Aswan University Medical Journal, volume 4 / No.2/ September 2024 (46-54) Online ISSN: **2735-3117**

ORIGINAL ARTICL

Fasting Ramadan and compliance to antiglaucoma eye drops

Ahmed F. Gabr, Amr H. Ahmed*, Andrew R. Ross, Ahmed I. Howaidy.

Ophthalmology department, Faculty of Medicine, Aswan University

ABSTRACT

Keyword: Adherence, glaucoma eye drops, fasting

***Corresponding author: Amr Hamdi Ahmed**

Email: d.amrdhmash@gmail.com

Phone: 01146649855

Background: studying patients' compliance and related factors is essential in the process of glaucoma treatment. **Aim:** This study aims to identify the effect of Ramadan fasting and other factors affecting compliance during fasting among glaucoma patients in Aswan. **Methods:** In the form of 20 -close ended- questions**,** 400 questionnaires were filled by glaucoma patients in the outpatient clinic in Aswan university hospital. After applying the exclusion criteria, 248 patients were accepted for this study. Different variables were investigated such as: age, gender, level of education, patients' beliefs and attitude towards using eye drops during fasting. **Results:** Patients' compliance during fasting was significantly affected by their beliefs, as 87.8% of patients who believed that eye drops do not break the fast were compliant (p =0.001). While 88.1% (p =0.044) of patients who discussed using eye drops during fasting with their ophthalmologists were more compliant to antiglaucoma drops during fasting. The other factors targeted by our study, their effect on compliance during fasting were not proven to be statistically significant. **Conclusion:** patients' compliance was significantly affected by their beliefs. Also, having a discussion about using eye drops during fasting with ophthalmologist had a positive influence on patients' compliance during Ramadan.

INTRODUCTION:

Being the second leading cause of blindness worldwide, glaucoma represents an important health care issue with a strong impact on the economy, especially in African developing country [(1)]. Lowering IOP to a certain level to prevent further optic nerve damage is still considered the main goal of glaucoma treatment [(2)]. Despite various laser and surgical treatment options, antiglaucoma eye drops is the initial and most common treatment option [(3)].

Patient compliance to antiglaucoma eye drops is a corner stone in the management of high Intra Ocular Pressure (IOP) making its study a critical issue that can enable ophthalmologists to provide more comprehensive care and help them to determine whether poor response to the treatment is attributed to low efficacy or poor patient compliance to the treatment [(4)].

Previous studies reviewed the effect of many factors on patients' compliance such as: age, gender, education, physical disability, patient knowledge and awareness about the disease, other systemic diseases, having medical insurance [(5)], forgetfulness, drug unavailability, high cost, fear of side effects [(6)], family history, complex treatment [(7)], and adherence to follow up [(8)].

Fasting Ramadan is the fourth pillar of Islam and it is obligatory for all adult Muslims to fast the whole month of Ramadan [(9)]. Most of the Islamic scholars agreed that using eye drops during fasting

does not break the fast [10]. Despite that, many Muslims change or avoid their antiglaucoma drops regimen during Ramadan [11].

Compliance to systemic treatment during Ramadan such as treatment of diabetes or bronchial asthma was the aim of many studies [12], but to our knowledge, no other study focused on the effect of Ramadan fasting on compliance to antiglaucoma treatment.

PATIENTS AND METHODS:

A questionnaire was designed to identify changes in the use of antiglaucoma drops during Ramadan and the effect of other factors on patient's compliance to drops among glaucoma patients in Aswan, Egypt. Subjects were collected from the patients attending the outpatient clinic in Aswan University Hospital. and were informed about the nature of this study. Adult Muslim glaucoma patients who fast more than half of Ramadan, and have been using anti-glaucoma drops for more than six months were included in the study. While incomplete questionnaire or questionnaires which did not meet the inclusion criteria were excluded.

The questionnaire was written in Arabic using a simple language and was either completed by the patients, or someone on their behalf if they were illiterate.

