

## **ANXIETY AND DEPRESSION AMONG INDIVIDUALS AFFECTED BY ECZEMA: A CROSS-SECTIONAL STUDY OF PREVALENCE AND ASSOCIATED FACTORS IN A UNIVERSITY HOSPITAL**

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### **ABSTRACT**

Eczema is a chronic skin condition linked to reduced quality of life and mental health issues, including anxiety and depression. It affects a significant proportion of the population worldwide and is debilitating. Therefore, the present study aimed to assess the relationship between eczema severity, anxiety, and depression in adult patients. A cross-sectional study was conducted from February to August 2024 at the Dermatology clinic at King Saud University Medical City in Riyadh, Saudi Arabia. Patients with Eczema were recruited to complete an online survey about demographic characteristics, medical history; eczema severity (assessed using the Patient-Oriented Eczema Measure [POEM]), and anxiety/depression levels (assessed using the Hospital Anxiety and Depression Scale [HADS]). The study included 287 participants with a median age of 35.0 years, predominantly female (76.3%), Saudi (92.3%), and with low income (39.0%). Notably, 15.7% of the participants had borderline anxiety and 26.5% had anxiety, whereas 12.5% of the participants had depression. Severe eczema was associated with longer disease duration, higher medication use, and higher rates of anxiety ( $p < .001$ ) and depression ( $p = .035$ ) rates. Regression analysis showed that participants with severe eczema had a significantly higher risk of anxiety (OR = 5.00, 95% CI: 1.63–16.20,  $p = .006$ ) and those with very severe eczema had even higher odds (OR = 22.1, 95% CI: 5.04–118.00,  $p < .001$ ). Similarly, participants with severe eczema had a significantly higher risk of depression (OR = 6.27, 95% CI: 1.5–28.7,  $p = .014$ ). Eczema severity is closely associated with higher levels of anxiety and depression, especially in those with severe disease. Prior mental illness and low income further increase the risk, emphasizing the need for integrated care addressing both physical and mental health in patients with eczema.

**Keywords:** anxiety; depression; eczema; hospital.

### **INTRODUCTION**

Atopic dermatitis (AD), a chronic skin condition commonly known as eczema, is becoming increasingly prevalent worldwide. Its primary symptoms include intense itching, lesions, and dry skin, often leading to sleep disturbances and social stigmatization. These factors contribute to a reduced quality of life and a negative impact on mental well-being in individuals with AD compared with individuals without the condition (Zeiser, Hammel, Kirchberger, & Traidl-Hoffmann, 2021; Schonmann et al., 2020). Globally, AD affects approximately 15%–20% of children and 5%–10% of adults (Schonmann et al., 2020; Baurecht et al., 2021). In Saudi Arabia, approximately 6%–13% of adults are estimated to suffer from this condition (Fatani et al., 2021).

Psychological disorders significantly exacerbate the itch–scratch cycle in AD. In particular, stress triggers the release of inflammatory mediators, worsening skin damage

(Maksimovic, Zaric, Bjelica, Eric Marinkovic, & Jankovic, 2018). Anxiety, a prevalent psychological disorder characterized by excessive fear and worry, often associated with muscle tension and vigilance in preparation for future danger and cautious or avoidant behaviors. Anxiety disorders differ in the types of objects or situations that induce fear, anxiety, or avoidance behavior and the associated cognitions. An example of anxiety disorder is panic disorder, in which an individual experiences recurrent, unexpected panic attacks and is persistently concerned or worried about having more panic attacks or changes their behavior in maladaptive ways because of the panic attacks (e.g., avoidance of exercise or of unfamiliar locations); the intense fear or discomfort peaks in a few minutes and is associated with both physical and psychological symptoms. Other examples of anxiety disorders include social anxiety disorder—in which an individual develops anxiety and fear or avoids social situations that may include scrutiny—and generalized anxiety disorder—in which an individual has excessive and persistent worries and anxiety about different domains, which they find difficult to control.

Similarly, depression is a common mental disorder characterized by an evident change in affect, depressed mood, or decreased interests over a distinct period of at least two weeks and is associated with five out of the following nine criteria: Depressed mood most of the day, nearly every day, markedly diminished interest or pleasure in almost all activities, significant weight loss not dieting or weight gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or excessive or inappropriate guilt, change in cognition such as diminished ability to think or concentrate, and recurrent thoughts of death, the incidence of depression is significantly associated with *increased* years lived with disability (American Psychiatric Association, 2013).

Psychological disorders are closely associated with AD. A global epidemiological study estimated that approximately 280 million people worldwide are affected by anxiety disorders (Long et al., 2022). Several studies have explored the link between AD and mental health disorders, highlighting a significant correlation between eczema, depression, and anxiety. For example, a systematic review and meta-analysis from 2018 found a strong association between AD and mental health outcomes such as depression, anxiety, and suicidal ideation in both children and adults (Rønnstad et al., 2018).

