

## Original Article

# Efficacy of Daily Eyelid Washing with Tea in the Treatment of Eyelid Inflammation and Dandruff

Bahareh Kermani <sup>1</sup>, MD; Mohsen Pourshahrokhi <sup>2</sup>, MD; Rasoul Raesi <sup>3</sup>, PhD; Akbar Mehralizadeh <sup>4</sup>, PhD; Haniyeh Rahmani <sup>5</sup>, MD; Salman Daneshi <sup>6,\*</sup>, MPH, PhD

1- Assistance Professor, School of Medicine, Jiroft University of Medical Sciences, Jiroft, Iran.

2- Assistance Professor, School of Medicine, Jiroft University of Medical Sciences, Jiroft, Iran.

3- Ph.D. in Health Services Management, Mashhad University of Medical Sciences, Mashhad, Iran.

4- School of Health, Jiroft University of Medical Sciences, Jiroft, Iran.

5- School of Medicine, Jiroft University of Medical Sciences, Jiroft, Iran.

6- Assistance professor, School of Medicine, Jiroft University of Medical Sciences, Jiroft, Iran.

\*Corresponding Author: Salman Daneshi

E-mail: salmandaneshi008@gmail.com

## Abstract

**Background:** Blepharitis is the most common eye disease that can cause problems in the daily life of the patient and his family members. This study was conducted with the aim of investigating the effectiveness of daily eyelid washing with tea in the treatment of inflammation and dandruff of the eyelid edge in patients referred to the ophthalmology clinic of Imam Khomeini Hospital (RA) in Jiroft in 2020.

**Material and Methods:** This study is a double-blind clinical trial that was conducted by non-probability sampling method on 90 patients referred to the ophthalmology clinic of Imam Khomeini Hospital (RA) in Jiroft. The people who entered the study were randomly divided into 3 homogeneous groups. The first group placed tea bags on their eyelids twice a day for 1 month for 1 to 5 minutes each time. The second group only used Argosol shampoo in the same way and the third group (control) used water for their treatment in the same way. All subjects went to the clinic for examination 1 and 3 weeks after the completion of the treatment and were clinically evaluated by ophthalmologist number 2 who did not know about the type of treatment of the patient. data were analyzed after coding and entering with statistical software SPSS version 26.

**Results:** The average age of the patients was  $40.9 \pm 17.5$  years. There was a statistically significant difference between the three treatment groups in terms of the average scores obtained in eyelid inflammation and dandruff in the third visit. The results showed that there is a significant difference between the effectiveness of eyelid washing in the treatment of eye itch and the Argosol shampoo treatment group based on gender.

**Conclusion:** The results of the study showed that daily eyelid washing with Argosol shampoo, tea, and water is effective in the treatment, and also the difference between the effectiveness of daily eyelid washing and tea with the effectiveness of daily eyelid washing. There was a significant relationship with Argosol shampoo and water in the treatment of eyelid edge dandruff in the second visit.

**Keywords:** Eye Inflammation; Eyelid Dandruff; Tea; Ophthalmology.

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## Introduction

Blepharitis is a chronic inflammatory process that involves the edge of the eyelid and can affect patients of all age groups. The complications that this inflammation may cause in the patient include dry eyes, damage to the eyelid, and damage to the cornea <sup>1, 2</sup>.

In general, it is estimated that 37 % of patients who are visited by ophthalmologists have some degree of Blepharitis, and only 34 % of those with Blepharitis refer for the treatment of Blepharitis symptoms. Blepharitis sufferers are identified in 41 % of cases with complaints of dry eyes, 16 % of cases for eye surgery evaluation, and 6 % for periodical examination. It seems that 22 % of patients diagnosed with Blepharitis do not complain of eye symptoms, and it is estimated that one-third of patients requiring cataract surgery have Blepharitis <sup>3, 4</sup>. Blepharitis is divided into two categories, infectious and non-infectious, based on the cause, and divided into anterior and posterior types based on the location of the lesion. Anterior Blepharitis refers to lesions in front of the gray line, such as staphylococcal Blepharitis that affects the eyelashes <sup>5</sup>.

In general, anterior Blepharitis is often caused by substances secreted from bacterial overgrowth or sebaceous gland activity. While posterior Blepharitis is caused by Meibomian Gland dysfunction <sup>3, 6</sup>. While posterior Blepharitis, which includes seborrhea, obstruction, or a combination of seborrhea and obstruction <sup>5</sup>.

