RESEARCH ARTICLE

Depressive symptoms among adult patients with systemic lupus erythematosus in the Jazan Region, Saudi Arabia: An analytical cross-sectional study

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Abstract

Mental disorders, including depression, are common among patients with systemic lupus erythematosus (SLE). Depressive symptoms can significantly impair quality of life and are associated with adverse clinical outcomes. Studies investigating depressive symptoms and their associated factors in individuals with SLE have yielded inconsistent findings. Therefore, this study aimed to determine the prevalence of depressive symptoms among patients with SLE and to identify the associated factors in patients from the Jazan Region of Saudi Arabia. An analytical cross-sectional study of 112 patients with SLE in Jazan, Saudi Arabia was conducted in 2023. A convenience sampling technique was used to recruit all eligible adult patients with SLE who attended rheumatology clinics and day-care units at the referral hospitals in the region. Depressive symptoms were assessed using the Patient Health Questionnaire-9 (PHQ-9). Chi-square tests and binary logistic regression analyses were used to examine associations and identify factors associated with depressive symptoms. The majority of participants were female (104 [92.9%]), with ages ranging from 18 to 59 years. Depressive symptoms were present in 80% of participants, with patients experiencing mild depression 25 (22%), moderate depression 28 (25%), moderate-to-severe depression 22 (20%), and severe depression 15 (13%).In the multivariable analysis, although physical activity as a categorical variable did not reach overall statistical significance (global p = 0.067), participants engaging in less than 150 minutes of physical activity per week were significantly less likely to experience depressive symptoms compared with those performing no physical activity (OR = 0.28; 95% CI 0.10–0.82; P = 0.020).In conclusion, depressive symptoms were highly prevalent among patients with SLE in the Jazan Region, and physical activity level was identified as a significant modifiable associated factor in this population.

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Routine screening could facilitate early detection and intervention in patients with SLE in similar settings, resulting in improved clinical outcomes.

Introduction

Systemic lupus erythematosus (SLE) is a complicated multisystemic autoimmune disease characterized by highly heterogenous clinical manifestations. The symptoms and clinical presentation of SLE vary considerably among patients, ranging from very mild disease to severe and serious manifestations involving multiple organ systems [1,2]. The female-to-male ratio in SLE is approximately 13:1, whereas it is only 2:1 in children and older adults [3]. The global prevalence of SLE generally ranges from 20–70 cases per 100,000 persons [4], while the prevalence in Saudi Arabia is approximately 19 cases per 100,000 persons [5].

In addition to causing physical morbidity, SLE is associated with an increased risk of psychiatric disorders, including depression. Numerous studies have evaluated the prevalence of depressive symptoms among patients with SLE, reporting ranges between 2.1% and 78.6% [6]. Furthermore, reports suggest that depressive symptoms are more common among individuals with SLE compared with healthy individuals [7,8].

Various factors are correlated with a higher risk of depressive symptoms and mood disorders in SLE, including disease activity [9]. However, studies examining the relationship between depressive symptoms and SLE disease activity have produced mixed findings [7–11]. Biological, psychological, social, and behavioral factors may all contribute to this complex association. In contrast, depressive symptoms may also be associated with an increased risk of SLE, and controlling for behavioral factors such as smoking and body mass index has been shown to reduce this association to some extent [12]. Furthermore, the overall burden of SLE can negatively affect quality of life, restricting their daily activities because of physical and psychological impairments [13].

Depressive symptoms in patients with SLE can result in increased fatigue, more severe somatic symptoms, greater disease activity, and a higher frequency of disease flares [14]. In addition, depressive symptoms significantly impair social functioning and emotional well-being in patients with SLE [15], and are associated with an increased risk of suicidal ideation and treatment nonadherence [16–18]. Previous studies of many other chronic illnesses have shown that the effective treatment of depressive symptoms can improve overall clinical outcomes [19]. Therefore, routine screening for depression, early detection, and appropriate management of depressive symptoms are essential components of comprehensive management of patients with SLE.