A more recent systematic review published in 2022 confirmed that eczema is a significant risk factor for anxiety and depression (Long et al., 2022). Similarly, a large cross-sectional study conducted across nine European countries, which included 1,189 adults with moderate to severe AD, demonstrated the significant effect of eczema on physical and emotional well-being (Ring et al., 2019). Additionally, a prospective study from Germany in 2021 reported higher levels of anxiety, depression, and sleep disturbances in patients with AD than in individuals without AD. Moreover, the study found that the severity of AD and levels of anxiety and depression are strongly correlated (Kage, Poblitzki, Zeynalova, Zarnowski, Simon, & Treudler, 2022).

Understanding the relationship between eczema and mental health disorders is crucial for healthcare providers, as it encourages more comprehensive and holistic patient care. Raising awareness about this association may lead to earlier interventions and increased support, ultimately improving the lives of many patients. The correlation between AD and mental health remains limited in Saudi Arabia; therefore, the present study investigated the

relationship between eczema severity and anxiety in adult patients attending the dermatology clinic at King Saud University Medical City in Riyadh, Saudi Arabia.

## **METHODS**

### *Study Design*

A quantitative, observational, analytical, cross-sectional study was conducted at the dermatology clinic at King Saud University Medical City in Riyadh, Saudi Arabia, between February and August 2024. The target population comprised adult patients with AD actively following up with a dermatologist. Patients aged 18 years and above who had a clinical or pathological diagnosis of AD were included in the study.

### *Instrument*

An online survey containing four sections was administered to the study participants: 1) Demographic information, 2) medical history, 3) the Patient-Oriented Eczema Measure (POEM), and 4) the Hospital Anxiety and Depression Scale (HADS) (Michopoulos, I. et al, 2008). The first section was concerned with demographic information such as age, gender, nationality, monthly income, and marital status. The medical history section asked for information such as the frequency of clinic visits in the previous year, disease duration, current medications for eczema, and previous diagnosis of a mental illness.

POEM was used to assess eczema severity among participants. It consists of seven questions assessing the frequency of eczema symptoms over the past week, with each question scored from 0 to 4 (0 = "No days," 1 = "1–2 days," 2 = "3–4 days," 3 = "5–6 days," 4 = "Every day"). The total POEM score ranges from 0 to 28, with higher scores indicating more severe eczema. POEM scores are categorized into five levels: 0–2 ("Clear or almost clear"), 3–7 ("Mild eczema"), 8–16 ("Moderate eczema"), 17–24 ("Severe eczema"), and 25–28 ("Very severe eczema"). It was first developed by Charman, who reported that it showed excellent internal consistency (Cronbach alpha = .88) with good construct validity and test–retest reliability (Charman, Venn, Ravenscroft, & Williams, 2013).

In the last section of the questionnaire, the HADS was used for screening for anxiety and depression. The HADS contains 14 items, divided into two subscales—HADS-Anxiety (HADS-A) and HADS-Depression (HADS-D)—each containing seven items. Each item is scored from 0 to 3, with total scores for each subscale ranging from 0 to 21. For both anxiety and depression subscales, scores are categorized into three levels: 0–7 indicating "Normal," 8–10 representing "Borderline case," and 11–21 indicating "Abnormal (case)". The scale was first described by Zigmond and Snaith in 1983, and showed an internal consistency of .82 and .83 in depression and anxiety domains, respectively—revealing good structural validity.

### *Data Collection*

The data were collected from patients diagnosed with AD or following up after diagnosis; we gained access to these patients' information via our institution's electronic health records. A researcher approached each patient individually through phone calls, explaining the study's objective and nature and asking them to participate voluntarily. Those who agreed to participate were asked to complete an online survey.

### *Statistical Analysis*

Statistical analysis was conducted using RStudio software (R version 4.3.1). Descriptive statistics were used to summarize demographic and clinical characteristics, including frequencies and percentages for categorical variables and median and interquartile range (IQR) for continuous variables. Additionally, inferential statistics were employed to assess differences between groups. These tests included the Kruskal–Wallis rank sum test and Wilcoxon rank sum test for numerical variables or Fisher's exact test and Pearson's Chi-squared test for categorical variables. Two logistic regression models were constructed to identify risk factors for anxiety and depression, with each condition as a dependent variable in a separate model. The independent variables included the demographic and clinical characteristics and the categories of eczema. These variables were incorporated in the regression models using the “enter” method. Results of the regression analysis were expressed as odds ratio (OR) and 95% confidence intervals (CI). The significance threshold was set at  $p < .05$ .