The most important clinical symptom in all types of Blepharitis is burning and irritation of the eyes, which is more severe in the morning and gets better during the day. Although Blepharitis is more common in older people, younger people complain more about the symptoms. The symptoms of Blepharitis include itching and burning of the

eyelids, discomfort in the eyes after working with the computer, a feeling of heaviness in the eyelids, the presence of secretions on the eyelashes, a feeling of dryness, sticking to the edge of the eyelids when waking up, and red eyes. In addition, patients may complain of intolerance to contact lenses, a history of eyelash flower, or thinness of eyelashes <sup>7, 8</sup>. In a study that was conducted on the prevalence and treatment of Blepharitis in 2009 in America, the most common complaint of patients was dry or irritated eyes (53 %) followed by eye discomfort after 3 hours of working with a computer (38 %) and it was watery eyes (36 %). Patients who complain of several symptoms often express the symptoms as a group. The adhesion of the eyelids when waking up is always associated with the burning of the eyelids, feeling of dryness, and irritation of the eyes. While the feeling of discomfort after working for a long time with the computer is associated with a feeling of dryness and irritation, heaviness and swelling of the eyelids, and watery eyes <sup>9</sup>.

Complaining about symptoms in women is different from men. Men complain more about eyelid discharge and eye redness when they wake up. While women complain of dryness and irritation of the eyes, heaviness and swelling of the eyelids, eye irritation after working for a long time with the computer, history of eyelash flower and thinness of the eyelashes <sup>5</sup>. They are more common in the elderly. The most common group prone to posterior Blepharitis and MGD are men over 65 years old <sup>10</sup>. Blepharitis occurs in both sexes, all races, and ages, although fair-skinned people over 40 years of age and residents of Northern Europe are more likely to be affected <sup>11</sup>.

The basic treatment for Blepharitis includes increasing eyelid hygiene, and one of the

first steps in this field can be the use of warm compresses to improve drainage of tear ducts. In the next steps of the treatment was washed the eyes with baby shampoo. Also, one of the auxiliary treatments that may be used in controlling Blepharitis is the use of tea tree oil. The treatment includes daily scrubbing of the edges of the eyelids with 50 % tea tree oil or using 5 % eye ointment for 2-3 weeks <sup>12</sup>.

The results of Behfarnia et al.'s study showed that the use of chewing gum containing green tea has a significant role in reducing the amount of bleeding, plaque, and inflammatory factors in patients <sup>13</sup>. Also, the results of the study by Ren JL et al showed that the use of green tea extract reduces the secretion of inflammatory cytokines such as IL-1 $\beta$ , TNF- $\alpha$  and IL-6 in the retina and vitreous fluid <sup>14</sup>.

Tea drink is prepared by infusing processed leaves, buds or branches in boiling water for a few minutes. Tea is a natural source of caffeine, theophylline, theanine and antioxidants, but it is almost free of fat, carbohydrates and protein, also tea contains a type of antioxidant called catechin <sup>15</sup>. Consuming brewed tea improves breathing, accelerates blood circulation, relieves drowsiness, feels renewed and strengthens mental power <sup>16</sup> and its anti-inflammatory properties have been proven in studies <sup>17</sup>.

The results of the study by Koh KJ et al showed that tea tree oil reduces skin inflammation caused by histamine and the use of tea tree oil can play a significant role in controlling inflammation <sup>18</sup>. Also, the results of the study by Hyun Koo and colleagues showed that after washing the eyes with tea tree oil, there is a significant reduction in the amount of eye contamination caused by demodex <sup>19</sup>.

Considering the high prevalence of eyelid inflammation (Blepharitis) in the population, as well as the problems that this chronic

inflammation may cause for the patient and the society, and make the daily life of the patient and his family members difficult, as well as the importance of hygiene and thumb and eyelid washing in the treatment and control of this disease and the availability of tea and its possible role in the recovery speed of this type of inflammation, this research aims to determine the effectiveness of daily eyelid washing with tea in the treatment of inflammation and dandruff of eyelid edge patients referring to the clinic Ophthalmology of Imam Khomeini (RA) Jiroft Hospital was designed and implemented in 2019.

### Material Methods

This research is a double-blind clinical trial that was conducted on 90 patients referred to the ophthalmology clinic of Imam Khomeini Hospital (RA) in Jiroft in 2019. Non-probability sampling method was used to select the statistical sample, in this way, by referring to the eye clinic of Imam Khomeini Hospital in Jiroft city, people who had eyelid inflammation and dandruff and met the criteria for entering the study were selected and randomly divided into three groups (2 intervention groups and 1 control group). The purpose of the experiment is to investigate the effect of tea-washing eyelid intervention on the treatment of inflammation and dandruff of the eyelid edge, the effectiveness of which is through the reduction of inflammation and dandruff of the eyelid / eye burning / hyperemia of the eyelid edge / sensation of a foreign body in the eye and itching eye was identified.

The study subjects were diagnosed and examined by ophthalmologist number 1, and the subjects who were subject to eye inflammation and dandruff were included in the study, and after explaining how the study was conducted, its benefits and safety, written

consent was obtained from them. And then they entered the study.

The people who entered the study were randomly divided into 3 homogeneous groups. The first group placed tea bags on their eyelids twice a day for 1 month for 1 to 5 minutes each time. The second group only used Argosol shampoo in the same way and the third group (control) used water for their treatment in the same way. All subjects went to the clinic for examination 1 and 3 weeks after the completion of the treatment and were clinically evaluated by ophthalmologist number 2 who did not know about the type of treatment of the patient.