With the approval of the local committee (Aswan University ethical Committee) and Institutional Review Board (IRB). Data were analyzed using Statistical Package for Social Sciences (SPSS) software program (version 26). Qualitative variables were recorded as frequencies and percentages and were compared by chi-square test. A two-tailed p value < 0.05 was considered statistically significant.

Questionnaire items:

Questionnaire was anonymous. Close-ended questions were used in the form of yes or no or multiple choice. Likert scale was used in selected questions. The questionnaire included the following questions:

1-Age:

2-Gender:

3-Level of education:

4-When did you start using anti-glaucoma eye drops?

5-How many types of anti-glaucoma medications do you use?

6-How do you acquire your eye drops?

7-How do you instill eye drops?

8-Do you forget using eye drops?

9. How good is your knowledge about the nature of glaucoma and its complications?

10. How often do you visit your ophthalmologist for glaucoma follow up?

11. Have your doctor counselled you about the importance of anti-glaucoma treatment and the dangers of high IOP?

12. Have you experienced any complications to glaucoma?

13. Do you have any family history of glaucoma?

14. Have you had any glaucoma surgery?

15. How many days did you fast during Ramadan?

16. Do you believe that using eye drops during fasting breaks the fast?

17. How do you use anti-glaucoma eye drops during Ramadan?

18. Did you discuss using eye drops during fasting with your doctor?

19. What do you think about the following statement "using eyedrops does not break the fast as it is a necessary treatment to maintain vision"?

20. What do you think about the following statement "using eye drops during fasting does not break the fast because it is not a type of food or drink and Al Azhar institution confirmed this"?

RESULTS:

Four hundred questionnaires were collected. After exclusion of incomplete questionnaires and questionnaires that did not meet the inclusion criteria, 248 patients were accepted for this study

general demographics:

The mean age of respondents was 55.8 ±13.4 SD (range from 18 to 85). Male patients (n=126, 50.8) were slightly higher than females (n=122, 49.1%). The majority of our patients (n=145, 58.4%) had only school education, almost one fifth (n=51, 20.6%) achieved university education and a similar number (n=52, 21%) were illiterate.

More than half of participants (N=138, 54%) paid for treatment, while medical insurance covered the treatment of the rest either partially or fully (n=110, 46%).

Generally, more than half of the patients (n=140, 56.5%) reported good compliance (rarely or never forgot to use they eye drops). On the other hand, (n=108, 43.5%) reported poor compliance.

Nearly half of the study subjects (n=132, 53.2%) stated that they did not have enough information about the nature and complications of glaucoma, while almost one third (n=81, 31%) of them felt they had sufficient education on glaucoma. Only 14% (n=35) thought their understanding about the disease were excellent.

Less than half of the patients (n=111, 44.8%) had a regular follow up every 3 months. While almost one fifth (n=53, 21.4%) had follow up every 6 months. The rest of them had follow up visits every year (n=28, 11.3%) or less (n=56, 22.5%).

Most of patients (n=201, 81%) stated that they received proper education from their ophthalmologists about glaucoma and its complications and importance of compliance to their eye drops, while lesser number of patients (n= 47, 19%) denied having any counseling.

Using antiglaucoma eye drops during fasting

Among participants, 74.6% (n=185) stated that they were fasting all days of Ramadan, while 25.4% (n=63) were fasting more than half of the holy month. Those who were fasting less than half of Ramadan were excluded from the study

The majority of patients (n=181, 73%) believed that using drops during fasting hours does not break the fast. On the other hand, one fifth of the patients (n=53, 21%) thought that it does. The remaining (n=14, 6%) stated that they don't know.