In Saudi Arabia, a cross-sectional study involving patients from four tertiary referral hospitals reported a high prevalence of depressive symptoms among Saudi patients with SLE (67.6%), and only four of these patients were treated with antidepressant [20]. Another study conducted in Abha demonstrated that more than 30% of the patients had psychiatric disorders, with depressive symptoms being the most

common diagnosis (16%) [21]. In a recent study, neuropsychiatric manifestations were found in nearly half of the patients with SLE, while approximately (11.5%) experienced chronic depressive symptoms [22]. Furthermore, a study from the Eastern Province of Saudi Arabia, reported that depressive symptoms were present in (46%) of patients with SLE [23].

Unfortunately, the number of studies conducted among Saudi or Arab patients with SLE is limited. Moreover, the Jazan region remains largely unexplored in this regard. Therefore, further research is needed to understand the prevalence of depressive symptoms and their associated factors among patients with SLE.

Therefore, this study aimed to determine the prevalence of depressive symptoms among patients with SLE in the Jazan Region, Saudi Arabia, and to identify their associated factors.

Methods

This observational study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines, with reference to the RECORD extension where applicable [24,25].

Design, setting, and participants

The Jazan region is located in the southwestern corner of Saudi Arabia, and is bordered by Yemen to the south. It is one of the administrative regions in the Kingdom of Saudi Arabia (KSA). According to the 2022 Saudi population census, the total population of Jazan region was 1,404,997 [26].

This analytical cross-sectional study included participants with SLE from the Jazan region, Saudi Arabia, between September and December 2023. All adult male and female patients with SLE aged ≥18 years who attended the rheumatology clinics and day-care units at the referral hospitals in Jazan (King Fahad Central Hospital, and Prince Mohd bin Naser Hospital) were recruited. SLE diagnosis was confirmed based on the treating rheumatologist's clinical assessment and medical records, in accordance with the 2019 European League Against Rheumatism/American College of Rheumatology (EULAR/ACR) classification criteria [27]. A convenience sampling method was employed due to the practical challenges of identifying and recruiting eligible patients with SLE, as no complete registry of SLE patients was available in the region. A formal sample size calculation was not performed a priori; however, all available eligible patients were included to maximize the sample size. A total of 112 participants were included in the final analysis. Patients with psychiatric illnesses other than depression were excluded to minimize the potential impact of confounding variables.

The study was approved by the Jazan Health Cluster Ethics Committee, Saudi Arabia (approval No. 2379). Written informed consent was obtained from all participants prior to enrollment in the study.

Data collection

Data were collected from participants using a self-administered questionnaire that included three main sections. The first section of the questionnaire collected sociodemographic information, including age, sex, nationality, marital status, residence, employment status, level of education, monthly income, smoking status, sleep duration, and physical activity. Physical activity was assessed using a single self-reported question asking participants to report their level of physical activity per week, categorized as: no physical activity, less than 150 minutes, or 150 minutes or more. No information was collected on the type or intensity of physical activity. Self-reported physical activity is subject to measurement error, which may have affected the accuracy of the reported values. Sleep duration was categorized as normal (7–9 hours per night) or abnormal (<7 or >9 hours per night), based on the National Sleep Foundation recommendation for adults [28]. The second section gathered clinical information, including SLE disease duration and comorbidities such as cardiovascular disease, hypertension, diabetes, pulmonary diseases, and other chronic conditions. *Comorbidities were assessed based on patient self-report of previously diagnosed conditions.* The third section included the validated Arabic version of the Patient Health Questionnaire-9 (PHQ-9) [29,30]. which was used to assess depressive symptoms among the study participants. The PHQ-9 consists of nine items that evaluate the frequency of depressive symptoms experienced over the preceding

2 weeks. Each item is scored on a scale from 0 to 3, yielding a total score between 0 and 27. PHQ-9 scores were categorized as follows: < 5, no depression; 5–9, mild depression; 10–14, moderate depression; 15–19, moderate-to-severe depression; and 20–27, severe depression. A PHQ-9 score of ≥ 5 was used to define the presence of depressive symptoms in this study, consistent with previous research among patients with chronic diseases, where lower thresholds have been applied to capture the full spectrum of depressive symptoms, including mild depression [29]. The interviews lasted approximately 5 minutes per participant. Participants who were able to read and write completed the questionnaire independently, with assistance provided when necessary. For participants who could not read or write, the questionnaire was administered by a member of the research team.

