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# Depression, anxiety, stress, and dry eye disease among Gazan undergraduate health sciences and nursing students: a structural equation modeling study

[Contact Lens and Anterior Eye](#) • Article • 2026 • DOI: 10.1016/j.clae.2025.102504

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## Abstract

**Purpose:** To investigate associations between dry eye disease (DED) symptoms and psychological distress (depression, anxiety, stress) among undergraduate health sciences and nursing students in the Gaza Strip during the 2023–2025 conflict period. **Methods:** A cross-sectional study used convenience sampling via WhatsApp and face-to-face interviews between 4 February and 29 April 2025. Participants completed a demographic form, the Arabic Ocular Surface Disease Index (OSDI), and the Arabic Depression Anxiety Stress Scale-8 (DASS-8). Analyses included descriptive statistics, group comparisons, correlations, and structural equation modeling (SEM) with interaction terms; sex was included as a covariate, and academic year was examined as an exploratory moderator of distress–symptom associations. **Results:** Data from 282 students (190 female, 92 male) were

analyzed. OSDI scores were skewed upward (median 25.0, IQR 16.67–33.33). Using OSDI > 12, symptomatic DED prevalence was 87.9 %. OSDI correlated with depression ( $r = 0.37$ ), anxiety ( $r = 0.44$ ), and stress ( $r = 0.56$ ), all  $p < 0.001$ . SEM indicated a stronger unique association for stress and a smaller, significant association for depression; moderation by academic year was not statistically significant. The classifier achieved good discrimination for symptomatic status (AUC = 0.829).

Conclusion: Among Gazan health sciences and nursing students, DED symptoms were common and associated with psychological distress—particularly stress and, to a lesser extent, depression. Sex and academic year did not show robust effects. Findings support considering mental health within DED management for students in conflict settings. © 2025

## Author keywords

Conflict; DASS-8; Dry eye disease; Gaza; OSDI; Psychological distress; Students

## Indexed keywords

### MeSH

Adult; Anxiety; Cross-Sectional Studies; Depression; Dry Eye Syndromes; Female; Humans; Latent Class Analysis; Male; Middle East; Prevalence; Stress, Psychological; Students, Nursing; Surveys and Questionnaires; Young Adult

### EMTREE medical terms

adult; anxiety; area under the curve; Article; classifier; convenience sample; correlation analysis; cross-sectional study; demography; depression; Depression, Anxiety and Stress Scale; disease association; distress syndrome; dry eye; face-to-face interview; false positive result; female; health science student; human; major clinical study; male; mental health; mental stress; nursing student; Ocular Surface Disease Index; Palestinian; paramedical student; prevalence; receiver operating characteristic; sex difference; social media; structural equation modeling; symptom; undergraduate student; war; young adult; dry eye syndrome; epidemiology; latent class analysis; Middle East; psychology; questionnaire

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