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RISK FACTORS AND OUTCOME OF DRY EYE DISEASE IN EASTERN ODISHA AMONG ADULTS AGED 18 YEARS AND OLDER, A PROSPECTIVE HOSPITAL-BASED STUDY.

*Ramamani Dalai[1], Rajashree Rout[2], Sabita Mohanta[3,] Kedarnath Das[4]**
[1]Department of Ophthalmology, Fakir Mohan Medical College, Balasore, Odisha.
[2]Department of Ophthalmology, SLN Medical College, Koraput.
[3]Department of Ophthalmology, S.C.B. Medical College, Cuttack, Odisha.
[4]Department of Pediatrics, J.K. Medical College, Jajpur, Odisha.*

ABSTRACT

Introduction
Dry eye disease (DED) is one of the most common chronic diseases of the ocular surface with a growing public health problem frequently encountered in ophthalmic practice.

Objective
The study aims to determine the prevalence and demographic characteristics of Dry Eye Disease (DED) and to identify and evaluate the various risk factors associated with DED in a hospital-based population.

Methods
This cross-sectional, population-based prospective study consists of 307 cases with DED of ages above 18 years attending the ophthalmology department or referred from other SCB Medical College Hospital, Cuttack in Odisha from October 2017 to September 2019.

Results
DED patients over 40 constituted 60.2% with a female-male ratio of 1.24:1. Keratoconjunctivitis sicca was commonly found in elderly of more than 40 years of age. Foreign body sensation was the most common symptom 267(86.9%). Tear film breakup time was used to assess the stability of precorneal tear film, it is a reliable and repeatable test for dry eye and is minimally invasive.

Conclusion
Dry eye is an under-diagnosed ocular disorder. DED evaluation with an appropriate questionnaire and standard tests helps in early diagnosis, appropriate management, and patient satisfaction with a better quality of life.

Recommendations
To reduce the public health effect of DED, ophthalmic examinations should include routine screening for DED in everyone over 40, especially women. Public health campaigns should educate people about DED risk factors and symptoms to encourage self-diagnosis and treatment. Adding a standardized DED questionnaire and tear film breakup time test to routine ophthalmological exams can improve early detection and patient outcomes.

Keywords: *Dry Eye Disease, Stevens-Johnson syndrome, Keratoconjunctivitis Sicca, Allergic Conjunctivitis.*
Submitted: 2023-12-30 *Accepted****: 2023-12-30***
Corresponding author*: Kedarnath Das**
Email: dr.kedar2008@gmail.com
Department of Pediatrics, J.K. Medical College, Jajpur, Odisha.

Introduction
The etiology of dry eye, a multifactorial disease of the ocular surface, includes tear film instability and hyperosmolarity, ocular surface inflammation and injury, and abnormalities related to the nervous system. The disease is characterized by a loss of tear film homeostasis and is accompanied by ocular symptoms.[1] It is more common in women than men (due to female hormonal effects on the lacrimal and Meibomian glands and ocular surface) and has an increased prevalence with age.[2] The prevalence of DED varies depending on the diagnostic criteria employed and has ranged from approximately 5 to 50% in population-based studies, which is as high as 70 % in visual terminal users.[2][3] In general, it is more common in Asian populations when compared to whites, although geographic, climatic, and environmental variations may also be significant factors.[2][4] Evaporative dry eye is considered the most common subtype of DED. There may be discordance between dry eye signs and symptoms, with signs being more prevalent and variable than symptoms.[2]

DED is multifactorial, including local ocular factors, systemic diseases, sociodemographic factors, environmental conditions, and iatrogenic causes such as medications or surgeries.[5] Systemic medications such as antihistamines, antihypertensives, anxiolytics/benzodiazepines, diuretics, systemic hormones, non-steroidal anti-inflammatory drugs, systemic or inhaled corticosteroids, anticholinergic medications, isotretinoin (causes meibomian gland atrophy), and antidepressants.[6]Topical medications include glaucoma