Data analysis

Data entry and analysis were performed using the Statistical Package for the Social Sciences (SPSS) version 25 for Windows (IBM Corp., Armonk, NY, USA). Descriptive and inferential statistics were used to analyze and interpret the data. Descriptive statistics are presented as frequencies and percentages for categorical variables. The PHQ-9 scores were classified into two categories: depressed (score ≥ 5) and not depressed (score < 5). Associations between depressive symptoms status and participant characteristics were assessed using the chi-square or Fisher's exact test, as appropriate. Results are reported as odds ratios (ORs) with 95% confidence intervals (CIs). To identify factors independently associated with depressive symptoms, multivariate binary logistic regression analysis was performed. Variables with $P < 0.05$ in the bivariate analysis were considered for inclusion in the multivariable model. Missing data were minimal and handled using listwise deletion. Statistical significance was set at $P < 0.05$. The Nagelkerke R^2 was used to assess the overall fit of the logistic regression model. Casewise diagnostics were performed to identify influential observations, using a threshold of standardized residuals exceeding ±2.5.

Results

Sociodemographic characteristics

Of the 112 enrolled participants with SLE, 104 were female and eight were male. The median age was 34 years (range: 18–59 years). Most participants (93 [83%]) were Saudi nationals and 19 (17%) were non-Saudi. Regarding marital status, 52 (46.4%) participants were single, 50 (44.6%) were married, and the remainder were divorced or widowed. Nearly half of the participants 51 (45.5%) had obtained a college-level education. In terms of employment status, 81 (72.3%) were unemployed or student, whereas only 31 (27.7%) were employed. Approximately two-thirds of participants (62.5%) reported a monthly income of less than 5,000 SAR. In addition, 48 participants (42.9%) presented with at least one comorbidities (such as cardiovascular disease, hypertension, diabetes, or pulmonary disease). Most participants (n = 70, [62.5%]) were physically inactive, 66 (58.9%) reported sleeping problems, and only six (5.4%) were smokers. Regarding disease duration, more than half of the participants (63 [56.3%]) had been diagnosed with SLE for less than 5 years (Table 1).

Prevalence of depressive symptoms among patients with SLE

Based on PHQ-9 scores, depressive symptoms were identified in 90 (80%; 95% CI: 72.6%–87.4%) of the 112 participants. The severity of depressive symptoms varied among participants. Of the total sample, 22 (20%) had no depression, 25 (22%) had mild depression, 28 (25%) had moderate depression, 22 (20%) had moderate-to-severe depression, and 15 (13%) had severe depression (Fig 1).

Determinants of depressive symptoms in patients with SLE

The associations between the independent variables and depressive symptoms are presented in Table 2. Depressive symptoms were significantly more prevalent among participants with low income (61 [87.1%])) compared with participants

Table 1. Demographic and clinical characteristics of study participants.

