



Frequency of Dry Eye in Smokers in Hospital Based Pakistan Population

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Abstract

Purpose:

To show the frequency of dry eye in smokers in hospital based Pakistani population.

Methodology:

160 cases over 18 years old who smoked for last one year and introduced to patient division with different ophthalmic problems were involved in the examination. Sick person with intense inflammatory conditions, intense contaminations, net conjunctiva and corneal illnesses, person who used contact lens and the individuals who gone through any structure visual medical procedure

inside the most recent a half year were prohibited from the examination.

Subsequent to taking full history, a pre-planned questionnaire was directed to the patients that asked about different side effects of dry eyes followed by a point-by point ophthalmic evaluation and estimation of tear movie separation time (TBUT) utilizing fluorescein color. Sick person displaying TBUT less than 10 seconds were marks as dry eye victims.

Results:

Hundred and sixty patients who smoked took an interest in the examination with mean age 46.8 ± 8.3 years. There were 58 (36.25%) females and 102 (63.75%) guys in the examination. The most widely recognized giving protest of the patients' dry eyes was blurring of vision in 29 (51.8%) of the cases followed by repetitive watering and itching in 39.3% and 19.6% of the cases individually. The recurrence of dry eye in smokers was discovered to be 35% (56 cases) in our examination populace. Patients matured over 70 years showed fundamentally higher commonness as contrasted and rest of the gatherings in 40.0% of the cases ($p = 0.006$; 95% CI 1.346 – 5.780). An overall pinnacle of dry eye commonness was noted in age bunch 31-40 years (20.3%). When contrasted with females (16.1%) guys showed fundamentally higher commonness of dry eyes 26.4% ($p = 0.021$; 95% CI 1.080 – 2.631) in smoker populace.

In spite of the fact that the frequency of dry eye came out to be more in rural populace (20.6%) as contrasted and urban populace (17.6%) ($p = 0.611$; 95% CI 0.552 – 1.392).

Conclusion:

This study shows that the frequency of dry eye is higher in smokers so there's a significant correlation between smoking and dry eye. TBUT values are also comparatively low in patients as ($p=0.005$).

Smoking also effect the tear film secretion and stability so it causes more problem of itching and redness in smokers.

Key Words: Dry eye; smoking; frequency TBUT

Introduction:

At the point when you flicker, a film of tears spreads over the eye. This keeps the eye's surface smooth and clear. Each layer of the tear film fills a need. The lip delayer is the outside of the tear film. It makes the tear surface smooth and holds tears back from evaporating excessively fast. This layer is made in the eye's meibomian organs^[1]. The water layer is the center of the tear film. It makes the most of what we see in tears. This layer cleans the eyes and washes away particles that have no space in the eye. This layer comes from the hard limbs of the eye lids. This is the whitening of your eyes and the tissue that covers the inside of your eyelids^[2]. Eye with dry condition (DES) is an issue of the precocular tear film that results in harm to the visual surface and is related with indications of visual uneasiness^[3]. DES is likewise called keratoconjunctivitis sicca (KCS), keratitis sicca, sicca disorder, xerophthalmia, dry eye infection (DED), visual surface dryness (OSD), or useless tear condition (DTS), or just dry eyes. Dry eye illness is portrayed by insecurity of the tear film that can be because of inadequate measure of tear creation or because of low quality of tear film, which brings about expanded vanishing of the tears. Deficient tears prompt harm to the interpalpebral visual surface and are related with many if situations of uneasiness^[4]. Dry eye is approximated follow up on influence 5%-35% of the total populace at various ages with expanding recurrence. Serious or moderate instances of dry eyes evaluated about 3.2 million in ladies and 1.6 million in men beyond 50 years old in the Assembled State. In China, air contamination, the fast use of PCs and cell phones, smoking, and the quick maturing of the populace are additionally expanding the rate of dry eyes, which is turning into a significant general medical condition^[5]. Dry eye is identified with many danger factors 1 keyway of life, climate, sex, age, drug history and foundational sicknesses, in which way of life variables can assume a significant part. Among the main five danger factors for death, smoking is the main source of death. It is assessed that by 2030, in excess of 8 million individuals will bite the dust every year from tobacco use. In spite of the fact that cellular breakdown in the lungs is emphatically connected with smoking^[6], tobacco use additionally builds the danger of coronary illness and other neurological illnesses, just as the danger of unhealthiness, which will prompt outcomes. Tobacco smoking is a genuine general medical issue which contains different hefty metals and poisonous mineral components that have been related with cardiovascular and respiratory problems^[7]. Smoking is not only associated with cataracts, ARMD, EO on and toxic optic neuropathy, but also dry eye disorders^[8]. The visual surface is deeply fragile with air generated compound exhaust and irrigation gas clouds, and its unobtrusive openness can cause damage to the visual surface and dry eyes.