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drops or preservative toxicity from eye drops containing preservatives.[7][8]
Skin diseases on or around the eyelids, such as rosacea or eczema.[9]Meibomian gland dysfunction is a common co-morbidity with thickening and erythema of the eyelids and inadequate or altered secretions of meibomian glands.[10] Ophthalmic surgery, including refractive surgery, cataract surgery, keratoplasty, and lid surgery.[11]Chemical or thermal burns that scar the conjunctiva.[12] Ocular allergies.[13]Computer or device usage as this may lead to decreased blinking when looking at the screen.[14] Vitamin A deficiency can lead to xerophthalmia and the appearance of Bitot spots on the conjunctiva in severe cases.[15] Decreased sensation in the cornea from long-term contact lens wear, herpes virus infections, or other causes of a neurotrophic cornea.[16]Graft-versus-host disease.[17] Systemic diseases, include Sjogren syndrome and other autoimmune or connective tissue disorders such as rheumatoid arthritis, lupus, and thyroid disease.[18] Environmental factors include exposure to irritants like chemical fumes, cigarette smoke, pollution, or low humidity.[19]
DED is classified into two categories: aqueous deficient and evaporative. Aqueous tear deficiency is characterized by inadequate tear production with predominant causes consisting of Sjogren Syndrome (primary or secondary); diseases, inflammation, and/or dysfunction of the lacrimal gland; obstruction of the lacrimal gland; and systemic drugs (i.e., decongestants, antihistamines, diuretics, beta-blockers, etc.) Evaporative dry eye is characterized by increased tear film evaporation and a deficiency in the lipid portion of the tear film. In this instance, the quantity of tears generated is normal, but the excessive evaporation is caused by the quality of the tears. This alteration is most frequently caused by meibomian gland dysfunction. [20]
The hallmark of DED is hyperosmolarity of the tear film, which may damage the ocular surface directly or indirectly by inciting inflammation.[21] The normal osmolarity of the tear film is usually less than 300 mOsm/L, which has been reported to be as high as 360 mOsm/L in patients with DED.[22] Hyperosmolarity of the tear film leads to a cascade of signaling events that releases inflammatory mediators (i.e., tumor necrosis factor, interleukin 1 and 6, etc.) and leads to damage to the ocular surface which may further decrease tear film stability, leading to self-perpetuation of the disease in a "vicious circle."[23] Apart from hyperosmolarity, other factors may initiate this pathologic cycle, including ocular surface inflammation caused by conditions such as allergic eye disease, topical preservative toxicity, or xerophthalmia.[24]
Diagnosis of DED is most often based on a combination of relevant patient history and multiple clinical diagnostics that detect tear film or ocular surface abnormalities. These include symptom questionnaires, ocular surface staining, lipid layer analysis, tear breakup time (TBUT), tear osmolarity, tear production, detection of ocular surface inflammatory markers, meibography, or eyelid health examination [25]The Ocular Surface Disease Index (OSDI) includes 6 questions related to visual disturbance (blurred vision, or poor vision) or visual function (problems reading, driving at night, working on a computer, or watching TV)[26].
In recent years, there has been an enormous increase in research into new therapeutics for dry eye disease that target meibomian gland dysfunction and evaporative dry eye. The most significant change seems to be the emphasis on finding therapies that could counteract the underlying cause, like inflammation, as opposed to just treating symptoms by moisturizing and lubricating the surface of the eyes. We specifically highlight the utilization of biological and biologically derived materials, including naturally occurring glycoproteins, amniotic membranes, and blood serum and plasma. Scleral lenses, such as the Boston Sight SCLERAL lens and the EyePrintPro™ lens, have also emerged as viable treatment options for ocular surface disease. Finally, the introduction of the intranasal neurostimulator represents a new approach to the treatment of dry eye and may offer an alternative or supplement to traditional eye drop therapeutics. However, despite the increase in newly available treatments, there is a continued need for novel and effective treatment options.[26X]

Methods

Study design

A prospective study was conducted.

Study setting

The study was conducted at the Department of Ophthalmology, SCB MCH, Cuttack, Odisha from October 2017 to September 2019.

Participants

The study consisted of 307 cases of ages 18 years or more with bilateral eye affection.

