ORIGINAL RESEARCH

Prevalence and associated risk factors of dry eye disease at a tertiary hospital

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ABSTRACT

Background: Dry eye disease (DED) is a common ocular surface disorder that is now days considered as a public health problem due to its impact on vision-related quality of life of the affected subjects.According to the recent official report of the International Dry Eye Workshop (DEWS 2017), that based on summary of the findings of current research, DED was defined as "a multifactorial disease of the tears and ocular surface that is associated with hyperosmolarity of tear film which in turn leads to inflammation and damage of the ocular surface that accompanied with ocular symptoms of discomfort, fatigue and disturbance in visioin"

Aim & Objective:

Method: Study design: A cross-sectional study. Study setting: Department of ophthalmology at tertiary care centre. Study duration: Dec 2020 to June 2021,Study population: The study population included all Subjects with current or previous diagnosis of DED were included in the study

Sample size: 769

Results: The mean age of all participants was 43.61 ± 18.57 years with a range of 18 to 90 years. Of all study population, 405 (52.7%) subjects were females and 364 (47.3%) were males. Of the study population, 131 (17%) reported having diabetes milletus (DM), 161 (20.9%) reported having hypertension (HTN). DED was significantly more prevalent in older age group > 45 years ($p = 0.002$) and in females than males in all age groups ($p = 0.00$).

Conclusions: The prevalence of DED is high in the study population. Older age and female gender were associated risk factors with the development of DED.

Keywords: Dry eye disease, Prevalence, Risk factors

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INTRODUCTION

Dry eye disease (DED) is a common ocular surface disorder that is now days considered as public health problem due to its impact on vision-related quality of life of the affected subjects [1, 2].According to the recent official report of the International Dry Eye Workshop (DEWS 2017), that based on summary of the findings of current research, DED was defined as "a multifactorial disease of the tears and ocular surface that is associated with hyperosmolarity of tear film which in turn leads to inflammation and damage of the ocular surface that accompanied with ocular symptoms of discomfort, fatigue and disturbance in

visioin" [1]. The prevalence of DED has been reported in many countries around the world, with a range of between 9.5–90% [3–12]. This variation has been suggested to be influenced by geographical location, the variety of the population studied, variation in diagnostic criteria used with an observed lack of standard diagnostic criteria across all studies. In general, it was reported that prevalence of DED more prevalent in Asian countries compared to Western countries [13]. Epidemiologic studies showed that the disease is more prevalent among women (particularly post menopause) [14] and elderly population [15]. Additionally, a group of risk factors have been reported to be associated with DED. Those include environmental factors such as extreme temperature and reduced relative humidity [16], use of video display terminals (VDT) [17], smoking [18], refractive surgery such as LASIK [19, 20], contact lens wear [21], and uptake of certain medications such as antihistamines [22], beta-blockers [23] and oral contraceptives [6]. DED was also reported to occur with anxiety disorders, sleep disorders and depression [24, 25].

AIM AND OBJECTIVES

MATERIAL AND METHODS
Study design: Cross Sectional study
Study setting: Department of Ophthalmology at tertiary care centre
Study duration: December 2020 to June 2021.
Study population: The study population included all Subjects with current or previous diagnosis of DED were included in the study
Inclusion criteria:
1. Subjects with current or previous diagnosis of DED were included in the study
Exclusion criteria:
1. Patients who are contact lens wearers, those who underwent refractive surgery procedures and those with an active ocular surface disease and any other conditions that may interfere with development of DED. Subjects with previous diagnosis of DED were included in the study
2. Not willing to participate in study
3. Incomplete Questionnaire
Approval for the study:
Written approval from Institutional Ethics committee was obtained beforehand. Written approval of Ophthalmology department and related department was obtained. After obtaining informed verbal consent from all Subjects with current or previous diagnosis of DED were included in the study
Sample Size: 769
Sampling technique: Using purposive sampling technique a total of 769 Subjects with current or previous diagnosis of DED were included in the study.
Methods of Data Collection and Questionnaire:
Predesigned and pretested questionnaire was used to record the necessary information. Questionnaires included general information, such as age, sex, residential address, Education, occupation, immunization status etc.
STUDY PROCEDURE:
This study was conducted in Ophthalmology Department of tertiary care center, in subjects who satisfied the above said inclusion and exclusion criteria and this study conducted from December 2020 to June 2021

Data entry and analysis:

The data were entered in Microsoft Excel and data analysis was done by using SPSS demo version no 21 for windows. The analysis was performed by using percentages in frequency tables, p<0.05 was considered as level of significance using the Chi-square test.