There is a lot of speculation about the device that can bring tears through smoking. Of the se, the effect of lipid peroxidation the outer layer of the tear film the most likely cause of tear film malfunction, which promotes dry eye effects^[9,10]. The side effects of dry eyes are brought about by smoking as it damages the tear film lipid layer through lipid peroxidation action. Lipid peroxidation is more important in non-smokers than in nonsmokers. Tobacco smoking management is unpredictable, including numerous free extreme species, including epoxides, aldehydes, nitrogen oxides, peroxides, peroxisome proliferators, and various peroxides^[11,12]. The large number of chain smoker

patients suffers with dry eye and the effects of the disease on patients economically and in terms of quality of life justify the analysis of all published research studies on this public health problem. This study was conducted to find out the frequency of dry eye in smokers.

Martial and Methods:

It was a cross-sectional study. Patients (smokers) who were affected with dry eye and visiting Eye Hospital Ward for examination. The sampling method used in this study is Non-Probability Purposive Sampling. The criteria set by the ethical committee of Lahore were followed by the implementation of research and right of research participants was obliged.

As this study was conducted from December 2020 to April 2021 at Eye ward Mayo Hospital Lahore in Punjab, Pakistan. So, Mayo hospital has a large longstanding eye department providing extensive surgical and medical facilities, seeing more than 20 000 patients OPD per year. Patients were enlisted from the OPD eye clinic on the basis of willingness and availability to share their relevant experiences. We interviewed the patients who aged more than 18 year, previously used tobacco for at least one year suffered with dry eye conditions and have no other major ocular pathology. Written consent was obtained in the form of questionnaire from each patient but most of the patients were illiterate so we asked them verbally about their experience.

In the optical objections, we evaluated 300 patients over the age of 18 who were reported to have OPD. After random sampling, all patients were selected. Such as patients who were significantly selected to take the test. The condition of critically ill patients, critically ill, nicticorneal or convulsive infections, contact lens we are rest and those who have undergone any kind of visual medical procedure in the last one and a half years were barred from investigation.

Our research team recorded patients' fine eyesight and general history, mainly due to dry eyes. Exposure to sunlight, rising air temperatures, smoking, air pollution, and medications are some of the things that have been specifically studied. After a step by step history, another researcher set up a predefined survey system for dry eye results. The study was conducted in patients' native language and requested background information, including age, sex, occupation, home and dry eye symptoms, often with water, count, physical Feelings (delicacy), conflict, consumption, well-being, dryness, irritation, and weight.

As a result, one researcher examines the relative factor of patients. During visual diagnosis is, visual surface irregularities, eyelid infection, meibomian gland dysfunction, the presence of any kind of fibers or fibers and then, tears using tear film separation time (TBUT) The condition of the film was assessed. The test was started at ambient temperature, preventing fans from using fluorescent dyes in the average forensics. The patient was contacted more than once to allow for flicker 4-really, even a fluorescent color transfer to the visual surface.

Finally, the patient was instructed not to blink any further and was examined on a kit light bio microscope with a cobalt blue channel. Even the time-consuming B/W last squat, the concept of the final starting point in the early tear film was TBUT. Patients who showed this stress for less than ten seconds experienced dry eyes. In a situation where any tolerance has revealed the use of a visible ointment, the TBUT was estimated after stopping the drug at any

rate for 24 hours.

