57.3 (59)	12.6 (13)	≤0.001*
Difficulties to understand how to use the medications	9.7 (10)	0	0.001*
Due to the side effects of medication	5.85 (6)	0	0.014*
Difficulties with the medication time	26.2 (27)	0	≤0.001*
Lack of confidence in doctor	1.9 (2)	0	0.158
Very stressful life	44.7 (46)	1.9 (2)	≤0.001*

*Statistically significant (p<0.05)

Patients' awareness of glaucoma was lacking before intervention but improved following it, and the findings of this study were consistent with those of a study carried out in India [14]. The improved knowledge after intervention indicated that the information and leaflet provided by the pharmacist were responsible for this improvement.

Before intervention, the mean score for adherence level was medium (1.19), which was comparable to the result of a study by Movahedinejad and Hajbaghery [21]. After the intervention, 72.8% of patients were highly adherence to glaucoma therapy. This improvement might be attributable to the cellphone alarm that the pharmacist recommended during the session.

In this study, there was a significant difference between the scores for medication adherence and knowledge of glaucoma, demonstrating that pharmacist intervention was successful in improving patient knowledge, which will ultimately improve medication adherence. The

findings of Mansouri *et al.*, who came to the conclusion that enhancing patient adherence required education, confirmed the findings [22].

This study went on to state that forgetfulness and a very stressful lifestyle were the main reasons people did not follow their glaucoma treatment regimens, which was supported by earlier research [7,23-25] that found similar factors to be significant barriers to medication non-adherence. Other studies have shown that an excessive number of medications, problems in scheduling times for medical visits, side effects of glaucoma medications, forgetting the medications, difficulties while using eye drops, and impatience were among the most important factors affecting patient adherence to glaucoma medications [21].

CONCLUSION

The findings of this study showed that a pharmacist intervention was effective in improving knowledge about open-angle glaucoma, which in turn improved adherence to glaucoma therapy. Furthermore, an intervention was also required to minimize forgetfulness among glaucoma patients, which was found to be a major cause of medication non-adherence. An intervention in the form of verbal counseling and an information leaflet would be effective for both literate and illiterate patients.

DECLARATIONS

Ethics approval and consent to participate
Written informed consent was taken from all the patients after explaining the nature of the study. Ethical approval was taken from the Institutional Review Committee of Pokhara University, Nepal (Ref. No. 20-075-76). The study approval was taken from Shree Rana Ambika Shah Eye Hospital, Siddharthanagar-3, Rupandehi, Nepal (Ref. No. 1712).

AVAILABILITY OF DATA AND MATERIALS

All relevant data are included in the manuscript. Further detailed data are available upon request.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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AUTHORS' CONTRIBUTIONS

Author KD was principle investigator and contributed to design and implementation of the research, the analysis of the results, and the writing of the manuscript. The author, GS, encouraged and supervised KD throughout this work.

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