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An observational study on association of meibomian gland dysfunction with increased digital screen time

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I. INTRODUCTION

Meibomian gland secretion plays a crucial role in maintaining ocular surface health. The lipid secretion of the meibomian glands is the main component of the outer layer of tear film and plays an important role in tear film stability.[1] Meibomian gland dysfunction (MGD) is a chronic, diffuse abnormality of the meibomian glands, commonly characterized by duct obstruction and/or changes in the glandular secretion. Due to the inflammatory and obstructive nature of chronic MGD, meibomian gland atrophy may develop over time.[2] Meibomian gland atrophy can be associated with a systemic disease or can be part of the normal aging process. It has been previously reported that the incidence of meibomian gland atrophy increases with age.[1,3,4] However, little is known about the prevalence of meibomian gland atrophy in pediatric age group and there are few reports in the literature demonstrating alterations of meibomian glands in this population.[5,6,7]

Electronic screen time has rapidly increased during the past decade. A range of short time ocular surface discomfort have been reported. These include dryness, redness, itching,burning and irritation of eye. Visual discomfort includes blurred vision, difficulty in shifting focus from one distance to another,headache and eye strain.

II. METHODS

This study was observational study conducted in department of ophthalmology,government medical college over a period of 6 months.

Patients of both sexes and above age of 18 years with presenting complaints of dryness, blurred vision, irritation, excessive watering were examined. One hundred patients were enrolled in the study after taking proper consent.

Patients with recent ocular surgery, any disease related to a lacrimal drainage system, inflammatory ocular surface disease unrelated to MGD were excluded from the study.

Detailed slit-lamp biomicroscopic examination, including tear film break-up time (TBUT) testing, Schirmer test, examination of meibumexpressibility and quality, was performed. The tear film break-up time was estimated by placing a fluorescein strip after wetting it with a drop of normal saline in the inferior fornix. The Schirmer test was performed without topical anesthesia. The meibum quality score (MQS) was assessed in eight glands of the central third of the lower eyelid by applying digital pressure on the lower tarsus and was graded. Meibomian glands with clear fluid were graded as 0; with cloudy fluid — as grade 1; with cloudy meibumwith debris — as grade 2; and with thick toothpaste-like meibum — as grade 3. Accordingly, the meibumexpressibility score was assessed from five glands of the central third of the lower eyelid. It was graded: grade 0 — with all glands expressible, grade1 — with 3–4 glands, grade 2 — with 1–2 glands, and grade 3 — with no glands expressible.

Meibomian gland dysfunction was divided into four stages according to International Workshop on Meibomian Gland Dysfunction & Management [8]

• stage 1: no symptoms of ocular discomfort, itching,or photophobia with minimally altered secretions (greater than or equal to grade 2 toless than grade 4), expressibility: 1 with no ocular surface staining present;

• stage 2: minimal to mild symptoms of ocular discomfort, itching, or photophobia with minimal to mild MGD clinical signs, scattered lid margin features with mildly altered secretions (greater than or equal to grade 4 to less than grade 8), expressibility: 1 with none to limited ocular surface staining (DEWS grade 0–7; Oxford grade 0– 3);

• stage 3: moderate symptoms of ocular discomfort, itching, or photophobia with limitations of activities with moderate MGD clinical signs, increased lid margin features: plugging, vascularity with moderately altered secretions (greater than or equal to grade 8 to less than grade 13), and expressibility: 2 with mild-to-moderate conjunctival and peripheral corneal staining, often inferior (DEWS grade 8–23; Oxford grade 4–10);

• stage 4: Marked symptoms of ocular discomfort, itching, or photophobia with definite limitations of

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activities with severe MGD clinical signs, increased lid margin features: dropout, displacement with severely altered secretions (grade ≥ 13), expressibility: with increased conjunctival and corneal staining, including central staining (DEWS grade 24–33; Oxford grade 11–15).
The prevalence of risk factors in patients with MGD were evaluated.

The Chi-square test/unpaired t-test were used for qualitative variables. p-value< 0.05 was considered statistically significant in our study. All data analysis was done with SPSS Software.

Results

Demographics of participants

Gender	Frequency
Male	72%
Female	28%

Age	Percentage
18-30	28
31-60	62
>60	10

In 18-30,31-60 and > 60 years age group, it was found that 31.25 %, 56.25% and 12.5% cases respectively had MGD. Prevalence and severity of MGD was observed more in the age group of 31-60 years.

Age	No of patients	Stage 1	Stage 2	Stage 3	Stage 4
18-30	25	8	10	5	2
31-60	45	3	18	10	9
>60	10	2	5	2	1

In our study, we found that increased digital screen time is significantly associated with MGD.

Screen time	No of cases
< 2 hours	10
2-6 hours	22
>6 hours	48

III. DISCUSSION

In this age and day electronic devices have become an inseparable part of life. Increased screen time is associated with high incidence of ocular surface discomfort. Meibomian gland dysfunction has been considered as the main reason of evaporative dry eye. The use of electronic devices has been recognized to decrease the frequency of blinking and accelerate evaporation.
A significant association of increasing severity of MGD was observed in the age group of 41-60 years (P<0.05%). These results were similar to the observations by Pult et al[9] . Guliani et al. in 2018 also reported similar findings[10]

The use of VDTs (television, mobile, computer, and laptop) in our study was observed to have a highly significant correlation with MGD (p < 0.001). It was in accordance with a study conducted in 2018, which also confirmed that long-term computer usage causes an evaporative dry eye disease.
In summary, there was a significant relationship between on screen time and the meibomian gland dysfunction. Therefore we would impress upon the fact that there is need of screening and regular follow up of the patients for mebomian gland dysfunction.

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