Inclusion criteria in this study included consent to participate in the study, people over 18 years of age and mild to moderate eyelid inflammation. Pregnant or lactating people, people with a history of diabetes, eye surgery and chronic eye diseases, and the use of topical eye medications in the last month were considered as exclusion criteria.

For data collection used checklist including demographic information and data related to research variables was used. Data were entered into the statistical software SPSS version 26 and analyzed. Frequency distribution tables, mean, standard deviation, and graphs were used to describe the data, and inferential statistics tests including the Chi-square test, sign test, McNemar and Wilcoxon test were used to answer the research questions. The Significance level was considered  $< 0.05$  in all tests.

In order to comply with ethical considerations in this research permission was obtained from the ethics committee of the university, and the collected information remained confidential and was used only in line with the goals of the research.

## Results

This study aimed to investigate the effectiveness of daily eyelid washing with tea and was conducted on 90 patients referred to the ophthalmology clinic of Imam Khomeini Hospital (RA) in Jiroft in 2019. The average age of the patients was  $40.9 \pm 17.5$  years. The results indicate that 30 patients were examined in each treatment group, and the share of each treatment group is 33.3 % out of 100 %. Also in Argosol and Tea treatment group, the number of male and female patients who referred were 19 (21.1 percent) and 11 (29.7 percent), respectively, and in the water treatment group, the number of men and women who referred with is equal (number = 15 and percentage = 14.7). In general, the number of men (number = 53 and percentage = 58.9) referring to the ophthalmology clinic is more than female patients (number = 37 and percentage = 41.1).

The results of Table 1 show that, although the average ratings of eyelid inflammation in the first visit (on admission) in the three Argosol, tea and water treatment groups were 41.87, 46.57 and 48.07, respectively, and the highest average eyelid inflammation was observed in the water treatment group, but there is no statistically significant difference between the three treatment groups in terms of the average scores obtained.

Also, the average ratings of eyelid inflammation in the second visit (third week) in the three Argosol, tea, and water treatment groups were 40.50, 36.00, and 60.00, respectively, and the highest average eyelid inflammation scores were observed in the water treatment group and there is a statistically significant difference between the three treatment groups in terms of the average ratings obtained.

The results of Table 2 show that, although the average ratings of eyelid edge dandruff in the

**Table 1:** The results of the Kruskal-Wallis test to compare the groups in terms of inflammation of the eyelid margin at the time of admission and the second visit

Referral time	Groups	Numbers	Mean Ranks	Statistics		No Significant
first visit (on arrival)	Argosol shampoo	30	41.87	1.16	0.55	No significant
	Tea	30	46.57			
	Water	30	48.07			
Second reference (third week)	Argosol shampoo	30	40.5	21.11	0.001	Significant
	Tea	30	36			
	Water	30	36			

first visit (on admission) in the three Argosol, tea and water treatment groups are 40.43, 43.05 and 53.02, respectively, and the highest average of dandruff the edge of the eyelid was observed in the water treatment group, but there is no statistically significant difference between the three treatment groups in terms of the average ratings obtained.

Also, the average ratings of eyelid edge dandruff in the second visit (third week) in the three Argosol, tea and water treatment groups

were 41.8, 38.87 and 55.83, respectively, and the highest average eyelid edge dandruff scores were observed in the water treatment group and there is a statistically significant difference between the three treatment groups in terms of the average ratings obtained.

The results of Table 3 show that, although the average ratings of eyelid margin hyperemia in the first visit (on arrival) in the three Argosol, tea, and water treatment groups were 46.77, 50.05 and 39.68 respectively, and the

**Table 2:** The results of the Kruskal-Wallis test to compare the groups in terms of eyelid dandruff at the time of admission and the second visit

Referral time	Groups	Numbers	Mean Ranks	Statistics		Meaningful situation
first visit (on arrival)	Argosol shampoo	30	40.43	4.53	0.1	No significant
	Tea	30	43.05			
	Water	30	55.83			
Second reference (third week)	Argosol shampoo	30	41.8	11.91	0.003	Significant
	Tea	30	38.87			
	Water	30	53.02			



**Table 3:** The results of the Kruskal-Wallis test to compare the groups in terms of eyelid margin hyperemia at the time of admission and the second visit

Referral time	Groups	Numbers	Mean Ranks	Statistics		significant situation
first visit (on arrival)	Argosol shampoo	30	46.77	2.9	0.23	No significant
	Tea	30	50.05			
	Water	30	39.68			
Second reference (third week)	Argosol shampoo	30	44	0.57	0.75	Significant
	Tea	30	45.5			
	Water	30	47			

highest average Eyelid hyperemia scores were observed in the tea treatment group, but there was no statistically significant difference between the three treatment groups.

Also, although the average scores of eyelid margin hyperemia in the second visit (third week) were 44, 45.5, and 47 in the three Argosol, tea, and water treatment groups, respectively, and the highest average eyelid margin hyperemia was observed in the water

treatment group. Again, there is no statistically significant difference between the three treatment groups.