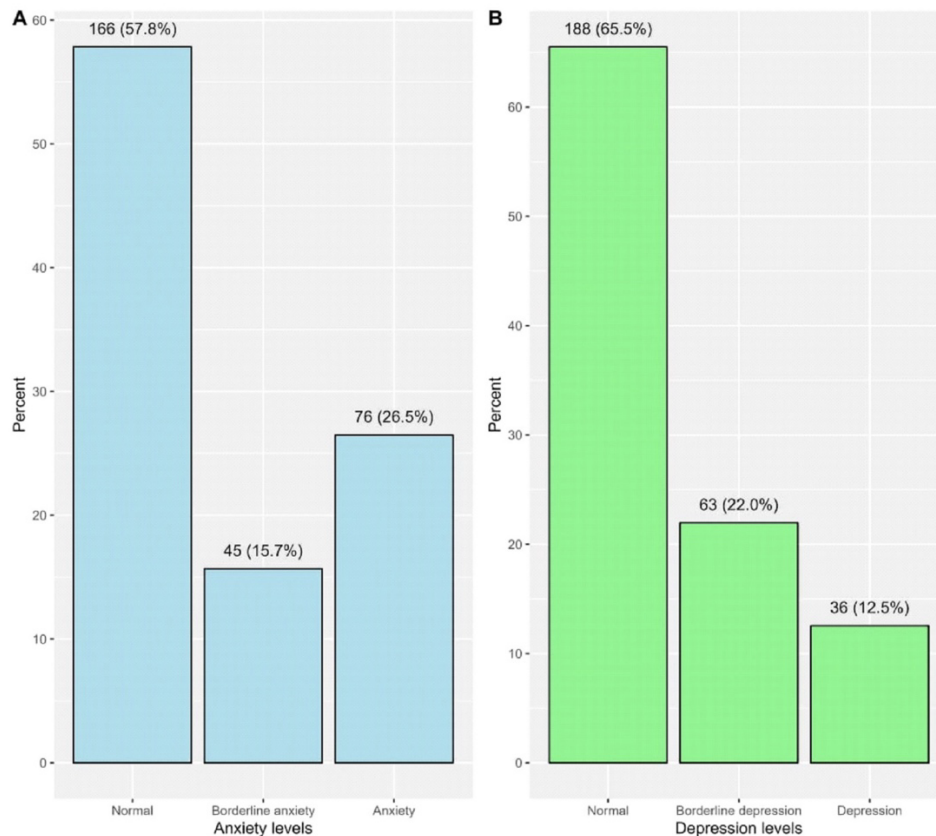
## RESULT

The present study analyzed data from 287 participants. The median age of the participants was 35.0 years (IQR: 25.0–48.0 years). Most participants were female (76.3%) and Saudi nationals (92.3%) and had an income of less than 3000 SR (39.0%). Most participants were married (49.1%) and had been living with the disease for a median of 6.0 years (IQR: 3.0–15.0 years). The majority of participants reported 1–3 clinic visits in the previous year (62.7%). A total of 11.1% of participants had been previously diagnosed with a mental disorder, with anxiety (43.8%) and depression (40.6%) being the most common types. Approximately two-thirds of the participants were using medications at the time of the study (67.9%, Table 1).

**Table 1.** Demographic and Clinical Characteristics of the Participants

| Characteristic      | Description      |
|---------------------|------------------|
| Age (years)         | 35.0 (25.0–48.0) |
| Gender              |                  |
| Male                | 68 (23.7%)       |
| Female              | 219 (76.3%)      |
| Nationality         |                  |
| Saudi               | 265 (92.3%)      |
| Non-Saudi           | 22 (7.7%)        |
| Income              |                  |
| Less than 3000 SR   | 112 (39.0%)      |
| 3,001–7,000 SR      | 60 (20.9%)       |
| 7,001–13,000 SR     | 67 (23.3%)       |
| 13,001–22,000 SR    | 35 (12.2%)       |
| More than 22,000 SR | 13 (4.5%)        |
| Social status       |                  |
| Single              | 117 (40.8%)      |
| Married             | 141 (49.1%)      |
| Divorced            | 20 (7.0%)        |
| Widowed             | 9 (3.1%)         |

|  |                |
|--|----------------|
| Years with disease                       | 6.0 (3.0–15.0) |
| Clinic visits last year                  |                |
| None                                     | 35 (12.2%)     |
| 1–3                                      | 180 (62.7%)    |
| 4–7                                      | 43 (15.0%)     |
| 8–12                                     | 14 (4.9%)      |
| More than 12                             | 15 (5.2%)      |
| Previously diagnosed with mental illness | 32 (11.1%)     |
| If yes, type of mental illness           |                |
| Anxiety                                  | 14 (43.8%)     |
| Depression                               | 13 (40.6%)     |
| Obsessive compulsive disorder            | 4 (12.5%)      |
| Panic attack                             | 1 (3.1%)       |
| Using medications for eczema             | 195 (67.9%)    |