Inclusion & exclusion criteria:

Inclusion Criteria:

- Patient must be smoker
- Patient used tobacco for last one year
- Aged between 18 to 60

Exclusion Criteria:

The exclusion standards were as per the following:

- Positive history of medication misuse, utilization of contact focal point, and visual medical procedure.
- Utilization of eye drops for long terms.
- All patients with anomalies in the cornea or conjunctiva or top.
- Patients with atopy or unfavorably susceptible sicknesses. • Sjogren's disorder.
- Diabetic patients and patients with immune system problems to stay away from the optional visual impact.

Instrument to be used:

- Pen torch
- Slit-lamp
- Questionnaire

Statistical Analysis:

All data was analysis on SPSS version 23. All descriptive statistics represented in the form of graphs and frequency tables. Chi square test was used for checking association between attributes and

considered significant at p-value 0.05

Results:

One hundred and sixty patients who smoked attended in the study with average age 46.8 ± 8.3 years. There were 58 (36.25%) females and 102 (63.75%) males in the study. The detailed socio-demographic characteristics of the patients (Table-1). the no of participants involved in study who smoke suffered with such condition of dry eye. The prominent presenting complaint of the patients with dry eyes was blurring of vision in 29 (51.8%) of the cases followed by recurrent watering and it changing in 39.3% and 19.6% of the cases respectively (table-2). The frequency of dry eye in smokers was found to be 35% (56cases) in our study population. Patients aged more than 70 years showed significantly higher prevalence as compared with rest of the groups in 40.0% of the cases ($p = 0.006$; 95% CI 1.346 – 5.780) (Table 3). A relative peak of dry eye prevalence was noted in age group 3140 years (20.3%). As compared to females (16.1%), males showed significantly higher prevalence of dry eyes (26.4%) ($p = 0.021$; 95% CI 1.080–2.631) in smokers' population. Though the prevalence of dry eye came out to be more in rural population (20.6%) as compared with urban population (17.6%) ($p = 0.611$; 95% CI 0.552– 1.392), this result was not statistically significant. A detailed analysis of prevalence of dry eye according to age, gender and place of residence (Table 3). Farmers and laborers were the most affected people with dry eye 13 (27.1%) followed by extreme exposure persons (4, 25.0%) that involved professional computer users, skillful drivers, field salesmen, field employees, outside painters, technicians and cooks. From detailed ophthalmic examination, all patients went through assessment of their refractive status as well. 15.2% of emmetropes suffered from dry eyes while 16.2% (16/105) myopes and 18.9% (22/116) hypermetropes were affected by this condition. The mean number of ocular symptoms in dry eye patients was significantly higher as compared to non-dry eye group: 6.8 ± 2.1 versus 3.4 ± 2.3 ($p = 0.001$; 95% CI 1.69- 2.86) (Table 4).

Table1: iSocio demographic characteristics of participants in the study (n=160)

Age group	No of Subjects	Percentage
21 – 30	36	23.4
31 – 40	30	19.7
41 – 50	33	20.6
51 – 60	29	18.3
61 – 70	19	11.3
Above 70	13	6.7

Gender distribution	No of subjects	Percentage
Male	102	63.75
Female	58	36.25

Residence	No of subjects	Percentage
Urban	97	60.62
Rural	63	39.37

Occupation	No of subjects	Percentage
Farmers / Laboure's	24	16.0
Others with High Exposure ^a	9	5.3
inside Office employees/Shopkeepers	27	17.7
Others with Low Exposure ^b	28	18.3
Factory Workers	5	1.7
Student	62	41.1

Table 2: Presenting symptoms of dry eye patients (n = 56).

Symptoms	Number of Participants	Percentage (%)
Blurred Vision	29	51.8
Watering	22	39.3
Itching	11	19.6
Heaviness	8	14.3
Burning	7	12.5
Stickiness	6	10.7
Dryness	5	8.9
Grittiness	4	7.1
Extra Mucoïd discharge	3	1.7

Table 3: Prevalence of dry eyes according to age, gender and residence.