The results of Table 4 show that, although the average ratings of eye irritation in the first visit (on arrival) in the three Argosol, tea and water treatment groups are 40.6, 50.1 and 45.8, respectively, and the highest average of eye irritation was observed in the tea treatment group, but there is no statistically significant

**Table 4:** Kruskal-Wallis test results to compare groups in terms of eye irritation on arrival and second visit

Referral time	Groups	Numbers	Mean Ranks	Statistics		NO significant
First, visit (on arrival)	Argosol shampoo	30	40.6	2.32	0.3	No significant
	Tea	30	50.1			
	Water	30	45.8			
Second reference (third week)	Argosol shampoo	30	43.5	2.4	0.3	NO significant
	Tea	30	43.5			
	Water	30	49.5			

**Table 5:** The results of the Kruskal-Wallis test to compare the groups in terms of the feeling of a foreign body in the eye at the time of admission and the second visit

Referral time	Groups	Numbers	Mean Ranks	Statistics		Significant Situation
first visit (on arrival)	Argosol shampoo	30	46.2	1.17	0.55	No significant
	Tea	30	48.58			
	Water	30	41.72			
Second reference (third week)	Argosol shampoo	30	48	1.24	0.53	NO significant
	Tea	30	43.5			
	Water	30	45			

difference between the three treatment groups in terms of the average ratings of eye irritation. Also, although the average ratings of eye irritation in the second visit (third week) were also 43.5, 43.5, and 49.5 in the three Argosol, tea, and water treatment groups, the highest average eye irritation was observed in the water treatment group. However, there is still

no statistically significant difference between the three treatment groups.

The results of Table 5 show that the average ratings of foreign body sensation in the eye at the first visit (on arrival) in the three Argosol, tea and water treatment groups were 46.2, 48.58 and 41.72, respectively, but the difference in significance there is no statistical

**Table 6:** Kruskal-Wallis test results for comparing groups in terms of eye itching at the time of arrival and the second visit

Referral time	Groups	Numbers	Mean Ranks	Statistics		Meaningful situation
first visit (on arrival)	Argosol shampoo	30	47.87			No significant
	Tea	30	48.77	2.33	0.31	
	water	30	39.87			
Second reference (third week)	Argosol shampoo	30	47.55	2.67	0.26	Significant
	tea	30	47.5			
	water	30	41.5			

difference between the three treatment groups. Also, although the average ratings of foreign body sensation in the eye in the second visit (third week) in the three Argosol, tea, and water treatment groups were 48, 43.5, and 45, respectively, the highest average foreign body sensation in the eye was observed in the Argosol treatment group again, there is no statistically significant difference between the three treatment groups.

According to the results of Table 5, although the average ranks of eye itch in the first visit (on arrival) in the three Argosol, tea and water treatment groups are 47.87, 48.77, and 39.87 respectively, but there is a significant difference. There is no statistical difference between the three treatment groups in terms of the average ratings of eye itching.

Also, although the average ratings of eye itching in the second visit (third week) in the three Argosol, tea, and water treatment groups were 47.50, 47.50, and 41.50, respectively, there was still a significant difference between the three treatment groups. There is no statistics.

Table 7 shows the results of the Wilcoxon test to measure the effectiveness of daily eyelid washing with Argosol shampoo in the treatment of eyelid margin inflammation, eyelid margin dandruff, eyelid hyperemia, eye irritation, foreign body sensation, and itching between the first and second visit. As can be seen, there is a significant difference between the ranks of the research components at the time of the first visit and the second visit, and this difference is in the direction that the set of values with the difference of negative ranks is significantly more than the frequency. positive ranks and knots, that is, daily washing of the eyelid with Argosol shampoo is effective in the treatment of six factors.

Negative ranks: The rank upon arrival is higher than the rank during the second visit

Positive ranks: the rank upon arrival is lower than the rank upon second visit

Nodes: The rank upon arrival is equal to the rank upon second visit

In Table 8, the results of the Wilcoxon test to measure the effectiveness of daily eyelid washing with tea in the treatment of eyelid

**Table 7:** Results of the Wilcoxon test to measure the effectiveness of daily eyelid washing with Argosol shampoo in the treatment of eyelid inflammation/eyelid dandruff/eyelid hyperemia/eye irritation/foreign body sensation/itching in the first and second visits

	Information	Number	Mean Ranking	Z-Wilcoxon	P value
The difference between the grade of inflammation of the eyelid margin at the time of admission and the second visit	Negative ranks	30	13.5	4.93	< 0.001
	Positive ranks	0	—		
	knots	0	—		



The difference between the rating of dandruff on the edge of the eyelid at the time of arrival and the second visit	Negative ranks	25	13	4.51	< 0.001
	Positive ranks	0	—		
	knots	5	—		
The difference between the rating of eye irritation at the first visit and the second visit	Negative ranks	28	14.5	4.76	< 0.001
	Positive ranks	0	—		
	knots	2	—		
The difference between the grade of eyelid margin hyperemia at the time of admission and the second visit	Negative ranks	29	15	4.84	< 0.001
	Positive ranks	0	—		
	knots	1	—		
The difference between the rating of foreign body sensation in the eye at the time of admission and the second visit	Negative ranks	22	11.5	4.21	< 0.001
	Positive ranks	0	—		
	knots	8	—		
The difference between the rating of eye itching at the first visit and the second visit	Negative ranks	21	11	4.11	< 0.001
	Positive ranks	0	—		
	knots	9	—		

