



RESEARCH ARTICLE

INCIDENCE AND FACTORS ASSOCIATED WITH DRY EYES IN YOUNG ADULT PATIENTS  
ATTENDING EYE OPD IN TERTIARY HEALTH CENTRE

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ARTICLE INFO

Received 6th December, 2017  
Received in revised form 21st  
January, 2018  
Accepted 05th February, 2018  
Published online 28th March, 2018

**Keywords:**

Dry eye, Incidence, Young adults

ABSTRACT

**Background:** Dry eye disease is one of the commonest reasons for patients visit to an eye care professional, although most of the times it remains undiagnosed. In various studies incidence among young population was found 6-34 % with female preponderance. In elderly age group, i.e. above 65 years, incidence was 75%. With advent of newer diagnostic procedures and increasing knowledge, we are better equipped to treat dry eye today. **Methods:** A one year study was conducted among young adult(20-45 year) patients attending Regional Institute of Ophthalmology, GMCH, Guwahati to study the incidence and factors associated with dry eyes. Preformed questionnaires (OSDI©) and clinical examinations including slit lamp evaluation, Schirmer's test, tear film break up time (TBUT) and stains like Rose Bengal, Fluorescein were performed to diagnose. **Results:** Out of 540 patients screened for dry eye disease, 90 were found to be positive (Incidence -16%). Among these 90 cases – 42 were females and rest were males. Incidence among females and males was found 14.73 and 18.82 respectively. **Conclusion:** Dry eye is an increasingly prevalent multifactorial ocular affliction. With changing lifestyle, environment, availability and dependency on electronic gadgets there is a rise in the number of dry eye patients in young adults. Being one of the most common ocular complaints, various objective tests are required to make precise diagnosis and evaluate the risk factors causing dry eye disease.

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INTRODUCTION

**Background**

Dry eye disease (DED) is one of the most frequently encountered ocular morbidities. 25% of patients who visit ophthalmic clinics report symptoms of dry eye, making it a growing public health problem and one of the most common conditions seen by eye care practitioners.<sup>1</sup> Historically, the term "Keratoconjunctivitis sicca" can be attributed to the Swedish ophthalmologist Henrik SC Sjögren who described the triad of dry eye, dry mouth and joint pain in 1933. In clinical practice, we commonly use the term 'keratoconjunctivitis sicca' (dry eye syndrome, chronic dry eye disease or keratitis sicca).<sup>2</sup>

DEWS II (2017) definition of dry eye states that "dry eye is a multifactorial disease of the tears and ocular surface with symptoms of discomfort, visual disturbance and tear film instability with potential damage to the ocular surface. It is often accompanied by increased osmolarity of the tear film and inflammation of the ocular surface".

It is estimated that some 75% of people above 65 years' experience symptoms of dry eyes.<sup>3</sup> DED is a common ocular condition which significantly reduces quality of life, and affects 6-34% of the global adult population with female preponderance.<sup>4,5</sup> Besides association with ocular surface disorders and few systemic disorders like Sjogrens syndrome, lupus, Steven Johnson syndrome, additional factors like contact lens wear and adverse environmental exposures like arid windy conditions and visual tasking can exacerbate symptoms of dry eyes.<sup>6</sup>

With changing lifestyle, environment and increased longevity due to improved medical services there is a rise in the number of dry eye patients. Dry eye disease (DED) is a distressing ocular condition. Due to its multifactorial nature, clinical and biological signs of DED can be inconsistent and sometimes discordant with symptomatology.<sup>7,8</sup> For the majority of DED patients, there is some relation between symptoms and clinical signs. However, it is also well established that perceived symptom severity may not equate to clinical signs of disease, and a significant proportion of patients have conflicting signs and symptoms. Consequently, there is no gold-standard model

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for determining DED severity. With advent of newer diagnostic procedures and increasing knowledge, we are better equipped to treat dry eye today. The strategy in treatment of DED in present scenario is early diagnosis, effective, efficient treatment and long term patient satisfaction.

**METHODS AND MATERIALS**

A one year observational study was conducted among young adult patients attending Regional Institute of Ophthalmology, GMCH, Guwahati to study the incidence and factors associated with dry eyes. We excluded patient below 20 years and above 45 years. Also patients with conjunctivitis, corneal ulcer, scleritis, episcleritis, uveitis (either active or recent past), glaucoma, diabetes mellitus were excluded. Patients with history of surgery for cataract, pterygium and refractive surgeries were also not taken into consideration.