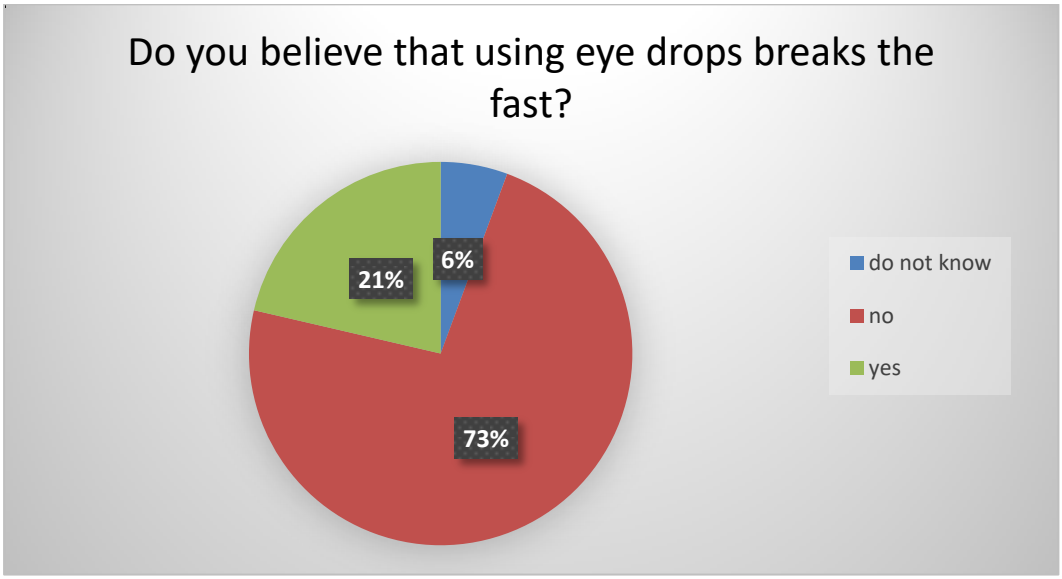

Figure (1): patient beliefs about using eye drops during fasting

The majority of the patients did not change their practice during Ramadan. About two thirds (n=151, 60.9%) were using their eye drops during fasting hours, and fewer numbers (n=21, 8.4%) were only using eye drops once at night from the start.

While those who altered their treatment schedule to avoid using drops during fasting hours, either used it once at night (during non-fasting hours) and ignored the morning dose (n=29, 11.7%), or used it twice after iftar (n=47, 19%). See figure (2).

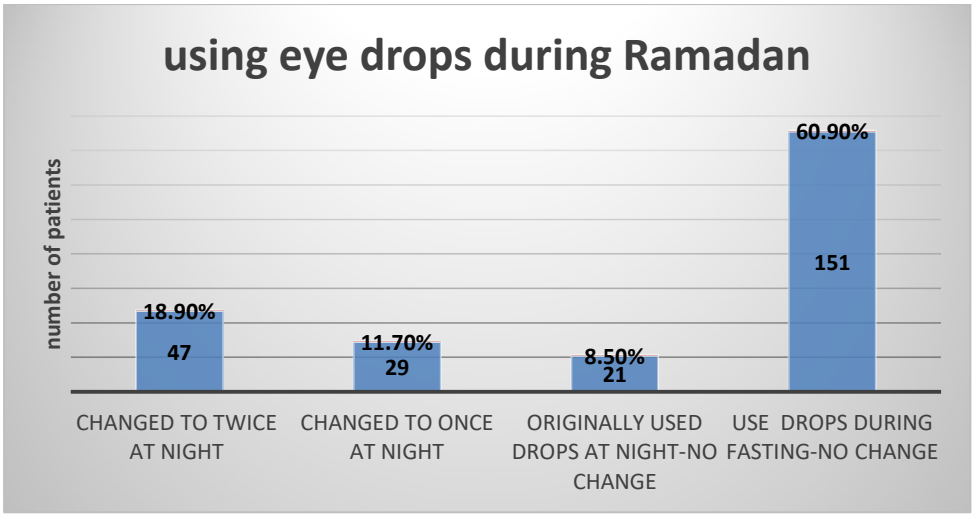

Figure (2): patients' compliance to antiglaucoma eye drops during fasting based on the change in their treatment regimen

Effect of patients Beliefs on compliance to eye drops during fasting:
Compliance during fasting was 87.8% of the group of patients who believed that using eye drops does not break fasting, compared to only 11.3% compliance level among those who thought that eye drops break fasting. Patients who had a neutral opinion, 50% of them were compliant. The difference in compliance during fasting between patients who believed that using eye drops break fasting and those who believed it does not was considered statistically significant (p =0.001).