**Table 8:** Wilcoxon test results to measure the effectiveness of daily eyelid washing with tea in the treatment of eyelid inflammation/eyelid dandruff/eyelid hyperemia/eye irritation/foreign body sensation/itching in the first and second visits

	Information	Number	Mean Ranking	Z-Wilcoxon	P value
The difference between the grade of inflammation of the eyelid margin at the time of admission and the second visit	Negative ranks	3	15.5	4.92	< 0.001
	Positive ranks	0	—		
	Knots	0	—		
The difference between the rating of dandruff on the edge of the eyelid at the time of arrival and the second visit	Negative ranks	27	14.81	4.58	< 0.001
	Positive ranks	1	6		
	Knots	2	—		
The difference between the rating of eye irritation at the first visit and the second visit	Negative ranks	28	14.5	4.7	< 0.001
	Positive ranks	0	—		
	Knots	2	—		
The difference between the grade of eyelid margin hyperemia at the time of admission and the second visit	Negative ranks	25	13	4.48	< 0.001
	Positive ranks	0	—		
	Knots	5	—		
The difference between the rating of foreign body sensation in the eye at the time of admission and the second visit	Negative ranks	22	12.34	4.13	< 0.001
	Positive ranks	1	4.5		
	Knots	7	—		
The difference between the rating of eye itching at the first visit and the second visit	Negative ranks	24	13.21	291/4	< 0.001
	Positive ranks	1	8		
	Knots	5	—		

margin inflammation, eyelid margin dandruff, eyelid margin hyperemia, eye irritation, foreign body sensation, and itching between the first and second visits are given. As can be seen, there is a significant difference between the ranks of the six components of the research at the time of the first visit and the second visit, and this difference is in the direction that the set of values with the difference of negative ranks is significantly. It is more than the frequency of positive ranks and knots, that is, daily washing of the eyelid with tea is effective in the treatment of six factors.

Negative ranks: The rank upon arrival is higher than the rank during the second visit

Positive ranks: the rank upon arrival is lower than the rank upon second visit

Nodes: The rank upon arrival is equal to the rank upon second visit

Table 9 shows the results of the Wilcoxon test to measure the effectiveness of daily eyelid washing with water in the treatment of eyelid margin inflammation, eyelid margin dandruff, eyelid margin hyperemia, eye irritation, foreign body sensation, and itching between the first and second visits. As can be seen, there is a significant difference between the ranks of the six components of the research at the time of the first visit and the second visit, and this difference is in the direction that the set of values with the difference of negative ranks is significantly. It is more than the frequency of positive ranks and nodes, that is, daily washing of the eyelid with water is effective in the treatment of six factors.

Negative ranks: The rank upon arrival is higher than the rank during the second visit

Positive ranks: The rank upon arrival is lower than the rank upon second visit

Nodes: The rank upon arrival is equal to the rank upon second visit

Table 10 shows the results of the effectiveness

of the three treatment groups in the first visit, that the highest average eyelid margin inflammation is in the Argosol shampoo and tea treatment group in men, and in the water treatment group in women, and there is also a significant difference between the effectiveness of washing. There is no eyelid in the treatment of eyelid margin inflammation in three treatment groups based on gender ( $P > 0.05$ ). The highest average of eyelid edge dandruff in Argosol shampoo and tea treatment group is in men, in water treatment group in women, and there is no significant difference between the effectiveness of eyelid washing in the treatment of eyelid edge dandruff in three treatment groups based on gender ( $P > 0.05$ ). The highest average of eyelid margin hyperemia in Argosol shampoo and tea treatment group is in men, in water treatment group in women, and there is no significant difference between the effectiveness of eyelid washing in the treatment of eyelid margin hyperemia in the three treatment groups based on gender ( $P > 0.05$ ). The highest average of eye irritation in Argosol shampoo and water treatment group in women, in the tea treatment group in men, and there is no significant difference between the effectiveness of eyelid washing in the treatment of eye irritation in the three treatment groups based on gender ( $P > 0.05$ ). The highest mean of foreign body sensation in Argosol shampoo treatment group is in men, in the tea and water treatment group in women, and there is no significant difference between the effectiveness of eyelid washing in the treatment of foreign body sensation in the three treatment groups based on gender ( $P > 0.05$ ). The highest mean of eye itching in the treatment group of Argosol shampoo and water is in men, in the tea treatment group in women, and there is also a significant difference between the effectiveness of eyelid

**Table 9:** The results of the Wilcoxon test to measure the effectiveness of daily washing of the eyelid with water in the treatment of inflammation of the eyelid edge/eyelid edge dandruff/eyelid edge hyperemia/eye irritation/foreign body sensation/itching in the first and second visits