**Figure 1**

Proportions and Frequencies of Levels of Anxiety (A) and Depression (B)

On the basis of the HADS-A subscale scores, 57.8% of participants were classified as normal, 15.7% as having borderline anxiety, and 26.5% as having anxiety (Figure 1A). On the basis of the HADS-D subscale scores, 65.5% were classified as normal, 22.0% as having borderline depression, and 12.5% as having depression (Figure 1B). Groups with varying eczema severity showed significant differences in the disease duration (in years),

use of medications, and anxiety categories. Participants with severe eczema had a significantly higher disease duration (median 12.5 years, IQR: 6.8–20.0 years) than participants in the no-eczema category (median 3.0 years, IQR: 1.0–7.0 years;  $p < .001$ ). The use of medications was significantly higher in the severe eczema group (89.5%) than in the no-eczema group (44.6%,  $p < .001$ ). Moreover, the anxiety levels differed significantly across groups with varying eczema severity ( $p < .001$ ). Participants with very severe eczema had the highest prevalence of anxiety (69.2%), followed by those with severe eczema (36.8%), moderate eczema (27.5%), mild eczema (24.6%), and clear skin (12.3%, Table 2).

**Table 2.** Statistical Differences between Different Groups of Eczema Severity

| Characteristic                           | Clear<br>N = 65  | Mild eczema<br>N = 69 | Moderate<br>eczema<br>N = 102 | Severe<br>eczema<br>N = 38 | Very severe<br>N = 13 | p-<br>value |
|--|------------------|-----------------------|-------------------------------|----------------------------|-----------------------|-------------|
| Age (years)                              | 34.0 (26.0–47.0) | 37.0 (27.0–49.0)      | 34.0 (24.0–46.8)              | 39.5 (30.0–50.0)           | 27.0 (22.0–44.0)      | .203        |
| Gender                                   |                  |                       |                               |                            |                       | .156        |
| Male                                     | 20 (30.8%)       | 12 (17.4%)            | 27 (26.5%)                    | 5 (13.2%)                  | 4 (30.8%)             |             |
| Female                                   | 45 (69.2%)       | 57 (82.6%)            | 75 (73.5%)                    | 33 (86.8%)                 | 9 (69.2%)             |             |
| Nationality                              |                  |                       |                               |                            |                       | .779        |
| Saudi                                    | 58 (89.2%)       | 63 (91.3%)            | 95 (93.1%)                    | 36 (94.7%)                 | 13 (100.0%)           |             |
| Non-Saudi                                | 7 (10.8%)        | 6 (8.7%)              | 7 (6.9%)                      | 2 (5.3%)                   | 0 (0.0%)              |             |
| Income                                   |                  |                       |                               |                            |                       | .191        |
| Less than 3000 SR                        | 24 (36.9%)       | 25 (36.2%)            | 40 (39.2%)                    | 19 (50.0%)                 | 4 (30.8%)             |             |
| 3,001–7,000 SR                           | 10 (15.4%)       | 14 (20.3%)            | 25 (24.5%)                    | 6 (15.8%)                  | 5 (38.5%)             |             |
| 7,001–13,000 SR                          | 14 (21.5%)       | 19 (27.5%)            | 26 (25.5%)                    | 6 (15.8%)                  | 2 (15.4%)             |             |
| 13,001–22,000 SR                         | 13 (20.0%)       | 10 (14.5%)            | 8 (7.8%)                      | 4 (10.5%)                  | 0 (0.0%)              |             |
| More than 22,000 SR                      | 4 (6.2%)         | 1 (1.4%)              | 3 (2.9%)                      | 3 (7.9%)                   | 2 (15.4%)             |             |
| Social status                            |                  |                       |                               |                            |                       | .666        |
| Single                                   | 27 (41.5%)       | 27 (39.1%)            | 44 (43.1%)                    | 12 (31.6%)                 | 7 (53.8%)             |             |
| Married                                  | 33 (50.8%)       | 33 (47.8%)            | 51 (50.0%)                    | 18 (47.4%)                 | 6 (46.2%)             |             |
| Divorced                                 | 3 (4.6%)         | 7 (10.1%)             | 5 (4.9%)                      | 5 (13.2%)                  | 0 (0.0%)              |             |
| Widowed                                  | 2 (3.1%)         | 2 (2.9%)              | 2 (2.0%)                      | 3 (7.9%)                   | 0 (0.0%)              |             |
| Years with disease                       | 3.0 (1.0–7.0)    | 7.0 (3.0–12.0)        | 7.0 (4.0–15.0)                | 12.5 (6.8–20.0)            | 5.0 (1.0–7.0)         | <.001       |
| Clinic visits last year                  |                  |                       |                               |                            |                       | .296        |
| None                                     | 14 (21.5%)       | 7 (10.1%)             | 9 (8.8%)                      | 4 (10.5%)                  | 1 (7.7%)              |             |
| 1–3                                      | 39 (60.0%)       | 46 (66.7%)            | 61 (59.8%)                    | 25 (65.8%)                 | 9 (69.2%)             |             |
| 4–7                                      | 9 (13.8%)        | 10 (14.5%)            | 20 (19.6%)                    | 3 (7.9%)                   | 1 (7.7%)              |             |
| 8–12                                     | 2 (3.1%)         | 3 (4.3%)              | 6 (5.9%)                      | 1 (2.6%)                   | 2 (15.4%)             |             |
| >12                                      | 1 (1.5%)         | 3 (4.3%)              | 6 (5.9%)                      | 5 (13.2%)                  | 0 (0.0%)              |             |
| Previously diagnosed with mental illness | 5 (7.7%)         | 9 (13.0%)             | 10 (9.8%)                     | 7 (18.4%)                  | 1 (7.7%)              | .505        |