Two statements were introduced to patients to give their opinion;

-First one " Do you agree that using eyedrops doesn't break the fast as it is a necessary treatment to maintain vision"

The second statement "Using eye drops during fasting does not break the fast because it is not a type of food or drink and Al Azhar Institution confirmed this"

The vast majority of patients who agreed with the statements were compliant to eye drops during fasting (85.6%), (88.1%) respectively. While none of those who disagreed with the statements were compliant during fasting. Compliance level among those who neither agree nor disagree with the statements were (35.4%), (39%) respectively. The difference in compliance during fasting between these different groups was considered statistically significant (p =0.001). Patients who discussed using eye drops during fasting with their ophthalmologists were more compliant during fasting with 88.1% (p =0.044).

All the other 14 factors targeted by our study including: age, gender, level of education, duration of using antiglaucoma eye drops, number of used medications, financial aspect, eye drop application practice, general compliance, knowledge about glaucoma, receiving counseling about glaucoma, follow up frequency, family history of glaucoma, previous glaucoma surgery, and previous glaucoma complications showed different compliance level but were not proven to be statistically significant.

Table (1): factors affecting compliance during fasting and their significance

Factors affecting compliance during fasting					
1-Age	**Less than 40 years**	**More than 40 but less than 60 years**	**More than 60 years**	**p-value**	**Significance**
Compliance level	83.3%	70.9%	63.4%	0.100	Insignificant
2-Gender	**Male**	**Female**		**p-value**	**Significance**
Compliance level	72.2%	66.4%		0.320	Insignificant
3-Level of education	**No education**	**School education**	**High education**	**p-value**	**Significance**
Compliance level	58.8%	71%	76.5%	0.094	Insignificant
4-Duration of using glaucoma drops	**Less than 2 years**	**More than 2 years and less than 4 years**	**More than 4 years**	**p-value**	**Significance**
Compliance level	70.1%	74%	65.9%	0.599	Insignificant
5-Number of used eye drops	**1 type**	**2 types**	**3 types**	**p-value**	**Significance**
Compliance level	76.2%	68.6%	58.7%	0.115	Insignificant
6-Financial aspect	**Pay**	**Free**	**Partially free**	**p-value**	**Significance**
Compliance level	67.2%	64.7%	76.4%	0.363	Insignificant
7-Eye drop application	**Patient**	**Others**	**Sometimes patient or others**	**p-value**	**Significance**
Compliance level	70.5%	68.4%	63%	0.724	Insignificant
8-General compliance	**Good compliance**	**Poor compliance**		**p-value**	**Significance**
Compliance level	70%	68.5%		0.911	Insignificant
9-Knowledge about glaucoma	**No or not enough**	**Sufficient or excellent**		**p-value**	**Significance**
Compliance level	65.1%	74.1%		0.163	Insignificant
10-Education by doctor	**Yes**	**No**		**p-value**	**Significance**
Compliance level	70.6%	63.8%		0.461	Insignificant
11-Follow up frequency	**Every 3 or 6 months**	**Every year or more**		**p-value**	**Significance**
Compliance level	71.9%	64.3%		0.274	Insignificant
12-Family history	**Yes**	**No**		**p-value**	**Significance**
Compliance level	75.3%	66.5%		0.204	Insignificant
13-Having	**Yes**	**No**		**p-value**	**Significance**