Inclusion criteria

Patients with chief complaints of foreign body sensation, irritation, burning, itching, discharge or crust on lashes, stickiness in the morning, redness, ocular fatigue, or pain even after refractive error correction with spectacles were included in the study.

Exclusion criteria

Seriously ill patients who were too ill to undergo ophthalmic evaluation, patients who were lost to follow-up, post cataract surgery, diagnosed cases of glaucoma, and history of eye trauma were excluded from the study.

Study size

After meticulous review and adherence to the specified inclusion and exclusion criteria, and following the acquisition of informed written consent from all potential participants, a total of 307 individuals were ultimately enrolled in the study. The inclusion criteria ensured that all participants were above the age of 18 and exhibited bilateral eye afflictions characteristic of the condition under investigation. Concurrently, the exclusion criteria meticulously screened out individuals who were either too ill for ophthalmic evaluation, had been lost to follow-up, had undergone specific eye surgeries, or had other disqualifying ophthalmic or systemic conditions. This thorough process was instrumental in compiling a robust and relevant sample size, reflective of the study's aim and scope, thus ensuring that the 307 cases included were optimally suited for an insightful and meaningful investigation.

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Material required for the study were slit lamp biomicroscope, fluorescein strips, and Whatman filter paper no 41,1% Rose Bengal stain. Each case was carefully interrogated and a detailed history and examination finding was noted in a prescribed format.

Clinical diagnostic tests

1. Examination of lid margin for the presence of meibomian gland dysfunction, meibomitis, lid-wiper epitheliopathy**, 2.** Examination of tear film for any mucus thread or filament or debris.3. Corneal epithelium may show filaments, facets, interpalpebral punctuate erosions, epitheliopathies or opacification.4. Schirmer's test: -was done using 5x3.5mm sterile strips of Whatman No 41 filter paper. The patient was made to sit in a relatively dark room with fans switched off. The terminal round end of the strip was folded at the pre-marked area 90-degree angle. The patient was then asked to look up, the lower lid retracted and the test paper was inserted in the lower cul–de–sac at the junction of medial 2/3rd and lateral 1/3rd of the lid. Adequate care was taken to ensure that the paper didn't touch the cornea to avoid reflex tearing. The patient was advised to blink normally. At the end of 5 minutes, the strips are removed and the length of the filter paper moistened was measured in mm starting from the fold. Normal wetting is greater than 10mm. The subnormal range is 6-10mm, whereas less than or equal to 5mm indicates dryness of the eyes. Less than 10mm of wetting, thus indicates an aqueous tear deficiency.

5. Tear film breakup time

After instilling a drop of 2% fluorescein in one eye, the patient was asked to blink a few times and place his head in the slit lamp. Then he/she was asked to look straight ahead without blinking. The tear film was observed by moving the beam of the slit lamp from limbus to limbus watching for an area of tear film rupture manifested by a black island within a green sea of fluorescein. The time elapsed between the last blink and the appearance of the first black spot was tear film break-up time and noted in seconds. This kind of measurement was taken for three successive blinks and the mean of this was noted as final reading**.** TBUT less than 5 seconds was considered definitive for dryness of the eyes.

6. Rose Bengal 1% staining using **a** sterile strip of Rose Bengal dye lubricated with normal saline was gently placed in the lower fornix. The dye was allowed to spread throughout the eye. It was then examined through the red free light of the slit lamp. The stained areas appear dark in color. The eye was divided into 3 zones. Zone -1 Area over the cornea, Zone -2 Bulbar conjunctiva temporal to the cornea**,** Zone -3 Bulbar conjunctiva nasal to the cornea**,** score -0 no stain**,** score -1 countable punctate staining, score 2-uncountable punctate staining**,** score-3 confluent staining**. A maximum** score of 9 was obtained. A score of 3 or more was considered as an indicator of a damaged ocular surface**.**

7. Conjunctival impression cytology

The impression cytology was performed by applying 1x1 cm of cellulose acetate filter paper to the upper temporal bulbar conjunctiva of each eye and keeping it pressed firmly for 5 seconds. Each strip was transferred onto glass slides fixed with a 1:1 mixture of absolute alcohol and ether and stained with PAS and hematoxylin stain. The stained smears were studied and epithelial cells were classified according to Nelson's (1988) classification into 4 stages, stage 0(normal morphology) to stage 3 (squamous metaplasia).