After detailed history regarding chief complaints, present illness, past illness, personal and drug history; pre-formulated OSDI© questionnaires [ Figure - 1 ] were given to patients where they were asked 12 questions, and were instructed to circle the number in the box which best represented each answer. Then, the boxes A, B, C, D, and E according to the instructions beside each were filled. The OSDI© is assessed on a scale of 0 to 100, with higher scores representing greater disability. The index demonstrates sensitivity and specificity in distinguishing between normal subjects and patients with dry eye disease.

After detailed slit lamp examination, series of objectives dry eye tests (under room temperature condition) were conducted in the following sequence: tear meniscus height, tearfilm break up time test, fluorescein staining, Schirmer test and Rose Bengal Staining. A 5 minutes gap was allowed in between the tests to minimize reflex tearing and ocular surface changes secondary to staining, presence of strands/ filaments/ meniscus floaters was looked for before & after the tests. Schirmers test value ≤ 15 mm in 5 minute on Whatman’s filter paper No. 41, TBUT value < 10 seconds, T.M.H. <0.3mm, fluorescein/ rose Bengal staining (Van Bjsterveld scoring > 3.5) and presence of strands and / or filaments in either / both eyes were taken as indicators of dry eye. If two or more of the above observations were positive, the patient was deemed to be suffering from dry eye.

Systemic laboratory investigations were done and in suspected cases of Sjogren syndrome special laboratory investigations like serum auto antibodies (anti-nuclear antibodies and rheumatoid factor) and X-ray joints were conducted.

**RESULTS**

During our study period of one year, out of total OPD attendance of 36,043 (thirty-six thousand fourty three) patients of all ages, 540 patients were screened randomly of young age group (20-45 years) and were subjected to various objective tests. Out of them 180 eyes of 90 (Ninety) patients were diagnosed to have dry eye disease.

Among 90 cases – 42 females and 48 cases were found to be males. Incidence among total patients was found to be 16.66. Incidences among females and males were found to be 14.73 and 18.82 respectively. Maximum incidence was found in 20-

25 years of age group (22.96%) followed by 41-45 years of age group (20%). [fig- 2] Highest incidence was found among electronic gadget (laptop, computer, mobile) users (30%) followed by outdoor workers (street workers and farmers) (25.55%). [fig- 3 ] Among refractive errors 30 cases (33.33%) were myopia, 27 cases (30%) hypermetropia & 10 cases (11.11%) were presbyopia. The most common presenting symptoms were foreign body sensation, redness (on and off) and burning/itching sensation respectively.

Have you experienced any of the following during the last week?	All of the time	Most of the time	Half of the time	Some of the time	None of the time
1. Eyes that are sensitive to light? ..	4	3	2	1	0
2. Eyes that feel gritty? .....	4	3	2	1	0
3. Painful or sore eyes? .....	4	3	2	1	0
4. Blurred vision? .....	4	3	2	1	0
5. Poor vision? .....	4	3	2	1	0

Subtotal score for answers 1 to 5 (A)

Fig 1 OSDI Classification

Have problems with your eyes limited you in performing any of the following during the last week?	All of the time	Most of the time	Half of the time	Some of the time	None of the time	N/A
6. Reading? .....	4	3	2	1	0	N/A
7. Driving at night? .....	4	3	2	1	0	N/A
8. Working with a computer or bank machine (ATM)? .....	4	3	2	1	0	N/A
9. Watching TV? .....	4	3	2	1	0	N/A

Subtotal score for answers 6 to 9 (B)

Fig 2 age wise distribution of DED

Have your eyes felt uncomfortable in any of the following situations during the last week?	All of the time	Most of the time	Half of the time	Some of the time	None of the time	N/A
10. Windy conditions? .....	4	3	2	1	0	N/A
11. Places or areas with low humidity (very dry)? .....	4	3	2	1	0	N/A
12. Areas that are air conditioned? ...	4	3	2	1	0	N/A

Subtotal score for answers 10 to 12 (C)

Fig 3 occupation wise distribution of DED

The most common associated ocular risk factors were low blink rate (25.55%) followed by exposure (proptosis, exophthalmos, high myopia) (18.88%), chronic contact lens user (14.44%), ocular allergy (14.44%). [fig- 4]

Add subtotals A, B, and C to obtain D  
(D = sum of scores for all questions answered) (D)