glaucoma surgery					
Compliance level	72.6%	67.7%		0.514	Insignificant
14-Having glaucoma complication	**Yes**	**No**		**p-value**	**Significance**
Compliance level	69.2%	69.4%		0.905	Insignificant
15-Believe that eye drops break fasting	**Yes**	**No**		**p-value**	**Significance**
Compliance level	11.3%	87.8%		<0.001	Significant
16-Opinion about statement 1	**Agree**	**Neutral**	**Disagree**	**p-value**	**Significance**
Compliance level	85.6%	35.4%	0%	<0.001	Significant
17-Opinion about statement 2	**Agree**	**Neutral**	**Disagree**	**p-value**	**Significance**
Compliance level	88.2%	39%	0%	<0.001	Significant
18-Discuss using eye drops during fasting with doctor	**Yes**	**No**		**p-value**	**Significance**
Compliance level	80%	65.6%		0.044	Significant

DISCUSSION:

In our study, compliance level to antiglaucoma eye drops during fasting, i.e. not changing their treatment regimen, was 69.8%. A study from India found that only 34.2% of participants would continue their regular treatment during fasting. [(11)]. In a study conducted in Indonesia, 78.6% of participants stated that they would use eye drops during fasting [(13)]. A similar study from Singapore concluded that 91% of participants would use eye drops during Ramadan [(14)]. A UK based study revealed that 59.4% of respondents would stay on the same regimen during Ramadan [(9)]. All these previous studies investigated patients' beliefs and attitude towards using eyedrops during fasting through questionnaires. The number of collected questionnaires was higher in our study as 248 questionnaires were completed, compared to 190 [(11)], 234 [(13)],101 [(9)] and 100 [(14)] in the previous studies.

Unlike our study, none of the previous studies focused on compliance to glaucoma eye drops during fasting, as these studies investigated the use of eyedrops in general, hence, questionnaires were collected from patients and healthy people also, inside medical and non-medical institutions like schools [(13)] and mosques [(9)]. In our study questionnaires were only collected from glaucoma patients at hospital.

While our study measured patients' adherence to eye drops during fasting through the change in their treatment regimen, other studies measured compliance through patients' opinion or as hypothetical question about using eye drops during fasting. [(9)], or did not measure compliance and focused on patients' attitude and believes about using eye drops [(15)].

Many factors were investigated in our study as well as other studies such as: age, gender, level of education and consulting an ophthalmologist before changing treatment regimen. While the objective of our study was the effect of these factors on patients' compliance during fasting, previous studies focused on the effect of these factors on patients' opinions [14,9]. Both age and gender had no significant effect in all studies including ours, while according to **Kumar et al**, level of education had a significant influence on patient attitude towards using eye drops to treat a condition that affects vision [9]. According to **Saha**, only 4% of participants consulted their ophthalmologist before changing their eye drops regime during fasting [15]. In our study almost 26% of participants discussed using eye drops during Ramadan with their doctors, and compliance rate was much higher among this group (88.1%).

Patients' beliefs about whether using eye drops during fasting breaks the fast or not was also a common point in our study and previous ones, the effect of this factor was significant in previous studies [14] as well as ours.

Unlike our study, some previous studies focused on opinions of participants about using eye drops in different eye conditions [11,9]. In other studies, they commented whether reaching the throat is related to breaking the fast or not [15,14]. Some studies investigated if patients who would fast extra days if they broke the fast, would have a different opinion on using eye drops during fasting [11,9]. One study found out that Muslims who immigrated to the UK, only 35,7% of them would use eye drops during fasting, in comparison to 57.8% of British Muslims [9].

Some factors and their effect on compliance during fasting were not included in other studies. These factors include duration of using antiglaucoma eye drops, number of used medications, financial aspect, eye drop application practice, general compliance, knowledge about glaucoma, receiving education about glaucoma and eye drops, follow up frequency, family history of glaucoma, previous glaucoma surgery and previous complications to glaucoma. Also, compliance varied according to these factors, but none of these values was statistically significant.