	No of cases	Dry Eye subject	Prevalence	p-value	95% CL
		<i>Age Groups (years)</i>			
21 – 30	36	10	14.3	0.110	0.381 – 1.118
31 – 40	30	12	20.3	0.502	0.671 – 1.898
41 – 50	33	10	16.1	0.182	0.471 – 1.394
51 – 60	29	9	16.4	0.990	0.485 – 1.620

61 – 70	19	7	20.5	0.054	0.551 – 2.121
Above 70	13	8	40.0	0.006	1.346 – 5.780
		<i>Gender Distribution</i>			
Female	58	18	14.1	0.021	1.080 – 2.631
Male	102	47	28.4		
		<i>Residence</i>			
Urban	193	34	17.6	0.611	0.552 – 1.392
Rural	107	22	20.6		

Table 4: Prevalence of dry eye in smokers in various occupational groups.

	No of cases	Dry Eye subject	Prevalence	p-value	95% CL
Farmers/ labourers	24	13	27.1	0.059	0.980 – 2.863
Others with high exposure	9	4	25.0	0.781	0.459 – 2.897
students	62	25	20.3	0.341	0.783 – 1.979
Factory workers	27	1	20.0	0.714	0.088 – 6.183
Indoor office workers/ shopkeepers	5	7	13.2	0.132	0.310 – 1.192
Others with low exposure	28	7	12.7	0.079	0.287 – 1.098

Discussion:

Tobacco smoking is a realized danger factor for some fundamental and visual illnesses. In any case, there have been not many examinations connecting smoking to dry eye, and the discoveries developing from these investigations are conflicting. In the current examination, unmistakably TBUT esteems in smokers were essentially lower than those of nonsmokers. Also, the eye aggravation records of the smokers were uniquely higher than those of the nonsmokers. The examination identified a straight adverse connection between the smoking file and TBUT esteems. By and large, two fundamental speculations can clarify the current discoveries. The main hypothesis is the ischemic hypothesis dependent on the way that poisons related with smoking lessening blood stream or additional clump arrangement inside visual vessels, along these lines removing supplements that are fundamental for eye cell physiology. The subsequent hypothesis is that the absence of cancer prevention agents like free extremists, aldehydes, peroxides, epoxides, nitrogen oxides, and peroxy revolutionaries rising up out of peroxidation can prompt an aggravation in the typical usefulness of the visual tissue. Tear film lipids, water components and make-up components interact with each other, so that the tear film can also spread the lipid layer, introduce corneal weight and allow tear stabilization within normal limits. Chronic smoking encourages specific

quantitative and quality barriers to ocular health. The results of our study confirmed that smoking is harmful to the previous tear film and ocular surface, which is consistent with many other study findings [13]. The therapeutic destination of this investigation was effectively met with dry eye proliferation and risk factors. The use of analytical standards in various investigations and the removal of tee honor for various tear film inspection tests has shown the predominance of dry eyes to reach approximately 10 to 70 contingents. In some studies, the tests were performed only on patients who had a large number of positive protests about dry eyes, which caused high waves of dry eyes [14].

Our results show that the immediate increase in contact between the age of patients using tobacco and dry eyes increases the frequency of dry eyes. This result was expected, along with several other studies. An overall frequency of dry eye commonalities was found in the 31- to 40-year-old age group, as Hickey previously observed [15]. Due to excessive use of tobacco or use of air pollution, we accept the most visual drying problem of this age group.

Nations like Pakistan with a lot of sun exposure can display this wonder to a more prominent degree. Nonetheless, we prescribe more investigations in such manner to discover precise reason for this spike of frequency of dry eyes in age bunch 31 – 40 years [16]. In the same way as other studies, our examination likewise showed altogether higher pre dominance of dry eyes in females when

contrasted with guys (26.4% versus 16.1%; $p = 0.021$).

Individuals living in provincial (rural) territories showed higher frequency of dry eyes when contrasted with metropolitan (urban) population [17]. In any case, as opposed to different investigations, the thing that matters were not measurably critical. The higher frequency in provincial occupants is believed to be the consequence of extreme openness to daylight and high outside temperatures and excessive passive smoking [18].