Total number of questions answered  
(do not include questions answered N/A) (E)

Figure 4 Pie diagram showing Associated ocular risk factors

Maximum number of cases associated with systemic risk factors of DED were long hours of computer work (30%), followed by air condition users (13.33%), drug user (11.11%), skin diseases (10%). [fig- 5]

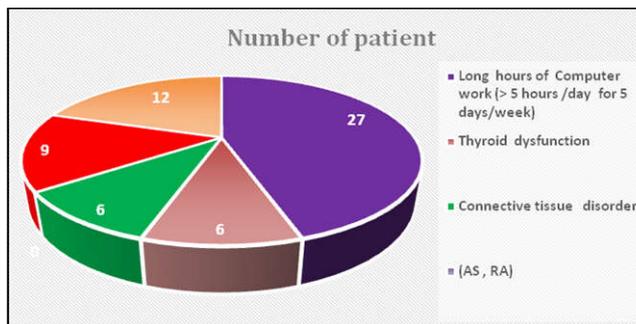


Figure 5 Pie diagram showing Associated problem

Dry eye disease was graded according to OSDI© scoring, and moderate grade of dry eye disease was found in maximum number of cases (63.33%) and least number of patients were found in severe grade (13.33%). [Fig-6]

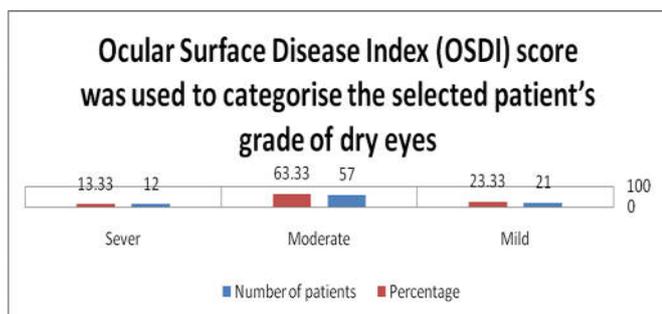


Figure 6 Bar diagram Ocular Surface Disease Index (OSDI) score was used to categorise the selected patient's grade of dry eyes

## DISCUSSION

Until recently dry eye disease was thought to be of effecting elderly age group and post-menopausal women but now a days increased dependency and easy availability of electronic gadgets and also due to increase use of air condition (A.C.) for change of climate/environment, there is huge increasing incidence/prevalence of dry eye diseases in all age group. Keeping this in mind, this study was conducted in young adult (20-45 years of age group) as most of the previous studies were done in elderly age groups.

Our present study was undertaken to determine the incidence of dry eye based on symptoms, OSDI score, dry eye objective tests and the probable risk factors for dry eye. The dry eye objectives tests were conducted only on patients presenting with symptoms related to dry eye.

In present study, incidence rate was found to be 16.6%, which is almost same to the Blue Mountains study, which is also 16.66%.<sup>9</sup> Different incidences may be found due to different diagnostic criteria for diagnosing dry eye disease. Incidence was found little higher in asian population. In particular, data from two studies performed in Asia namely, Shihpai (33.7 %) and Sumatra study(27.5%) suggest the possibility of a higher prevalence of dry eye due to environmental factors those populations.<sup>10-11</sup>

In present study, incidence among the male was found to be more than female as most of the other studies included post-menopausal age group also and disease burden among the post-menopausal women was found maximum in each and every studies that was conducted. The disease consciousness among rural women may also be a cause of less number of reported cases among female.

In our study, dry eye incidence was found maximum in 20-25 years of age group (22.96%), most of the cases found to be associated with increased electronic gadget users, like mobile, laptop. It may be due to increase availability of these electronic gadgets among the young school, college going students.

In our study, maximum number of cases were reported on long duration of electronic gadget users (27 cases) like computer, laptop, mobile phones, followed by outdoor workers (23 cases) including street workers farmers and other field worker.

Followed by indoor workers (19 cases) including office worker and shop keeper. There was also increase in incidence of dry eye in indoor workers using air conditioner (A.C.) it may be due to increased evaporation of tear fluid. The common complains of this patients were burning, dryness, stinging and grittiness. These findings were similar with Sahai A *et al* studies<sup>12</sup>

Our finding of increased incidence of dry eye in those with refractive errors (corrected and uncorrected 53.4%) compared to emmetropes (46.6%) is consistent with the observation by Sahai A *et al.* (2005).<sup>12</sup> It is found that persons with refractive error have an increased tendency to rub their eyes and thereby cause introduction of infective maternal, sebum and sweat along with lodgement of particulate foreign substances that predispose to tear film instability.

