



## Prevalence and Clinical Subtypes of Dry Eye Disease in Pregnant Women: A Cross Sectional Study

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### Abstract

**Aim:** To study the prevalence and clinical subtypes of dry eye disease among pregnant women. As Multisystemic physiological changes in pregnancy can result in tear film disturbance and dry eye.

**Methods:** A hospital- based cross sectional study of pregnant women attending antenatal clinic. Subjects completed the ocular surface disease index (OSDI) followed by clinical examination of the ocular surface comprising of Slit lamp examination, Tear film break up time test(TBUT), Schirmers I test. Subjects with predisposing risk factors for dry eye were excluded from the study.

**Results:** A total of 88 women were included in the study, with mean age (SD) of 24 ( $\pm 4.74$ ) years (age range, 18–40 years). The prevalence of dry eye disease among the pregnant women was 39.78% (35/88, 95% confidence interval). The frequencies of the clinical subtypes of dry eye were: evaporative dry eye [7/35(29%; 95% CI)], aqueous deficient dry eye [5/35(14.2%; 95% CI)], mixed dry eye [2/35(5.7%; 95%)], and unclassified dry eye [21/35(60%; 95% CI)].

**Keywords:** dry eye disease, pregnancy.

### Introduction

Dry eye disease is a prevalent ophthalmic disease and it is the most common reason for patients visiting ophthalmic practitioners<sup>[1,2]</sup>. Dry eye is a multifactorial ocular surface disorder characterized by a loss of homeostasis of the tear film, resulting in tear film instability, and ocular surface inflammation/damage<sup>(1)</sup>. It is frequently associated with psychosomatic symptoms further

entrenching its role as a perpetrator of poor quality of life<sup>[3]</sup>.

Pregnancy is marked with maternal endocrine, hormonal profile modifications and interactions required for physiological adaptations needed for optimal fetal development and smooth delivery at term. However, the physiological effects of these hormones often go beyond reproductive system and affect other organs including eye and its adnexa. Studies report that during pregnancy,

lacrimal gland growth factor expression can be altered and lacrimal acinar cells could be damaged, increasing the risk of dry eye [4,5]. Dryness can be further increased by dehydration resulting from nausea and vomiting and the use of anti-nausea medications.

At present, there is dearth of data on pregnancy-related dry eye changes, hence the need for this study to explore dry eye changes in pregnancy and produce relevant information on the subject. The outcome of this study is expected to further create awareness, to facilitate early recognition and prompt treatment wherever necessary-as Identifying and alleviating the symptoms related to dry eye can potentially improve the quality of life in pregnant women [2,6].

### Materials and Methodology

In this cross-sectional study, 88 women (between 18-40 years of age) with clinically confirmed pregnancy (positive blood/urine analysis or pelvic ultrasonography) were included from the obstetric outpatient departments of a tertiary care hospital in Thodupuzha, Kerala. Participants with predisposing dry eye risk factors such as Sjogren's syndrome, history of any ocular surgery/pre-existing ocular surface diseases, lid abnormality, diabetes mellitus, glaucoma, facial nerve palsy, contact lens wear, and more than 7 hours of computer usage were excluded from the study.

The study followed the protocols recommended by the tenets of the Declaration of Helsinki and the methods were approved by the Institutional Ethical Committee. All participants provided written informed consent.

Subjects' demographic profile, systemic and ocular history, trimester were noted. Subjects completed the ocular surface disease index (OSDI) followed by clinical examination of the ocular surface comprising of Slit lamp examination, Tear film break up time test (TBUT), Schirmers 1 test.

Participants were diagnosed with the dry eye if the OSDI  $\geq$  13 and either the tear breakup time  $<$  10 s

(7) in accordance to the DEWS II (Dry Eye Workshop study). Afterward, if an individual had a Schirmer's 1 test value  $\leq$  5, it was considered aqueous deficient dry eye and if MGD was diagnosed, the participant was considered as having an evaporative dry eye [7]. The mixed dry eye was diagnosed based on the presence of both MGD and abnormal Schirmer 1 test scores.

Analyses were performed using SPSS version. The frequency of dry eye disease was determined among the cross-section of pregnant women. The one way Anova test was used to identify the associated factors of dry eye symptoms such as age, gravidity, gestational age, For 95% confidence level,  $P < 0.05$  was considered statistically significant.

### Results

A total of 88 women were included in the study. The mean age (SD) for the sample was 24 ( $\pm$ 4.74) years (age range, 18–40 years). Most participants were of age group 21-30 years (77.8%), in their second or third trimester (75.2%), and of status primigravida (66.2%).

The prevalence of dry eye disease among the pregnant women was 39.78% (35/88, 95% confidence interval). Among the women, 40.2% of the subjects had symptoms like dryness, grittiness or irritation, burning / watering, or eye fatigue. Eye fatigue was the most reported symptom and was present in 76.4% of women with dry eye.

Among the 35 pregnant women with dry eye disease, the frequencies of the clinical subtypes of dry eye were: evaporative dry eye [7/35(29%; 95% CI)], aqueous deficient dry eye [5/35(14.2%; 95% CI)], mixed dry eye [2/35(5.7%; 95%)], and unclassified dry eye [21/35(60%; 95% CI)].

### Discussion

Studies on dry eye disease have focused on the aging population, youthful population and postmenopausal women [8]. However, recent studies have indicated a high prevalence of dry

eye in pregnant women<sup>[9]</sup> consistent with the finding of the current study.

The dry eye disease is very common in pregnancy regardless of gestational age and/or trimester<sup>[10]</sup>. Even though trimester was not significantly associated with dry eye in this study nonetheless there was an increased odds of developing dry eye with increasing gestational age.

Dry eye disease during pregnancy may be due to damage to the lacrimal acinar cells through several mechanisms including but not limited to enhanced immune-reactivity of prolactin and adverse effects of transforming growth factor-beta 1 and epidermal growth factor on the ductal cells<sup>[9,11]</sup>. Potential causes of dry eye may be due to elevated estrogens and progesterone which mitigates androgens' effects on the ocular surface through competitive antagonism<sup>[12]</sup>. It may be plausible that an increase in adipose tissue in pregnancy may instigate or contribute to dry eye in pregnancy as reported in the general population<sup>[13]</sup>.

We found higher dry eye symptoms in the evaporative dry eye compared to aqueous deficient dry eye or unclassifiable dry eye. This implies that evaporative dry eye may be more symptomatic compared to aqueous deficient dry eye. This finding is consistent with the study by Lemp et al, which found subjects with evaporative dry eye demonstrated less ocular surface staining and higher OSDI scores compared with the mixed subtype and even aqueous deficient dry eye<sup>[14]</sup>. There was a high proportion of the participants with dry eye who could not be classified as aqueous deficient or evaporative dry eye. It implies that other etiological instigators in pregnancy might be responsible for dry eye clinical signs and symptoms. Pregnant women may be unsuitable for traditional dry eye therapies such as topical immunomodulators and corticosteroids; hence, knowledge about the subtypes of dry eye will be important in therapeutic management

The limitation of this study is that it was a cross-sectional study hence the natural history of dry eye from the first to the third trimester was not explored.

In conclusion, the current study showed a high frequency of dry eye among a wide spectrum of pregnant women from the first to the third trimester and it is associated with increasing gestational age. Educating pregnant women on dry eyes and providing eye care along with general health monitoring, will further improve quality of life in pregnant women.

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