Stage 0: Small round epithelial cells, large nuclei, abundant goblet cells(>75/HPF)

Stage 1: larger polygonal cells, smaller nuclei, decreased number of goblet cells(50-75/HPF)

Stage 2: larger polygonal cells, smaller nuclei, smaller and rare goblet cells (15-50/HPF)

Stage 3: larger polygonal cells, pycnotic or absent nuclei, absent goblet cells(<15/HPF)

Interpretation

Normal goblet cell density is 75/HPF or more and a density less than 75/HPF was considered an indicator of ocular surface destruction

8. Fluorescence staining: positive/negative

9. Corneal sensation test: Intact /Reduced/Absent

All the patients were managed medically according to the severity and duration of symptoms. Local therapy artificial tear substitute (drop &/or ointment), steroid drop and ointment, antibiotic, soft bandage contact lens, daily dressing. Systemic therapy with antibiotics, hormone replacement therapy, steroids, and treatment of associated diseases. General avoidance of predisposing factors, withdrawal of medication if indicated, nutritional supplement, maintenance of hygiene of eyelids and contact lens. Cases were followed up for six months at an interval of 6 weeks, three months, and six months. After six months the signs and symptoms of all patients were evaluated. Those patients did not improve with medical therapy for six months, and were subjected to surgery; punctual occlusion, the release of symblepharon, and tarsorrhaphy.

Ethical considerations

Informed written consent was obtained from all the participants before the study. The study protocol was approved by the institutional ethical committee application number 990.

Results

Among 307 patients, most (95/30.94%) were from the age group 41-50 years. 78(25.4%) were farmers by occupation, as farmers.

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Table –1 Sociodemographic and clinical profile of the study population.

Age distribution		
Age in years	Number of cases (n=307)	%
18-30 years	49	15.9
31-40 years	73	23.7
41-50 years	95	30.94
>50 years	90	29.3
Distribution of patients according to sex		
Sex	n=307	%
Female	170	55.3
Male	137	44.6
Distribution of patients according to habitat		
Habitat	n=307	%
Rural	123	40.06
Urban	184	59.9
Distribution of patients according to socioeconomic status		
Socioeconomic status	n=307	%
BPL (below poverty line)	175	57.1
APL (above the poverty line)	132	42.9
Distribution of patients according to occupation		
Occupation	**n=307**	**%**
Housewife	31	10.09
Farmer	78	25.4
Business /office work	49	15.9
Driver	61	19.8
Teacher	32	10.4
Student	27	8.7
Others	29	9.4

Table 2: Distribution of patients according to etiology

Etiological factors	**n=307**	**%**
KCS (keratoconjunctivitis sicca)	74	24.1
SJS (Steven Johnson syndrome)	53	17.2
Contact lens user	22	7.1
Computer user	21	6.8
Allergic conjunctivitis with blepharitis	26	8.4
Postmenopausal women with hormonal imbalance	41	13.3
Post radiotherapy	13	4.2
Associated systemic diseases (n=57)		18.5
a. Diabetes mellitus	25	
b Graves' disease	06	
c Leprosy	06	
d Rheumatoid arthritis	20	

Most (74/24.1%) cases were due to KCS

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Table 3: Corneal sensation test in patients with single etiologies

Corneal sensation test	KCS	CL	SJS	All conjuunctivitis+blepharitis	Computer users	Postmenopausal women with hormonal imbalance	Asso systemic diseases	Post radiotherapy	Total	%
Intact	10	20	9	14	16	31	47	8	155	50.4
Reduced /absent	64	2	44	12	5	10	10	5	152	49.5

Corneal sensation was present in all four quadrants including the apex in 155(50.4%). Corneal sensation was reduced /absent in 152 (49.5%) patients, from the 64(42.1%) cases were KCS patients, 44 (28.9%) cases were SJS.