	Information	Number	Mean Ranking	Z-Wilcoxon	P value
The difference between the grade of inflammation of the eyelid margin at the time of admission and the second visit	Negative ranks	27	14	4.68	< 0.001
	Positive ranks	0	—		
	knots	3	—		
The difference between the rating of dandruff on the edge of the eyelid at the time of arrival and the second visit	Negative ranks	30	15.5	4.93	< 0.001
	Positive ranks	0	—		
	knots	0	—		
The difference between the rating of eye irritation at the first visit and the second visit	Negative ranks	29	15.5	4.84	< 0.001
	Positive ranks	0	—		
	knots	1	—		
The difference between the grade of eyelid margin hyperemia at the time of admission and the second visit	Negative ranks	27	14.65	4.59	< 0.001
	Positive ranks	1	10.5		
	knots	2	—		
The difference between the rating of foreign body sensation in the eye at the time of admission and the second visit	Negative ranks	21	11	4.13	< 0.001
	Positive ranks	0	—		
	knots	9	—		
The difference between the rating of eye itching at the first visit and the second visit	Negative ranks	21	11	4.17	< 0.001
	Positive ranks	0	—		
	knots	9	—		

**Table 10:** Comparison of the effectiveness of daily eyelid washing with tea in the treatment of eyelid dandruff/eyelid hyperemia/eye irritation/foreign body sensation/itching/duration of the disease, compared to the two treatment groups of washing with Argosol shampoo and water according to Demographic variables of sex in the first visit

	Group	Mean	Ranks	Statistics	
	first visit (on arrival)	Male	Female		
inflammation	Argosol shampoo	15.97	14.68	0.46	0.64
Edge	Tea	15.71	15.14	0.20	0.83
Eyelid	Water	15.33	15.67	0.11	0.91
Dandruff on the edge of the eyelid	Argosol shampoo	16.03	14.59	0.46	0.64
	Tea	16.68	13.45	0.20	0.83
	Water	14.43	16.57	0.71	0.47
hyperemia	Argosol shampoo	17.26	12.45	1.61	0.1
Edge	Tea	16.95	13	1.25	0.21
	Water	15.23	15.77	0.18	0.85
burning eyes	Argosol shampoo	15.29	15.86	0.19	0.84
	Tea	16.05	14.55	0.47	0.63
	Water	14.6	16.4	0.62	0.53
Feeling	Argosol shampoo	17.18	12.59	1.45	0.14
body	Tea	15.21	16	0.24	0.8
Foreign	Water	14.57	16.43	0.6	0.54
itchy eyes	Argosol shampoo	17.97	11.23	2.13	0.03
	Tea	14.76	16.77	0.63	0.52
	Water	17.23	13.77	1.14	0.25

washing in the treatment of eye itching and Argosol shampoo treatment group based on gender ( $P = 0.033$ ).

Table 11 shows the results of the effectiveness of the three treatment groups in the second visit, which shows the highest average eyelid margin inflammation in the Argosol shampoo

treatment group in men, and in the tea treatment group in women, and also a significant difference between the effectiveness of eyelid washing in the treatment of eyelid margin inflammation, there is no treatment based on gender in the three treatment groups ( $P > 0.05$ ). The highest average of eyelid edge dandruff in

**Table 11:** Comparison of the effectiveness of daily eyelid washing with tea in the treatment of eyelid dandruff/eyelid hyperemia/eye irritation/foreign body sensation/itching/duration of the disease, compared to the two treatment groups of washing with Argosol shampoo and water according to the demographic variable of sex in the second reference

Groups	Reference Second (third week)	Average Ranks		statistics	
		Male	Female		
inflammation	Argosol shampoo	16.74	13.36	1.38	0.16
Edge	Tea	15.08	16.23	0.58	0.55
eyelid	Water	15.5	15.5	0.23	0.11
Dandruff on the edge of the eyelid	Argosol shampoo	15.66	15.23	1.6	0.1
	Tea	15.87	14.86	1.04	0.29
	Water	15.03	15.97	0.71	0.47
hyperemia Edge	Argosol shampoo	16.37	14	1.36	0.17
	Tea	15.87	14.86	0.51	0.6
	Water	16	15	0.48	0.63
burning eyes	Argosol shampoo	16.66	13.5	1.6	0.1
	Tea	15.87	14.86	0.51	0.6
	Water	15.5	15.5	1.65	0.98
Feeling body Foreign	Argosol shampoo	14.87	16.59	0.74	0.45
	Tea	15.58	15.36	0.12	0.9
	Water	15.5	15.5	2.98	0.11
itchy eyes inflammation Edge	Argosol shampoo	15.66	15.23	0.18	0.85
	Tea	16.45	13.86	1.11	0.26
	Water	15.5	15.5	1.11	0.23

Argosol shampoo and tea treatment group is in men, in water treatment group in women, and there is no significant difference between the effectiveness of eyelid washing in the treatment

of eyelid edge dandruff in three treatment groups based on gender ( $P > 0.05$ ). The highest average of eyelid margin hyperemia in Argosol shampoo and tea and water treatment



group is in men, and there is no significant difference between the effectiveness of eyelid washing in the treatment of eyelid margin hyperemia in the three treatment groups based on gender ( $P > 0.05$ ). The highest average of eye irritation in Argosol shampoo and tea treatment group in men, in the water treatment group, the average ranks in women are equal to men.