CONCLUSION:

In our study, many factors were investigated for their influence on patients' compliance to antiglaucoma eye drops during fasting. patients' compliance was significantly affected by their beliefs, as patient who believed that using eye drops does not break the fast were more adherent. Also, having a discussion about using eye drops during fasting with ophthalmologist had a positive influence on patients' compliance during Ramadan.

REFERENCES:

1. **Zhang, N., Wang, J., Chen, B., Li, Y., & Jiang, B. (2021).** Prevalence of Primary Angle Closure Glaucoma in the Last 20 Years: A Meta-Analysis and Systematic Review. *Frontiers in medicine*, *7*, 624179.
2. **Gedde, S. J., Vinod, K., Wright, M. M., Muir, K. W., Lind, J. T., Chen, P. P., Li, T., Mansberger, S. L., & American Academy of Ophthalmology Preferred Practice Pattern Glaucoma Panel (2021).** Primary Open-Angle Glaucoma Preferred Practice Pattern®. *Ophthalmology*, *128*(1), P71–P150.
3. **Schuster, A. K., Erb, C., Hoffmann, E. M., Dietlein, T., & Pfeiffer, N. (2020).** The Diagnosis and Treatment of Glaucoma. *Deutsches Arzteblatt international*, *117*(13), 225–234.
4. **Schwartz G. F. (2005).** Compliance and persistency in glaucoma follow-up treatment. *Current opinion in ophthalmology*, *16*(2), 114–121.
5. **Abu Hussein, N. B., Eissa, I. M., & Abdel-Kader, A. A. (2015).** Analysis of Factors Affecting Patients' Compliance to Topical Antiglaucoma Medications in Egypt as a Developing Country Model. *Journal of ophthalmology*, *2015*, 234157.

6. **Meguid A. Latif, A. A., Shafik, A. A., & Youssef, M. A. (2014).** Adherence to medical treatment in primary open-angle glaucoma in Egypt. Journal of the Egyptian Ophthalmological Society, 107(2), 86.
7. **Robin, A. L., & Covert, D. (2005).** Does adjunctive glaucoma therapy affect adherence to the initial primary therapy?. *Ophthalmology*, *112*(5), 863–868.
8. **Kyari, F., Abdull, M. M., Bastawrous, A., Gilbert, C. E., & Faal, H. (2013).** Epidemiology of glaucoma in sub-saharan Africa: prevalence, incidence and risk factors. *Middle East African journal of ophthalmology*, *20*(2), 111–125.
9. **Kumar, N., Dherani, M., & Jivan, S. (2009).** Ramadan and eye-drops: perspective of Muslims in the UK. *The British journal of ophthalmology*, *93*(4), 551–552.
10. **Islamweb (2002)** English, إسلام ويب - سعادة تمتد. Available at: https://islamweb.net/en/fatwa/85119/using-eye-drops-while-fasting (Accessed: 24 December 2023).
11. **Kumar, N., & Jivan, S. (2007).** Ramadan and eyedrops: the muslim perspective. *Ophthalmology*, *114*(12), 2356–2360.
12. **Jin, J., Sklar, G. E., Min Sen Oh, V., & Chuen Li, S. (2008).** Factors affecting therapeutic compliance: A review from the patient's perspective. *Therapeutics and clinical risk management*, *4*(1), 269–286.
13. **Zulkarnain, B. S., Nita, Y., & Loebis, R. (2017).** Eyedrops use perception during fasting. In *Unity in Diversity and the Standardisation of Clinical Pharmacy Services*. CRC Press, 375–379.
14. **Koh, Y. T., Goenadi, C. J., & Sanjay, S. (2013).** Ramadan and eye drops: attitudes and practices of Malay Muslims in Singapore. *Annals of the Academy of Medicine, Singapore*, *42*(11), 613–614.
15. **Saha N. (2007).** The attitudes and practice of Muslim patients using guttae medication during Ramadan. *Eye (London, England)*, *21*(6), 8