# Standard Patient Evaluation of Eye Dryness (SPEED) and Ocular Surface Disease Index (OSDI) Scores in Dry Eye Disease Patients

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## Abstract

Dry eye disease (DED) is a common multifactorial ocular surface state that affects quality of life. A cross-sectional study was conducted in Bangladesh Eye Hospital and Institute, Dhaka, Bangladesh, between January and December of 2024, to assess the impact of age and gender on the severity of dry eye disease (DED) as determined by Standard Patient Evaluation of Eye Dryness (SPEED) and Ocular Surface Disease Index (OSDI) scores. A total of 200 patients, who exhibited symptoms of dry eye disease (DED), were included in this study. They were asked to complete the SPEED and OSDI questionnaires. SPEED and OSDI scores were analyzed by gender and age groups (25–35, 36–45, 46–55, and 56–65 years). The patients aged between 25 and 65 years (mean age was 46.52 years). Among them, 83 were male and 117 were female (male-female ratio was 1:1.41). Regarding SPEED score, 25–35 years age group having the highest mean score (2.84), which indicates more severe symptoms. Regarding OSDI scores, patients in 36-45 years and 25-35 years age groups exhibited the highest mean scores (1.85±0.71 and 1.80±0.76 respectively). In contrast, older patients (56–65 years age group) demonstrated lower score (1.60±0.79), which indicates variation in symptom severity as individual is ageing. In SPEED scores, female patients had slightly higher mean compared to males (2.66±0.65 vs. 2.79±0.54), although the difference was less pronounced. In OSDI scores, male patients were marginally higher compared to females (1.81±0.79 vs. 1.69±0.70); however, the difference was not significant. Gender and age have a big impact on DED symptoms. Our results signify the need for specialized management plans for DED considering demographic variables.

**Keywords:** Dry eye disease, SPEED score, OSDI score, tear production

## Introduction

Dry eye disease (DED), a multifactor tear deprivation disorder of the ocular surface area, is one of the most prevalent ocular diseases in the world.[1] In the past three decades, dry eye illness has become a significant clinical issue. A dry eye disease presented with discomfort, visual problems, and tear film instability with potential damage to the ocular surface. Raised tear film osmolarity and ocular surface inflammation are associated with it. Evidence showed that 25% of the patients who visit ophthalmology clinics reported dry eye symptoms, making it a growing public health concern and one of the most common conditions seen by the eye care practitioners.[2] Patients with DED experience unpleasant sensations, ranging from mild discomfort to extreme pain, frequently accompanied by visual disturbance to varying degrees.[3] Specific populations defined by sex, age, or location, for example, can display widely different prevalences, as can groups predicated on various diagnostic criteria.[4] Among these, age and gender are key determinants of disease severity. The SPEED and OSDI questionnaires are commonly utilized instruments for evaluating subjective symptoms of dry eye disease (DED). Therefore, we proposed this study to examine

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the demographic profile of DED patients, with a particular focus on how age and gender impact SPEED and OSDI scores.

## Methods

A cross-sectional study was conducted in Bangladesh Eye Hospital & Institute, Dhaka, Bangladesh, between January and December of 2024. A total of 200 patients with DED were included in this study. However, patients with chronic conditions like diabetes, hypertension, renal disease were excluded. We investigated the clinical profiles of the patients to confirm the diagnosis. Then they asked to complete the SPEED and OSDI questionnaires.

*SPEED questionnaire:* The Standard Patient Evaluation of Eye Dryness (SPEED) questionnaire was developed by Korb and Blackie to track the progression of dry eye symptoms over time quickly. Based on eight elements that assess the frequency and severity of symptoms, this questionnaire assigns a score ranging from 0 to 28.[5] Although recently introduced as DED assessment questionnaire, SPEED is widely used by the eye care practitioners worldwide.[6,7]

*OSDI questionnaire:* The Ocular Surface Disease Index (OSDI) is a survey specifically designed to assess visual symptoms, visual performance, and the impact of environmental factors on ocular comfort. It is one of the most frequently used questionnaires for quantifying ocular surface–related complaints.[8] OSDI is a validated questionnaire that is frequently used in clinical trials as it provides a quick assessment of dry eye disease (DED) and also its impact on patients' quality of life (QoL).[9-11]

Following data collection, data input was done. The collected data was assessed for completeness, accuracy, and consistency before analysis. Statistical

analysis was carried out using Statistical Package for Social Sciences (SPSS) version 23.0 for windows. Continuous variables were expressed as mean and standard deviation (SD). The data were presented in tables.

Ethical clearance for this study was taken from the Ethical Review Committee of Bangladesh Eye Hospital and Institute, Dhaka, Bangladesh.

## Results

Our patients aged between 25 and 65 years (mean age was 46.52 years). Among them, 83 were male and 117 were female (male-female ratio was 1:1.41). Regarding SPEED score, all age groups showed high average score, with 25–35 years age group having the highest mean score (2.84), which indicates more severe symptoms (Table-I).