RESULTS AND OBSERVATIONS

The present Cross sectional study was done among 769 Subjects with current or previous diagnosis of DED

Table 1: participants' characteristics (n = 769)

Age	Frequency	Percentage
From 18 to 25	179	23.3%
From 25 to 45	225	29.3%
Above 45	365	47.5%
Sex		
Male	364	47.3%
Female	405	52.7%
Education level		
Illiterate	67	8.7
High school	481	62.5
Higher education	221	28.8
Comorbidity		
HTN	161	20.9%
DM	131	17%

The mean age of all participants was 43.61 ± 18.57 years with a range of 18 to 90 years. Of all study population, 405 (52.7%) subjects were females and 364 (47.3%) were males. Of the study population, 131 (17%) reported having diabetes milletus (DM), 161 (20.9%) reported having hypertension (HTN).

Table 2: Severity of DED symptoms based on OSDI score

Level of OSDI score	Frequency
Normal (0–12)	224 (29.1)
Mild (13–22)	150 (19.5)
Moderate (23–32)	122 (15.9)
Severe (33–100)	273 (35.5)

769 subjects, the proportion of subjects with an OSDI score equal or greater than 13 (the cut off value) was 71%. The frequency of different levels of dryness symptoms severity based on OSDI score

Table 3: logistic regression analysis of risk factors associated with definite DED

Age	Definite DED (n)	P value	AOR (95% Cl)
From 18 to 25	107		
From 25 to 45	127	0.001	1.018 (1.008-1.029)
Above 45	258		
Sex			
Male	207		
Female	285	0.001	0.524(0.364-0.755)

The risk factors associated with the definite DED were evaluated using a bivariate and a multivariate logistic regression analysis. Significant odds of having DED were associated with older age (older than 45) and female gender.

DISCUSSION

DED can be assessed based on a combination of symptoms and signs. However, several studies reported poor correlation between DED symptoms and signs.Dryness symptoms could be assessed systematically using validated questionnaires that include questions that allow for the monitoring of dryness symptoms and their frequency and or their severity over time .

Examples of these questionnaires include Ocular Surface Disease Index (OSDI) questionnaire, Dry Eye Questionnaire (DEQ), MacMonnies dry eye questionnaire and Standard Patient Evaluation of Eye Dryness (SPEED) questionnaire.Clinical signs of DED are routinely assessed using a set of tests that include measure of tear film stability as in tear film break-up time test (TBUT), assessment of ocular surface desiccation through corneal and conjunctival staining by fluorescein or lissamine green stains, tear volume which can be estimated with Schirmer test or observation of lower tear film meniscus volume under a slit-lamp.

The quality of the tear film can also be assessed and monitored by measuring tear film osmolarity that based on the number of charged particles in a small tear sample measured by osmometer. Normal range varies between 293 and 318 mOsm/l.

In this study, definite DED diagnosis was more prevalent in subjects older than 45 years. This in agreement with many reports that found age related to DED development.

The results also showed an association between DED diagnosis and female gender as females have 1.5 times higher risk of developing DED compared to males. This finding could be explained by use of hormones for contraception or infertility in the younger women age group and the long term impact of these hormones on the female's lacrimal gland, goblet cell function, MG and ocular surface sensitivity that may contribute to dry eye symptoms [11].

In women within the older age group, lower levels of estrogens and androgen may lead to inadequate lacrimal gland secretion that associate with aqueous deficient DED.The impact of gender on the development of DED varies across studies. Consistent with the current study, most studies reported that DED occurs more likely among females [3, 4, 6].

CONCLUSION

It was found that the prevalence of DED is relatively high in this study. An attempt should be performed to increase the awareness of the society with DED, so modifiable risk factors can be reduced. However, further research is required to better understand other potential risk factors associated with DED including; impact of arid environment, drug use, systemic diseases and anxiety.

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