In this study noted a higher incidence of dry eye among rural resident (52.22%) than in urban dwellers (47.77%) which is similar to results obtained by Sahai A *et al* study<sup>12</sup>. The increased affection of rural population in the present study was a result of the increased exposure of rural resident, largely farmers and manual labourers to environmental risk factors such as sunlight, heat and wind.

In our study 13 cases were found associated with chronic contact lens users using contact lens for more than 2 years and most of the cases are high myopic. The use of contact lens is associated with increased mucous production, reduced blink frequency, increased tear evaporation, increased tear osmolarity, reduced TBUT, all of which can initiate and / or accentuate dry eye sign and symptoms. Doughty and colleagues in 1997 reported dry eye in 37% of contact lens users.<sup>13</sup>

In our study, 17 cases were found due to higher exposure of eye i.e. proptosis, exophthalmos, high myopia causing higher evaporation of tear fluid. Most of the exophthalmos cases were associated with auto immune thyroid disease, Most SE, Klein R, Klein BE *et al*<sup>14</sup>. also reported association of dry eye disease with exophthalmos and thyroid eye disease on their study.

In our study, 9 cases were found in associated with topical drug users containing preservatives. Broadway *et al*, Baudouin *et al*.<sup>15</sup> also reported the association of dry eye with topical drug users containing preservatives. In our study, 6 cases were found to be associated with chemical burn injury and traumatic ectropion. Ectropion causing increased inter- palpebral resulting in increased tear fluid evaporation. Chemical injuries to the eye can produce extensive damage to the ocular surface causing dry eye. Alkali agents are lipophilic and therefore penetrate tissues more rapidly than acids and damages corneal stroma. In this region of the country, alkali burn is more common may be due to using limestone in painting at home and using with battle nut chewing. Medi Eslani, Alireza Baradaran-Rafi *et al.*<sup>16</sup> also suggested association of alkali burn with dry eye on their study.

In our study, 9 cases were found to be associated with Meibomian gland dysfunction. In 1997, McCulley and Sciallis<sup>17</sup>, also identified Meibomian dysfunction resulting in dry eye, it was suggested that cause may be due to stagnation of the gland secretions and tear film instability due to a compromised lipid layer. In our study, 6 cases were found in associated with connective tissue disorder / rheumatoid arthritis. Arthritis particularly rheumatoid arthritis is a risk factor for dry eye as it initiates, a secondary auto immune impairment of lacrimal

secretion. Fujita M, Igarashi T, Kurai T, *et al.*<sup>18</sup> reported dry eye among rheumatoid arthritis in 19%-31% of cases.

In this study 9 cases were found in associated with skin diseases, acne rosacea, atopic dermatitis, ocular pemphigoid. A similar association were noted by Rolando M, Papadia M *et al.*<sup>19</sup> study report.

## CONCLUSION

Dry eye is an increasingly prevalent multifactorial ocular affliction. Subjective symptoms of dryness can hide various disease other than dry eye. In this study dry eye cases is found to be 16%. Male predominance was seen in young age group. Increasing number of DED was found due to increase usage of electronic gadgets in young adults, accounting 30%. Also outdoor street workers show enhanced increase due to dry, hot and humid condition. Injudicious use of drugs causing increase in numbers of dry eye. Increasing number rural population were found due to exposure to dry, hot, windy condition and less consciousness of protective measure. Low blink rate was noted in significant number of cases due to increase availability and dependency on laptop/computer, air conditioner, T.V. Although earlier it was thought, it is the disease of older and of post-menopausal age group but recently there is huge increase of dry eye found in young adults, so special importance should be given for on this age group. Being a one of the most ocular complaints, various objective tests are required to make precise diagnosis and evaluate the risk factors causing dry eye disease. Most of the time, it goes undiagnosed so special importance should be given for proper diagnosis and treatment.

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### How to cite this article:

Bharati Gogoi and Minhaz Uddin Ahmed (2018) 'Incidence And Factors Associated With Dry Eyes In Young Adult Patients Attending Eye Opd In Tertiary Health Centre', *International Journal of Current Multidisciplinary Studies*, 04(3), pp. 866-869.

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