Variables	Frequency (%)
Age (n = 112); Median (IQR)	34 (17 years)
Sex (n = 112)	
Male	8 (7.1)
Female	104 (92.9)
Nationality (n = 112)	
Saudi	93 (83)
Non-Saudi	19 (17)
Marital status (n = 112)	
Single	52 (46.4)
Married	50 (44.6)
Divorced or Widowed	10 (8.9)
Residence (n = 112)	
Urban	69 (61.6)
Rural	43 (38.4)
Education level (n = 112)	
Less than primary school and primary school	19 (17)
Intermediate school	6 (5.4)
Secondary school	36 (32.1)
College	51 (45.5)
Employment (n = 112)	
Employed	31 (27.7)
Unemployed or Student	81 (72.3)
Monthly income, SAR (n = 112)	
Low income <5,000 SAR	70 (62.5)
Moderate income 5,000–15,000 SAR	36 (32.1)
High income >15,000 SAR	6 (5.4)
Presence of comorbidities (n = 112)	
Yes	48 (42.9)
No	64 (57.1)
Physical activity (n = 112)	
No physical activity	70 (62.5)
Less than 150 minutes a week	30 (26.8)
From 150 minutes or more a week	12 (10.7)
Sleep duration (n = 112)	
Normal sleep duration	46 (41.1)
Abnormal sleep duration	66 (58.9)
Smoking status (n = 112)	
Yes	6 (5.4)
No	106 (94.6)
SLE disease duration (n = 112)	
Less than 5 years	63 (56.3)
From 5 to 10 years	27 (24.1)
From 10 to 15 years	13 (11.6)
More than 15 years	9 (8)

n, the number of participants; IQR, interquartile range; SAR, Saudi riyal; SLE, systemic lupus erythematosus.

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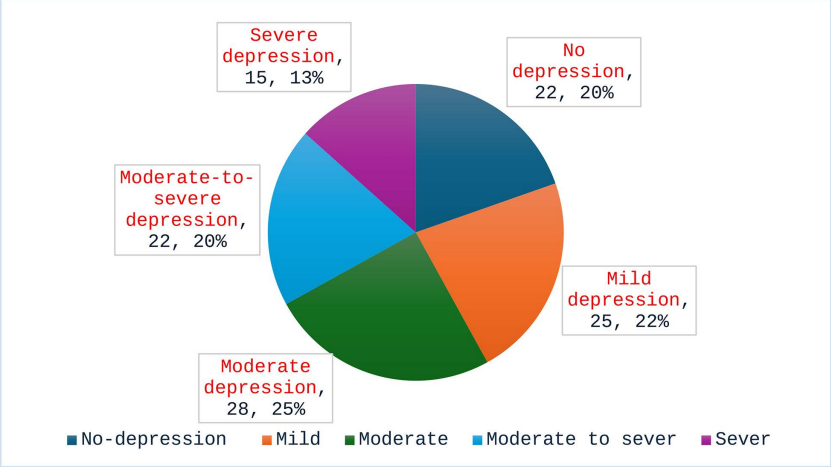


Fig 1. Prevalence of depressive symptoms among patients with SLE.

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with other levels of income ($P < 0.05$). Similarly, participants with comorbidities showed a significantly higher prevalence of depressive symptoms, with 43 (89.5%) affected ($P < 0.05$). Physical activity was also associated with depressive symptoms, as 61 (87.1%) of physically inactive participants were classified as depressed ($P < 0.05$) (Table 2).

The results of the multivariate logistic regression analysis are presented in Table 3. After adjusting for potential confounders, although physical activity as a categorical variable did not reach overall statistical significance (global p = 0.067), a specific contrast showed that participants engaging in less than 150 minutes of physical activity per week were significantly less likely to experience depressive symptoms compared with those performing no physical activity (OR = 0.28; 95% CI 0.10–0.82; P = 0.020). Monthly income and presence of comorbidities were not statistically significant in the adjusted model (P = 0.089 and P = 0.109, respectively), although the trends observed in the bivariate analysis remained in the expected direction (Table 3). The Nagelkerke R^2 for the final model was 0.163 (Cox & Snell $R^2 = 0.103$), indicating that the model explained approximately 16.3% of the variance in depressive symptoms. Casewise diagnostics revealed no influential observations, as all standardized residuals were within the ± 2.5 threshold.