Also, there is no significant difference between the effectiveness of eyelid washing in the treatment of eye irritation in three treatment groups based on gender ( $P > 0.05$ ). The highest mean of foreign body sensation in Argosol shampoo and tea treatment group in men, in the water treatment group, the average ratings in women are equal to men, and there is also a significant difference between the effectiveness of eyelid washing in the treatment of foreign body sensation in the three groups. There is no treatment based on gender ( $P > 0.05$ ). The highest mean of eye itch in Argosol shampoo and tea treatment group in men, in the water treatment group, the average ranks in men and women are equal and there is also a significant difference between the effectiveness of eyelid washing in the treatment of eye itch in three treatment groups based on There is no gender ( $P > 0.05$ ).

## Discussion

This study aimed compare the effectiveness of the three different treatments was conducted on 90 patients referred to the ophthalmology clinic of Imam Khomeini Hospital (RA) in Jiroft in 2019. The average age of the patients was  $40.9 \pm 17.5$  years. In line with this research finding, Ficker et al. investigated the role of immunity caused by staphylococcal intermediate cells in Blepharitis in a study. They concluded that most of the patients had an average age of 40 years and light skin and

lived in Northern Europe <sup>20</sup>.

The results of this study showed that the number of men referring to the ophthalmology clinic is more than the number of female patients. In line with this research finding, Gorden et al concluded in their study that the most common gender group prone to posterior Blepharitis and MGD is men over 65 years old <sup>21</sup>. Also, the findings of Turk et al.'s study are in line with this research finding, in such a way that the results of their study showed that the prevalence of Blepharitis is higher in men <sup>22</sup>. The results of Kemal et al.'s study are not in line with this research finding, as the results of their study showed that there is no significant relationship between people's gender and Blepharitis <sup>23</sup>.

The findings of this research showed that daily eyelid washing with Argosol shampoo, tea and water is effective in the treatment of six factors. Savla et al investigated the effects of tea tree oil in the treatment of Blepharitis. Their study showed that there is uncertainty regarding the effectiveness of 5-50 % tea tree oil for the short-term treatment of Blepharitis, however, if used, the concentration Lower levels may be better in eye care to avoid eye irritation <sup>24</sup>. Also, in the study of Ren JL and his colleagues, the results showed that the use of green tea extract reduces the secretion of inflammatory cytokines such as IL-1 $\beta$ , TNF- $\alpha$  and IL-6 in the retina and vitreous fluid <sup>25</sup>.

The results of the present study showed that there is a significant difference in the treatment of eyelid dandruff, eyelid hyperemia, eye irritation, foreign body sensation, compared to the three treatment groups of washing with Argosol shampoo and tea and water according to the gender of the patients in the first visit and the second visit. There is no and finally the results showed that there was a significant difference between the efficacy

of eyelid washing in the treatment of eye itch and Argosol shampoo treatment group based on gender. Also, Rabi et al. concluded in their study that among the studied variables, the sex of the people did not show a significant relationship with demodex infection, considering the relationship between demodex infection and rosacea, which is associated with posterior Blepharitis, as a result between There is no significant relationship between gender of patients and Blepharitis <sup>26</sup>.

The current research, like other researches, has limitations, which, of course, based on its special conditions, we can first point to its most important limitation, which is the lack of resources and research background in the field of the effectiveness of daily eyelid washing with tea in the treatment of eyelid inflammation and dandruff in the world. And he pointed out especially in Iran. Considering the different role of cultural, economic and geographical factors in different parts and provinces of the country and the impact of these variables on eye health, it should be noted that this research was conducted only in the city of Jiroft and it is necessary to be careful to generalize the results and carry out such a research. It should be done by considering cultural, social and economic differences.

The limitations of the present study were the non-cooperation of the patients due to busy work, which was resolved after talking and justifying and coordinating the relevant patients. Based on this, conducting similar researches can be a guide for developing specific treatment packages in the treatment of eyelid inflammation and dandruff while testing the results of this research.

It is also suggested that in the next studies, a quantitative investigation of Blepharitis types in control groups, as well as an investigation of anterior, posterior, and mixed Blepharitis

subgroups. Future studies should be better controlled, evaluate long-term outcomes, consider patient compliance, and study the effects of different concentrations of tea tree oil.

### Conclusion

The results of the study showed that daily eyelid washing with Argosol shampoo, tea and water is effective in the treatment of six factors, and also the difference between the effectiveness of daily eyelid washing and tea with the effectiveness of daily eyelid washing. There was a significant relationship with Argosol shampoo and water in the treatment of eyelid edge dandruff in the second visit.