|                                |            |            |            |            |            | .867  |
|--------------------------------|------------|------------|------------|------------|------------|-------|
| If yes, type of mental illness |            |            |            |            |            |       |
| Anxiety                        | 1 (20.0%)  | 5 (55.6%)  | 4 (40.0%)  | 3 (42.9%)  | 1 (100.0%) |       |
| Depression                     | 4 (80.0%)  | 3 (33.3%)  | 3 (30.0%)  | 3 (42.9%)  | 0 (0.0%)   |       |
| Obsessive compulsive disorder  | 0 (0.0%)   | 1 (11.1%)  | 2 (20.0%)  | 1 (14.3%)  | 0 (0.0%)   |       |
| Panic attack                   | 0 (0.0%)   | 0 (0.0%)   | 1 (10.0%)  | 0 (0.0%)   | 0 (0.0%)   |       |
| Using medications              | 29 (44.6%) | 46 (66.7%) | 77 (75.5%) | 34 (89.5%) | 9 (69.2%)  | <.001 |
| Anxiety (HADS-A)               |            |            |            |            |            | <.001 |
| Normal                         | 53 (81.5%) | 39 (56.5%) | 53 (52.0%) | 18 (47.4%) | 3 (23.1%)  |       |
| Borderline anxiety             | 4 (6.2%)   | 13 (18.8%) | 21 (20.6%) | 6 (15.8%)  | 1 (7.7%)   |       |
| Anxiety                        | 8 (12.3%)  | 17 (24.6%) | 28 (27.5%) | 14 (36.8%) | 9 (69.2%)  |       |
| Depression (HADS-D)            |            |            |            |            |            | .101  |
| Normal                         | 49 (75.4%) | 43 (62.3%) | 70 (68.6%) | 18 (47.4%) | 8 (61.5%)  |       |
| Borderline depression          | 11 (16.9%) | 17 (24.6%) | 23 (22.5%) | 10 (26.3%) | 2 (15.4%)  |       |
| Depression                     | 5 (7.7%)   | 9 (13.0%)  | 9 (8.8%)   | 10 (26.3%) | 3 (23.1%)  |       |

Median (interquartile range); n (%). Kruskal-Wallis rank sum test; Fisher's exact test

The inferential analysis (Table 3) showed that participants previously diagnosed with a mental illness had a significantly higher prevalence of anxiety (46.9%) than those without a prior diagnosis (23.9%;  $p = .006$ ). Additionally, there were significant differences in anxiety prevalence across groups with varying eczema severity ( $p < .001$ ), with the highest observed in participants with very severe eczema (69.2%) and severe eczema (36.8%), and a lower anxiety prevalence in those with clear skin (12.3%). Lower income levels were associated with a higher prevalence of anxiety, with participants earning less than 3000 SR showing a significantly higher prevalence (33.9%) than those in higher income brackets ( $p = .020$ ). The regression analysis identified significant risk factors for anxiety. Participants with moderate eczema (OR = 3.21, 95% CI: 1.30–8.72,  $p = .015$ ), severe eczema (OR = 5.00, 95% CI: 1.63–16.20,  $p = .006$ ), and very severe eczema (OR = 22.1, 95% CI: 5.04–118.00,  $p < .001$ ) had a significantly higher risk of anxiety than those with clear eczema. Additionally, a previous diagnosis of mental illness was associated with a higher risk of anxiety (OR = 2.46, 95% CI: 1.07–5.61,  $p = .032$ , Table 3).