Table 4: -TBUT values in patients

TBUT in mm	KCS	CL	SJS	All Con+ Blepharitis	Comp users	Postmenopausal women with hormonal imbalance	Ass Syst ds	Post radiation	Total	%
0-5	44	8	48	12	4	15	5	5	141	45.9
6-10	20	10	5	8	7	14	40	4	108	35.1
>10	10	4	-	6	10	12	12	4	36	11.7

In the above table it was observed that of 307 cases, 249(81.89%) cases had decreased TBUT value<10 sec.
In 141 (45.9%) Cases there was a severe decrease of TBUT value (<5/sec) of which 48 cases are of SJS, 44 cases KCS.

Table 5: Schirmer's test in patients (n=307)

Schirmer's reading (in mm)	KCS	CL	SJS	All Con+Blepharitis	Comp user	Post-menopausal woman with hormonal imbalance	Ass sys ds	Post radiotherapy	total	%
0-5	44	5	35	4	4	14	5	3	114	37.1
6-10	13	5	10	12	10	15	25	5	95	30.9
11-15	12	6	5	4	5	10	25	4	71	23.12
>15	5	6	3	6	2	2	2	1	27	8.7

In most of the cases, 114(37.1%) Schirmer's test values were 0-5 of them 44 were KCS, 35 cases were from SJS, and 14 cases were from postmenopausal women with hormonal imbalance.

Table 6 Fluorescence staining in patients

Fluorescence stain	KCS	CL	SJS	All Con+ Blepharitis	Comp user	Postmenopausal women with hormonal imbalance	Asso systemic ds	Post radiotherapy	total	%
Present	70	8	43	20	8	34	20	8	211	68.7
Absent	4	14	10	6	13	7	37	5	96	31.2

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Fluorescence staining was positive in 211(68.7%) cases, from them 70 cases were from KCS.

Table 7: -Rose Bengal staining in patients (n=307)

RBS score	KCS	CL	SJS	Alle Con+Blepharitis	Comp users	Post-menopausal woman with hormonal imbalance	As Syst. ds	Post radiotherapy	total	%
0	1	7	-	4	7	5	9	3	36	11.7
1-3	6	8	-	12	4	8	10	3	51	16.6
4-6	17	6	2	4	4	25	30	3	91	29.6
7-9	50	1	51	6	6	3	8	4	129	42.01

The majority of cases e 129(42.01%) had an RBS score of 7-9 of which 51 cases were from SJS, and 50 cases were KCS.

Table 8: -Conjunctival impression cytology of patients

Goblet cell density/HPF	KCS	CL	SJS	All Con+Blepharitis	Comp user	Post-menopausal woman with hormonal imbalance	Ass systemic ds	Post radiotherapy	total	%
<75	74	9	52	18	4	29	32	9	227	73.9
>75	-	13	1	8	17	12	25	4	80	26.05

Most of the patients 227(73.9%) had conjunctival cell density <75 cell density/HPF of which 74 cases were KCS, 52 cases were from SJS, and 32 cases were from associated systemic diseases.

Table 9: Profile of patients after 6 months of medical therapy (n=305)

Aetiological factor	No of the patients responded	Percentage	No of pts not responded	Percentage
KCS	42	56.7	32	43.3
Contact lens users	22	100	0	0
SJS	15	28.3	38	71.7
Allergic conjuunctivitis+blepharitis	26	100	0	0
Computer users	21	100	0	0
Post-menopausal woman with hormonal imbalance	35	85.3	6	14.7
Asso systemic diseases	52	91.2	5	8.8
Post -radiotherapy	10	76.9	3	23.1
No of patients	223	72.6	84	27.3

Table 10 Surgical procedure (n =39)

Procedure	KCS	SJS	Post-menopausal woman with hormonal imbalance	Asso. Syst. diseases	Post radiotherapy	total	%
Punctual occlusion	0	0	6	0	0	6	7.1
Release of symblepharon	0	18	0	0	0	18	21.4
Temporary tarsorrhaphy	0	0	0	5	0	5	5.9