Regarding OSDI scores, patients in 36-45 years and 25-35 years age groups exhibited the highest mean scores (1.85±0.71 and 1.80±0.76 respectively). In contrast, older patients (56–65 years age group) demonstrated lower score (1.60±0.79). This pattern indicates variation in symptom severity as individual is ageing (Table-I).

In SPEED scores, female patients had slightly higher mean compared to males (2.66±0.65 vs. 2.79±0.54), although the difference was less pronounced. In OSDI scores, male patients were marginally higher compared to females (1.81±0.79 vs. 1.69±0.70); however, the difference was not significant (Table-II).

. **Table-I:** SPEED and OSDI scores among different age group

| Variable | Age group | Mean | 95% CI (Lower Bound – Upper Bound) | Median | Std. Deviation | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|
| **Speed Score Group** | 25-35 | 2.84 | 2.72 – 2.96 | 3.00 | 0.370 | -1.954 | 1.918 |
| | 36-45 | 2.60 | 2.41 – 2.80 | 3.00 | 0.716 | -1.522 | 0.771 |
| | 46-55 | 2.80 | 2.67 – 2.93 | 3.00 | 0.511 | -2.629 | 6.143 |
| | 56-65 | 2.71 | 2.52 – 2.90 | 3.00 | 0.651 | -2.043 | 2.705 |
| **OSDI Score Group** | 25-35 | 1.82 | 1.56 – 2.07 | 2.00 | 0.766 | 0.332 | -1.192 |
| | 36-45 | 1.85 | 1.65 – 2.05 | 2.00 | 0.718 | 0.233 | -0.993 |
| | 46-55 | 1.70 | 1.53 – 1.88 | 2.00 | 0.691 | 0.467 | -0.809 |
| | 56-65 | 1.60 | 1.37 – 1.83 | 1.00 | 0.792 | 1.117 | 0.465 |

**Table-II:** SPEED and OSDI scores between male and female

| Variables | Gender | Mean | 95% CI (Lower Bound – Upper Bound) | Median | Std. Deviation | Variance | Skewness (±SE) | Kurtosis (±SE) |
|---|---|---|---|---|---|---|---|---|
| **Speed Score** | Female | 2.79 | 2.69 – 2.88 | 3.00 | 0.54 | 0.290 | -2.485 (±0.224) | 5.082 (±0.444) |
| | Male | 2.66 | 2.52 – 2.80 | 3.00 | 0.65 | 0.421 | -1.729 (±0.264) | 1.636 (±0.523) |
| **OSDI Score** | Female | 1.69 | 1.56 – 1.82 | 2.00 | 0.70 | 0.491 | 0.509 (±0.224) | -0.848 (±0.444) |
| | Male | 1.81 | 1.64 – 1.98 | 2.00 | 0.79 | 0.621 | 0.512 (±0.264) | -0.731 (±0.523) |

## Discussion

The findings of this study provide valuable insights into the relationship between age and gender with the severity of dry eye disease, as measured by SPEED and OSDI scores. The influence of demographic characteristics, including age and gender, on the clinical manifestation of DED has been emphasized in several earlier investigations.[3,4] Women tended to report higher SPEED ratings in this study, which implies that they have a heavier load of symptoms. This is consistent with previous studies that show hormonal variations, especially the impact of estrogen, lead to decreased tear film stability, which exacerbates dry eye symptoms in women.[3]

The findings indicate that women tend to express more severe subjective symptoms using the SPEED assessment of ocular and visual discomfort and disturbance. This claim is further substantiated by the hypothesis, which states that estrogen plays a considerable role in modulating the rates of tear production and evaporation. More specifically, variations in estrogen levels can affect both the quality and quantity of tears, leading to increased dryness and discomfort in the eyes.[5,7] On the other hand, our research revealed that men's OSDI scores were slightly higher than those of women. This discrepancy indicates a clear trend in the way male and female patients experience and report symptoms of DED, even if it was not as noticeable as the gender-based disparity seen in SPEED scores. Previous studies have speculated that men may demonstrate different reporting behaviours, possibly underreporting symptoms or failing to recognize the subtler manifestations of DED.[10,12] Due to a decrease in their capacity to produce sufficient tears, older individuals may exhibit higher OSDI scores, indicating greater discomfort and visual disruption.

Despite having higher SPEED scores, younger patients in our study reported somewhat lower OSDI ratings. This suggests that although younger people may experience more severe or frequent dry eye symptoms, these symptoms may not significantly impact their overall OSDI-rated quality of life.[10] Additionally, the variation shown between age groups indicates that the severity of DED is impacted by a wide range of characteristics rather than just age or gender. These include lifestyle choices like screen usage, concomitant diseases, and environmental exposures that can worsen symptoms in both younger and older individuals.[12] To develop focused treatment plans, a thorough understanding of DED necessitates taking into account these extra aspects, even though age and gender differences influence how symptoms manifest.[13]

## Conclusion

To summaries, the results of this study highlight the importance of considering demographic variables, such as age and gender, when treating DED. Patients may benefit from more individualized treatment plans that take these variations into account. To create more efficient and particular treatments for DED patients, future investigations need to examine the underlying mechanisms that lead to these demographic variations, particularly hormonal impacts and tear film features.

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