**Table 3.** Results of Inferential and Regression Analyses for the Risk Factors of Anxiety

| Characteristic | Inferential analysis (Anxiety) |                  |         | Regression analysis |            |         |
|----------------|--------------------------------|------------------|---------|---------------------|------------|---------|
|                | No/borderline<br>N = 211       | Yes<br>N = 76    | p-value | OR                  | 95% CI     | p-value |
| Age (years)    | 35.0 (26.0–50.0)               | 30.0 (24.0–44.3) | .053    | 0.99                | 0.96, 1.02 | .438    |
| Gender         |                                |                  | .115    |                     |            |         |
| Male           | 55 (80.9%)                     | 13 (19.1%)       |         | Reference           | Reference  |         |

|  |                |                |       |           |            |       |
|--|----------------|----------------|-------|-----------|------------|-------|
| Female                                   | 156 (71.2%)    | 63 (28.8%)     |       | 1.39      | 0.65, 3.15 | .411  |
| Nationality                              |                |                | .930  |           |            |       |
| Saudi                                    | 195 (73.6%)    | 70 (26.4%)     |       | Reference | Reference  |       |
| Non-Saudi                                | 16 (72.7%)     | 6 (27.3%)      |       | 1.10      | 0.34, 3.18 | .860  |
| Income                                   |                |                | .020  |           |            |       |
| Less than 3000 SR                        | 74 (66.1%)     | 38 (33.9%)     |       | Reference | Reference  |       |
| 3,001–7,000 SR                           | 40 (66.7%)     | 20 (33.3%)     |       | 0.95      | 0.44, 1.98 | .882  |
| 7,001–13,000 SR                          | 56 (83.6%)     | 11 (16.4%)     |       | 0.41      | 0.17, 0.90 | .031  |
| 13,001–22,000 SR                         | 30 (85.7%)     | 5 (14.3%)      |       | 0.53      | 0.16, 1.53 | .264  |
| More than 22,000 SR                      | 11 (84.6%)     | 2 (15.4%)      |       | 0.24      | 0.03, 1.35 | .149  |
| <b>Social status</b>                     |                |                | .348  |           |            |       |
| Single                                   | 80 (68.4%)     | 37 (31.6%)     |       | Reference | Reference  |       |
| Married                                  | 109 (77.3%)    | 32 (22.7%)     |       | 0.89      | 0.40, 1.99 | .784  |
| Divorced                                 | 16 (80.0%)     | 4 (20.0%)      |       | 0.57      | 0.13, 2.06 | .410  |
| Widowed                                  | 6 (66.7%)      | 3 (33.3%)      |       | 1.60      | 0.21, 10.8 | .636  |
| Years with disease                       | 6.0 (2.0–14.0) | 7.0 (4.0–16.3) | .162  | 1.0       | 0.96, 1.03 | .765  |
| Clinic visits last year                  |                |                | .934  |           |            |       |
| None                                     | 24 (68.6%)     | 11 (31.4%)     |       | Reference | Reference  |       |
| 1–3                                      | 133 (73.9%)    | 47 (26.1%)     |       | 0.66      | 0.27, 1.68 | .374  |
| 4–7                                      | 33 (76.7%)     | 10 (23.3%)     |       | 0.54      | 0.17, 1.74 | .307  |
| 8–12                                     | 10 (71.4%)     | 4 (28.6%)      |       | 0.62      | 0.11, 2.96 | .556  |
| >12                                      | 11 (73.3%)     | 4 (26.7%)      |       | 0.60      | 0.11, 2.83 | .531  |
| Previously diagnosed with mental illness |                |                | .006  |           |            |       |
| No                                       | 194 (76.1%)    | 61 (23.9%)     |       | Reference | Reference  |       |
| Yes                                      | 17 (53.1%)     | 15 (46.9%)     |       | 2.46      | 1.07, 5.61 | .032  |
| Using medications                        |                |                | .855  |           |            |       |
| No                                       | 67 (72.8%)     | 25 (27.2%)     |       | Reference | Reference  |       |
| Yes                                      | 144 (73.8%)    | 51 (26.2%)     |       | 0.74      | 0.37, 1.49 | .396  |
| Eczema categories (POEM)                 |                |                | <.001 |           |            |       |
| Clear                                    | 57 (87.7%)     | 8 (12.3%)      |       | Reference | Reference  |       |
| Mild eczema                              | 52 (75.4%)     | 17 (24.6%)     |       | 2.65      | 1.01, 7.44 | .053  |
| Moderate eczema                          | 74 (72.5%)     | 28 (27.5%)     |       | 3.21      | 1.30, 8.72 | .015  |
| Severe eczema                            | 24 (63.2%)     | 14 (36.8%)     |       | 5.00      | 1.63, 16.2 | .006  |
| Very severe                              | 4 (30.8%)      | 9 (69.2%)      |       | 22.1      | 5.04, 118  | <.001 |