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Table 11: -Patient profile 6 weeks after surgical management (n=39)

Etiology	Corneal sensation test		ABOUT		Goblet cell density		Schirmer value		Fluorescence staining		Rose Bengal		BCVA	
	Present	Reduced /absent	<10	>10	<75	>75	<15	>15	+	0	0	+	>6/18	<6/18
SJS	18		6	12	6	12	12	6	6	12	12	6	12	6
Hormonal imbalance (PMW)	6		0	6	0	6	0	6		6	6	0	6	0
SD	5	0	0	5	0	5	0	5		5	5	0	5	0

PMW (postmenopausal women), SD (Systemic disease)

Discussion

In the present study, most cases (90/29.3%) were from the age group >50 years, in this age group people are more prone to develop other systemic diseases like diabetes mellitus, hypertension, and arthritis, and postmenopausal women fall in the group who have hormonal imbalances and develop dry eye symptoms. DED was mostly seen in the older population (>50 years of age). This finding is consistent with Schaumberg, Moss, et al. Due to an increase in age, the rate of tear production decreases as well as the rate of tear evaporation increases, this is also one of the important causes of the increase in the prevalence of dry eye in old age. [27, 28]

In the age group 31-40 years, most were software professionals and drivers, as they are more exposed to dry humid, and arid conditions, they develop dry eye symptoms. 49(15.9%) were from the age group 18-30 years, in this age group most patients were students and they were using more smartphones and computer users, so they developed dry eye symptoms This is in correlation with the study done by Jong Ho Ahn et al 2017.[29]

According to table 1, it was observed that out of 307 patients, females 170(55.3%) were more than males 137(44.6%). It is in correlation with Mc Carty et al in Australia that females are more prone to develop dry eye symptoms than males. [30]

Another study was done by Jong Ho Ahn et al 2017, that female persons are more affected by dry eye as compared to males. They suggested that estrogen stimulates immune response whereas androgen suppresses inflammatory reactions, in males' androgen/estrogen ratio is higher than in females and there may be a sex prevalence difference. Androgen enhances the function of the lacrimal and meibomian gland and estrogen may antagonize. In females, there is a decrease in tear production after 60 years. [31]This was attributed to the prevalence of hormonal imbalance in post-menopausal women which leads to meibomian gland dysfunction leading to dryness of the eyes. Older age and female sex are well-known risks for dry eye disease (Ankita S Bhavsar et al 2011). [32] A study by Lin et al they stated that as urban people are exposed to higher levels of air pollution, they develop more dry eye symptoms than rural people. [33]

SJS patients were commonly presented with bleeding from the conjunctiva, discharge, and hemorrhagic crust on the lid and lashes. Erythematous rashes were at the target site and all over the body as observed by another study.[34]

Most (249 / 81.89%) cases had decreased TBUT value<10 sec, 141 (45.9%) Cases had a severe decrease of TBUT value (<5/sec, 108 (35%) cases had TBUT subnormal range i.e. 6-10,58 (18.89%) cases had TBUT >10 /sec. Tear film breakup time was used to assess the stability of precorneal tear film, it is a reliable and repeatable test for dry eye and is minimally invasive. It is low in KCS mucin deficiency and meibomian gland disease.114 (37.1%) Schirmer's test value 0-5 of them,95(30.9%) cases had Schirmer's test value 6-10,71(23.12%) cases had Schirmer's test value 11-15,27(8.7%) cases had Schirmer's test value >15.According to Rocha et al, the decrease in Schirmer's test value in the older age group could be due to a decrease in reflex secretion by the lacrimal gland.[35]

Fluorescence staining was positive in 211(68.7%) cases, 96(31.2%) cases had fluorescence stain negative. In the dry eye, there may be superficial punctuate epithelial erosions and they stain florescence-positive Casey et al. [36].227(73.9%) had conjunctival cell density <75 cell density/HPF, 80(26.05%) patients had conjunctival cell density >75 cell density/HPF.223 (72.6%).[37]

Not responders to medical treatment were 84(27.3 %%). Among them 32 cases were KCS, and 38 cases were SJS patients who had developed partially to total symblepharon with pseudomembranous conjunctivitis. 5

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Cases of leprosy had bilateral exposure keratitis due to lagophthalmos, 6 cases were postmenopausal women > 60 years of age and 3 were post-radiotherapy patients. The conjunctival impression cytology of these 84 patients showed a reversal in goblet cell density count.