In this study explained that tobacco smoking may harm visual surface epithelium in light of the immediate contact between airborne particles coming from smoke and visual surface. Yoon revealed a high measure of squamous metaplasia in the conjunctival surface epithelium in smokers. The creators defended their outcomes by the shortfall of development factors needed for epithelial separation as a result of poisonous disturbance by the synthetic mixtures. Dry eye is one of the most common medical problems, causing complaints of burning, itching, or even dryness. Available treatments are in the form of tear substitutes, which provide a means of relieving symptoms for a short period of time, but require repeated application [19].

Lot of studies are available about the mechanism by which the tear caused by smoking causes the film to break. Of these, the effect of lipid peroxidation of the outer layer of the pre-tear film is the most likely cause of tear film malfunction, leading to dry eye symptoms. At the ocular level, gas phase per puff reveals short-lived radicals greater than $1E + 14$, and even more so in the tar phase, during which the radicals last longer [20]. Schaumborg DA et al., evaluated the lipid layer of the tear film in smokers and reported damage to the lipid layer which also prevents the tear film from spreading at the corneal level and makes it irreparable. According to him, the tear film damages the lipid layer through the lipid peroxidation process and causes dry eyes. Smokers also have higher levels of lipid peroxidation than nonsmokers. The chemical composition of cigarette smoke is complex, containing many free radical species, aldehydes, peroxides, epoxides, nitrogen oxides, peroxy radicals and other peroxides. There is growing evidence that these oxidants may contribute to smoking cessation. Smoking tar and gas contain a lot of oxidizing substances. Smoking can also cause epithelial damage to the ocular surface because the smoke comes in direct contact with the eye surface [21]. Moss SE et al. observed that smokers had higher levels of squamous metaplasia in the epithelium of the conjunctival surface than in controls. This may be due to an increase in inflammation caused by toxic itching in cigarette smoke, resulting in the absence of growth factors necessary for epithelial differentiation. Polymorphonuclear leukocytes and squamous epithelial cell counts were increased before and after shifts in tobacco workers [22]. MantelliF reported a high degree of nervous irritation among tobacco workers who came in contact with high concentrations of the substance. The presence of toxins and irritants in the smoke causes a mixed reaction that causes redness of the eyes [23].

Smoking also causes changes in the tear protein patterns of smokers compared to smokers. By electrophoretic analysis of tear proteins, gross observed that the change in tear protein occurs in smokers more than in control. They noted significantly higher protein peaks in heavy smokers than in non-smokers. With the increase in subjective symptoms related to dry eyes in smokers, they approached changes.

Conclusion:

This study shows that smokers have a higher frequency of dry eyes, so there is an important link between smoking and dry eyes. Patients have relatively low TBUT values such as ($P=0.005$). Smoking also affects the secretion and stability of tear films, so it causes more it changing and redness in smokers. The study shows a large but low diagnostic burden of this condition in our patients. We conclude that dry eye is related to aging, female gender, external occupations, smoking, diabetes, meibomian gland dysfunction and reflection errors. These findings should guide the visionary community to develop a more targeted and focused approach to problem solving, as famine is not only an eye disease but also a huge burden on the patient's economy. A detailed history of the condition's symptoms and a good clinical examination over time with a tear film break can help us accurately diagnose the condition and actively manage the condition.

Recommendation:

After study this research there are following recommendation to improve smoking habits:

- Clinical physician should ask about smoking habit to their adult patient and advise them to quit smoking
- Doctors should guide their patient about dry eye and smoking side effects properly
- Patient should maintain their balanced diet to avoid smoking side effects
- There should be more awareness spread about smoking side effects on human body on TVC and posters.
- Doctor should prescribe nicotine replacement supplements to patient to avoid this habit

References:

1. Afshan A, Bhutkar MV, Reddy R, Patil RB, JIJB, Research M. Effect of chronic cigarette smoking on intraocular pressure and audio-visual reaction time. 2012;3(2):1760-3.
2. Altinors DD, Akça S, Akova YA, Bilezikçi B, Goto E, Dogru M, et al. Smoking associated with damage to the lipid layer of the ocular surface. 2006;141(6):1016-21. e1.
3. Zawahry WMAER, Hamdy AM, Ahmed MB. Passive Smoking as a Risk Factor of Dry Eye in Children. Journal of Ophthalmology. 2012;2012:130159.
4. Galor A, Feuer W, Lee DJ, Florez H, Carter D, Pouyeh B, et al. Prevalence and risk factors of dry eye syndrome in a United States veterans affairs population. 2011;152(3):377-84. e2.
5. Goto E, Yagi Y, Matsumoto Y, Tsubota K, Ajoo. Impaired functional visual acuity of dry eye patients. 2002;133(2):181-6.
6. Grus FH, Sabuncuo P, Augustin A, Pfeiffer NJ, Gsaft, ophthalmology. Effect of smoking on tear proteins. 2002;240(11):889-92.
7. Lee SY, Petznick A, Tong LJO, Optics P. Associations of systemic diseases, smoking and contact lens

- ns wear with severity of dry eye. 2012;32(6):518-26.
8. Nita M, Grzybowski AJCpd. Smoking and eye pathologies. A systemic review. Part II. Retina diseases, uveitis, optic neuropathies, thyroid-associated orbitopathy. 2017;23(4):639-54.
 9. Lemp MA, Foulks GNJOS. The definition and classification of dry eye disease. 2007;5(2):75-92.
 10. Timothy C, Nneli RJNjops. The effects of cigarette smoking on intraocular pressure and arterial blood pressure of normotensive young Nigerian male adults. 2007;22(1-2).
 11. Liu Z, Pflugfelder SCJO. Corneal surface regularity and the effect of artificial tears in aqueous tear deficiency. 1999;106(5):939-43.
 12. Matsumoto Y, Dogru M, Goto E, Sasaki Y, Inoue H, Saito I, et al. Alterations of the tear film and ocular surface health in chronic smokers. 2008;22(7):961-8.
 13. Moss SE, Klein R, Klein BEJAoo. Prevalence of and risk factors for dry eye syndrome. 2000;118(9):1264-8.
 14. Phadatare SP, Momin M, Nighojkar P, Askarkar S, Singh K KJAiP. A comprehensive review on dry eye disease: diagnosis, medical management, recent developments, and future challenges. 2015;2015.
 15. Pritasari A, Faida S, Zulaikhah S. Smoking as Risk Factors to Dry Eye Syndrome. Jurnal Kesehatan Masyarakat. 2019;15:1-5.
 16. Rieger GJBjoo. The importance of the precorneal tear film for the quality of optical imaging. 1992;76(3):157-8.
 17. Sahai A, Malik PJJjoo. Dry eye: prevalence and attributable risk factors in a hospitalbased population. 2005;53(2):87.
 18. Satici A, Bitiren M, Ozardali I, Vural H, Kilic A, Guzey MJ AOS. The effects of chronic smoking on the ocular surface and tear characteristics: a clinical, histological and biochemical study. 2003;81(6):5837.
 19. Schaumberg DA, Sullivan DA, Dana MRJLG, Tear Film, 3 DES. Epidemiology of dry eye syndrome. 2002:989-98.
 20. Tian Y, Liu Y, Zou H, Fu J, Shen B, Wang W, et al. The epidemiologic study of dry eye in Beixinjing district of Shanghai. 2009;27(7):776-80.
 21. Smith JAJAOS. The epidemiology of dry eye disease. 2007;85.
 22. Schaumberg DA, Sullivan DA, Buring JE, Dana MRJAjoo. Prevalence of dry eye syndrome among US women. 2003;136(2):318-26.
 23. Moss SE, Klein R, Klein BEJO, Science V. Longterm incidence of dry eye in an older population. 2008;85(8):668-74.
 24. MantelliF, Massaro- G ordano M, Macchi I, Lambiase A, Bonin SJJocp. The cellular mechanisms of dry eye: from pathogens to treatment. 2013;228(12):2253-6.