Median (interquartile range); n (%). Wilcoxon rank sum test; Pearson's Chi-squared test; Fisher's exact test. OR = odds ratio, CI = confidence interval

Furthermore, the inferential analysis (Table 4) revealed that participants previously diagnosed with a mental illness had a significantly higher prevalence of depression (37.5%) than those without a prior diagnosis (9.4%,  $p < .001$ ). Moreover, significant differences were observed across eczema severity categories ( $p = .035$ ), with higher rates of depression in participants with severe eczema (26.3%) and very severe eczema (23.1%) than in those with

clear skin (7.7%). The regression analysis showed that participants with severe eczema had a significantly higher risk of depression (OR = 6.27, 95% CI: 1.5–28.7,  $p = .014$ ) than those with no eczema. A previous diagnosis of mental illness was a significant risk factor for depression (OR = 6.60, 95% CI: 2.43–18.30,  $p < .001$ , Table 4).

**Table 4.** Results of Inferential and Regression Analyses for the Risk Factors of Depression

| Characteristic                           | Inferential analysis (depression) |                  |         | Regression analysis |            |         |
|--|-----------------------------------|------------------|---------|---------------------|------------|---------|
|  | No/borderline<br>N = 251          | Yes<br>N = 36    | p-value | OR                  | 95% CI     | p-value |
| Age (years)                              | 35.0 (25.0–48.5)                  | 32.5 (24.0–45.0) | .391    | 1.01                | 0.97, 1.05 | .659    |
| Gender                                   |                                   |                  | .538    |                     |            |         |
| Male                                     | 58 (85.3%)                        | 10 (14.7%)       |         | Reference           | Reference  |         |
| Female                                   | 193 (88.1%)                       | 26 (11.9%)       |         | 0.63                | 0.23, 1.74 | .361    |
| Nationality                              |                                   |                  | .746    |                     |            |         |
| Saudi                                    | 232 (87.5%)                       | 33 (12.5%)       |         | Reference           | Reference  |         |
| Non-Saudi                                | 19 (86.4%)                        | 3 (13.6%)        |         | 0.79                | 0.13, 3.39 | .777    |
| Income                                   |                                   |                  | .058    |                     |            |         |
| Less than 3000 SR                        | 91 (81.3%)                        | 21 (18.8%)       |         | Reference           | Reference  |         |
| 3,001–7,000 SR                           | 53 (88.3%)                        | 7 (11.7%)        |         | 0.66                | 0.22, 1.85 | .446    |
| 7,001–13,000 SR                          | 64 (95.5%)                        | 3 (4.5%)         |         | 0.22                | 0.05, 0.75 | .028    |
| 13,001–22,000 SR                         | 32 (91.4%)                        | 3 (8.6%)         |         | 0.68                | 0.14, 2.57 | .599    |
| More than 22,000 SR                      | 11 (84.6%)                        | 2 (15.4%)        |         | 0.65                | 0.07, 3.78 | .662    |
| Social status                            |                                   |                  | .112    |                     |            |         |
| Single                                   | 97 (82.9%)                        | 20 (17.1%)       |         | Reference           | Reference  |         |
| Married                                  | 129 (91.5%)                       | 12 (8.5%)        |         | 0.44                | 0.13, 1.37 | .161    |
| Divorced                                 | 18 (90.0%)                        | 2 (10.0%)        |         | 0.42                | 0.05, 2.18 | .342    |
| Widowed                                  | 7 (77.8%)                         | 2 (22.2%)        |         | 0.43                | 0.02, 7.15 | .565    |
| Years with disease                       | 7.0 (3.0–15.0)                    | 5.5 (5.0–10.0)   | .770    | 0.94                | 0.88, 0.99 | .032    |
| Clinic visits last year                  |                                   |                  | .328    |                     |            |         |
| None                                     | 30 (85.7%)                        | 5 (14.3%)        |         | Reference           | Reference  |         |
| 1–3                                      | 161 (89.4%)                       | 19 (10.6%)       |         | 0.52                | 0.15, 2.05 | .323    |
| 4–7                                      | 36 (83.7%)                        | 7 (16.3%)        |         | 0.83                | 0.18, 3.97 | .809    |
| 8–12                                     | 13 (92.9%)                        | 1 (7.1%)         |         | 0.40                | 0.02, 3.73 | .466    |
| >12                                      | 11 (73.3%)                        | 4 (26.7%)        |         | 1.45                | 0.19, 10.4 | .715    |
| Previously diagnosed with mental illness |                                   |                  | <.001   |                     |            |         |
| No                                       | 231 (90.6%)                       | 24 (9.4%)        |         | Reference           | Reference  |         |