Among 84 cases those did not respond to medical treatment, 39 (46.4%) cases underwent different surgical procedures of which 6(7.1%) cases underwent punctual occlusion, 18 (21.4%) cases underwent separation of symblepharon and 5(5.9%) cases underwent temporary tarsorrhaphy. After 6 weeks of surgical therapy, 23 cases showed improvement in symptoms and signs, and only 6 cases of SJS showed poor response due to the severity of the disease. [38]

Generalizability

The study's findings, primarily involving participants over 50, may be relevant in similar aging populations with prevalent systemic diseases like diabetes and hypertension, which correlate with a higher incidence of Dry Eye Disease (DED), especially among postmenopausal women. The observed occupational and lifestyle-related DED risks could apply to urban settings or similar environments. While the noted gender disparity, with females more prone to DED, is likely broadly applicable due to biological factors, local variations in environmental conditions, healthcare access, and cultural practices could influence the generalizability of the results. Thus, while the study offers valuable insights, its wider applicability should be considered within the local demographic and healthcare contexts.

Conclusion

Dry eye diseases are multifactorial in their etiology affecting mostly elderly people by the normal aging process. Keratoconjunctivitis sicca, blepharitis, and systemic diseases are also responsible for dryness of eyes like diabetes mellitus and rheumatoid arthritis, malnutrition, drug-induced Steven's Johnson syndrome, allergic conjunctivitis, and blepharitis. Due to changing lifestyles, computer users are especially prone to developing dry eyes because of prolonged periods of staring at the visual screen. Patients who prefer contact lenses to spectacles are at increased risk of developing dry eye syndrome. Women in their post-menopausal period are affected more often due to hormonal imbalances. Though very often misdiagnosed dry eye disease patients can easily be diagnosed clinically by assessing the functional status of tear film break-up time, Schirmer's test, Rose Bengal staining, cytology and density of conjunctival goblet cells, corneal sensation test and fluorescence staining. The management of these patients is a challenge and often frustrating. Prolonged medical management in the form of either tear substitute, lubricating gel, steroid drop, or antibiotic drop is required. In a few cases, management like punctual occlusion, and symblepharon release helped in recovering useful vision.

DED should be diagnosed early and managed with a lot of care and skill. This entity requires patience and prolonged management by the ophthalmologist. It is an under-diagnosed ocular disorder. This is because diagnosis and assessment of dry eye are complicated by the considerable variation in disease symptoms and signs and the lack of definitive diagnostic tests.

While considering a diagnosis of dry eye, attention should also be paid to gender, the presence of refractive error, and associated systemic diseases like rheumatoid arthritis, as dry eye has a positive correlation with these factors. Dry eye evaluation with an appropriate and standard questionnaire along with standard tests for dry eye helps in diagnosis and treatment. This will go a long way in the effective and successful management of patients with dry eye, especially as the disease is chronic and needs long-term treatment. Early and appropriate management will provide ocular comfort and satisfaction with a better quality of life.

Limitations

The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of a comparison group also poses a limitation for this study's findings.

Recommendations

To mitigate the public health impact of Dry Eye Disease (DED), routine screening for DED in individuals over 40, especially women, should be considered in ophthalmic evaluations. Public health initiatives should focus on educating the population about the risk factors and symptoms of DED to promote earlier self-identification and treatment. Additionally, integrating a standardized DED questionnaire and tear film breakup time test in routine ophthalmological assessments can enhance early detection and improve patient outcomes.

Acknowledgment

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List of abbreviations

DED- Dry Eye Disease
TBUT- Tear Breakup Time
OSDI- Ocular Surface Disease Index
KCS- Keratoconjunctivitis Sicca
SJS- Stevens-Johnson syndrome
PMW- Postmenopausal Women
SD- Systemic disease

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