### Authors ORCIDs

Bahareh Kermani:

 <https://orcid.org/0000-0002-6041-7284>

Salman Daneshi:

 <https://orcid.org/0000-0002-9199-0382>

### References

1. Driver PJ, Lemp MA. Meibomian gland dysfunction. Survey of ophthalmology. 1996;40(5):343-67.
2. Javadi M, Feizi S. Blepharitis. Bina Journal of Ophthalmology. 2011;16(2):142-58.
3. Venturino G, Bricola G, Bagnis A, Traverso C. Chronic Blepharitis: treatment patterns and prevalence. Investigative Ophthalmology & Visual Science. 2003;44(13):774.
4. Wilhelmus K. Inflammatory disorders of the eye lid margins and lashes. Ophthalmol Clin North Am. 1992;5:187.
5. Jackson WB. Blepharitis: current strategies for diagnosis and management. Canadian journal of ophthalmology. 2008;43(2):170-9.
6. Cheng AM, Sheha H, Tseng SC. Recent advances on ocular Demodex infestation.

- Current opinion in ophthalmology. 2015;26(4):295-300.
7. Bowman R, Miller K, McCulley J. Diagnosis and treatment of chronic Blepharitis. Focal Points. 1989;1-11.
  8. Vipul B, Jagadeesh K R. Blepharitis: always remember demodex. 2014.
  9. Bernardes TF, Bonfioli AA, editors. Blepharitis. Seminars in ophthalmology; 2010: Taylor & Francis.
  10. Bowman R, Miller K, McCulley J. Diagnosis and treatment of chronic Blepharitis. Focal Points: Clinical Modules for Ophthalmologists American Academy of Ophthalmology San Francisco. 1989;7.
  11. Duane TD, Jaeger EA. Clinical ophthalmology: Medical Department, Harper & Row; 2005.
  12. Liu J, Sheha H, Tseng SC. Pathogenic role of Demodex mites in Blepharitis. Current opinion in allergy and clinical immunology. 2010;10(5):505.
  13. Behfarnia P, Aslani A, Jamshidian F, Noohi S. The Efficacy of Green Tea Chewing Gum on Gingival Inflammation. Journal of dentistry (Shiraz, Iran). 2016;17(2):149-54.
  14. Ren JL, Yu QX, Liang WC, Leung PY, Ng TK, Chu WK, et al. Green tea extract attenuates LPS-induced retinal inflammation in rats. Scientific reports. 2018;8(1):429.
  15. Nataro JP. Atypical enteropathogenic Escherichia coli: typical pathogens? 2006.
  16. Serafini M, Ghiselli A, Ferro-Luzzi A. In vivo antioxidant effect of green and black tea in man. European journal of clinical nutrition. 1996;50(1):28-32.
  17. Vinson JA. Black and green tea and heart disease: a review. Biofactors. 2000;13(1-4):127-32.
  18. Koh KJ, Pearce AL, Marshman G, Finlay-Jones JJ, Hart PH. Tea tree oil reduces histamine-induced skin inflammation. The British journal of dermatology. 2002;147(6):1212-7.
  19. Koo H, Kim TH, Kim KW, Wee SW, Chun YS, Kim JC. Ocular surface discomfort and Demodex: effect of tea tree oil eyelid scrub in Demodex Blepharitis. J Korean Med Sci. 2012;27(12):1574-9.
  20. Ficker L, Ramakrishnan M, Seal D, Wright P. Role of cell-mediated immunity to staphylococci in Blepharitis. American journal of ophthalmology. 1991;111(4):473-9.
  21. Groden LR, Murphy B, Rodnite J, Genvert GI. Lid flora in Blepharitis. Cornea. 1991;10(1):50-3.
  22. Türk M, Oztürk I, Sener AG, Küçükbay S, Afşar I, Maden A. Comparison of incidence of Demodex folliculorum on the eyelash follicle in normal people and Blepharitis patients. Türkiye Parazitoloj Derg. 2007;31(4):296-7.
  23. Kemal M, Sümer Z, Toker MI, Erdoğan H, Topalkara A, Akbulut M. The Prevalence of Demodex folliculorum in Blepharitis patients and the normal population. Ophthalmic Epidemiology. 2005;12(4):287-90.
  24. Savla K, Le JT, Pucker AD. Tea tree oil for Demodex Blepharitis. Cochrane Database of Systematic Reviews. 2020(6).
  25. Ren JL, Yu QX, Liang WC, Leung PY, Ng TK, Chu WK, et al. Green tea extract attenuates LPS-induced retinal inflammation in rats. Scientific reports. 2018;8(1):1-10.
  26. Mohammad-Rabei H, Behnaz N, Javadi M, Roshandel D, Feizi S, Ghadyani Z, et al. Prevalence of demodex infestation in chronic Blepharitis. Bina J Ophthalmol. 2018;24(1):3-8.

#### Footnotes and Financial Disclosures

#### Conflict of interest:

The authors have no conflict of interest with the subject matter of the present manuscript.