|                          |             |            |      |           |            |       |
|--------------------------|-------------|------------|------|-----------|------------|-------|
| Yes                      | 20 (62.5%)  | 12 (37.5%) |      | 6.60      | 2.43, 18.3 | <.001 |
| Using medications        |             |            | .861 |           |            |       |
| No                       | 80 (87.0%)  | 12 (13.0%) |      | Reference | Reference  |       |
|                          |             |            |      | e         |            |       |
| Yes                      | 171 (87.7%) | 24 (12.3%) |      | 1.01      | 0.39, 2.68 | .983  |
| Eczema categories (POEM) |             |            | .035 |           |            |       |
| Clear                    | 60 (92.3%)  | 5 (7.7%)   |      | Reference | Reference  |       |
|                          |             |            |      | e         |            |       |
| Mild eczema              | 60 (87.0%)  | 9 (13.0%)  |      | 2.24      | 0.64, 8.65 | .216  |
| Moderate eczema          | 93 (91.2%)  | 9 (8.8%)   |      | 1.26      | 0.36, 4.82 | .727  |
| Severe eczema            | 28 (73.7%)  | 10 (26.3%) |      | 6.27      | 1.50, 28.7 | .014  |
| Very severe              | 10 (76.9%)  | 3 (23.1%)  |      | 4.53      | 0.71, 26.2 | .093  |

Median (interquartile range); n (%). Wilcoxon rank sum test; Pearson's Chi-squared test; Fisher's exact test. OR = odds ratio, CI = confidence interval

## DISCUSSION

AD is a common skin condition that significantly affects the quality of life of those affected. It has been linked to various mental health disorders, including anxiety and depression. The present study aimed to determine the relationship between AD (eczema), anxiety, and depression in adult patients visiting dermatology clinics and to investigate the correlation between the degree of eczema severity and levels of anxiety and depression. Exploring this association is critical for improving holistic care for affected individuals.

The present findings highlight the significant prevalence of anxiety and depression among individuals with eczema, particularly those with severe AD. Factors such as longer disease duration, higher medication usage, and previous diagnoses of mental illness were associated with increased risk of anxiety and depression. The regression analyses showed that participants with moderate, severe, and very severe eczema had significantly higher risk of anxiety and depression than those with clear skin, underscoring the effect of disease severity on mental health outcomes. These results emphasize the importance of addressing both the physical and psychological aspects of eczema in patient care and suggest the need for integrated approaches that consider the complex interplay between disease severity, mental health, and overall well-being in individuals with eczema. Further research and interventions should focus on developing holistic care strategies to improve outcomes for this vulnerable population.

The findings of this study underscore the substantial burden of anxiety and depression among individuals with eczema, particularly those with severe disease. The association between longer disease duration, higher medication usage, and previous mental health diagnoses with increased risk of anxiety and depression highlights the need for comprehensive care approaches that address both the physical symptoms of eczema and the associated psychological distress. These results suggest that healthcare providers should prioritize mental health screening and support for individuals with eczema, especially those with more severe forms of the condition. Integrated care models that address the complex interplay between disease severity, mental health, and overall well-being are essential for improving outcomes for this vulnerable population.

This study has several strengths and limitations. One of the key strengths is the use of validated screening tools, specifically the HADS, which enhances the reliability and validity of the findings regarding anxiety and depression in patients with AD. Additionally, the focus on eczema severity provides valuable insights that can inform clinical practice and treatment approaches. Moreover, because the study includes a diverse sample of adult patients from a dermatology clinic in Saudi Arabia, the findings are relevant in this specific context and not generalizable. Furthermore, exploring the socioeconomic factors added depth to the analysis of mental health outcomes in this population, addressing a notable gap in the existing literature. However, the study's cross-sectional design restricts the ability to establish causal relationships between eczema severity and mental health outcomes, making it difficult to determine the temporal sequence of these conditions. Furthermore, the study was conducted only in KKUH-OPD; therefore, it has limited generalizability. A multicenter study would presumably provide a higher level of evidence. The present study included only AD as a skin condition that potentially affects the quality of life; however, various other skin conditions and other diseases may affect the quality of life that needs to be addressed in future researches.

## CONCLUSION

Based on our investigation, eczema severity is strongly associated with increased anxiety and depression levels. Participants with severe and very severe eczema had significantly higher odds of experiencing anxiety and depression compared to those with no eczema. Additionally, a prior diagnosis of mental illness and lower income were significant risk factors for both anxiety and depression. These findings highlight the importance of recognizing mental health concerns and early signs of possible psychological disorders such as anxiety and depression in patients with eczema, particularly those with severe disease, to ensure comprehensive care and targeted interventions that address both physical and psychological aspects of the condition.

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