Discussion

This cross-sectional study examined the prevalence and associated factors of depressive symptoms among adult patients with SLE in the Jazan region of Saudi Arabia. The study found that depressive symptoms were highly prevalent, affecting 80% of participants. In the bivariate analysis, low monthly income, presence of comorbidities, and physical inactivity were significantly associated with depressive symptoms. In the multivariable analysis, although physical activity as a categorical variable did not reach overall statistical significance, a specific contrast showed that participants engaging in less than 150 minutes of physical activity per week were significantly less likely to experience depressive symptoms compared with those performing no physical activity.In the present study, most patients with SLE were female (92.9%), which is consistent with findings reported by Alammari et al. and Mok et al. [22,31]. The female-to-male ratio was 13:1, in agreement with previous studies demonstrating that SLE occurs considerably more frequently in females than in males [3].

The present study assessed the prevalence of depressive symptoms among patients with SLE in the Jazan region of Saudi Arabia using the validated Arabic version of the PHQ-9. Depressive symptoms were highly prevalent based on the questionnaire scores, with four-fifths of the study population affected by depressive symptoms. Regarding severity, 22% of the patients had mild depression, 25% had moderate depression, approximately 20% had from moderate-to-severe depression, and the remaining 13% had severe depression.

Table 2. Association between depressive symptoms and independent variables among the study participants.

Variables	Depressive symptoms		P value
	Yes (n = 90) n (%)	No (n = 22) n (%)	
Sex			0.189 *
Male	5 (62.5)	3 (37.5)	
Female	85 (81.7)	19 (18.2)	
Nationality			0.761 *
Saudi	74 (79.5)	19 (20.4)	
Non-Saudi	16 (84.2)	3 (15.7)	
Marital status			0.588
Single	40 (76.9)	12 (23.07)	
Married	41 (82)	9 (18)	
Widowed/divorced	9 (90)	1 (10)	
Residence			0.787
Urban	56 (81.1)	13 (18.8)	
Rural	34 (79)	9 (20.9)	
Education level			0.859 *
Less than primary school and primary school	16 (84.2)	3 (15.7)	
Intermediate school	5 (83.3)	1 (16.6)	
Secondary school	27 (75)	9 (25)	
College	42 (82.3)	9 (17.6)	
Employment			0.962
Employed	25 (80.6)	6 (19.3)	
Unemployed or student	65 (80.2)	16 (19.7)	
Monthly income			0.029 **
Low income (<5,000 SAR)	61 (87.1)	9 (12.8)	
Moderate income (5000–15000 SAR)	26 (72.2)	10 (27.7)	
High income (>15,000 SAR)	3 (50)	3 (50)	
Presence of comorbidities			0.03 **
Yes	43 (89.5)	5 (10.4)	
No	47 (73.4)	17 (26.5)	
Physical activity			0.02 **
No physical activity	61 (87.1)	9 (12.8)	
Less than 150 minutes a week	19 (63.3)	11 (36.6)	
From 150 minutes or more a week	10 (83.3)	2 (16.6)	
Sleep duration			0.152
Normal sleep	34 (73.9)	12 (26.0)	
Abnormal sleep	56 (84.8)	10 (15.15)	
Smoking status			1.0 *
Yes	5 (83.3)	1 (16.6)	
No	85 (80.1)	21 (19.8)	
SLE disease duration			0.769 *
Less than 5 years	50 (79.3)	13 (20.6)	
From 5 to 10 years	21 (77.7)	6 (22.2)	
From 10 to 15 years	12 (92.3)	1 (7.6)	
More than 15 years	7 (77.7)	2 (22.2)	

*Using Fisher's exact test; **Statistically significant result: P-value ≤ 0.05; SLE, systemic lupus erythematosus.

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Table 3. Multiple logistic regression of depressive symptoms among study participants.

Variables	OR (CI)	*P* value
Monthly income		0.089
Low income (<5,000 SAR)	5.53 (0.79–38.50)	0.084
Moderate income (5000–15000 SAR)	2.12 (0.30–15.25)	0.454
High income (>15,000 SAR)	1 [Ref.]	NA
Presence of comorbidities		
Yes	2.53 (0.81–7.89)	0.109
No	1 [Ref.]	NA
Physical activity		0.067
Less than 150 minutes a week	0.28 (0.10–0.82)	0.020**
From 150 minutes or more a week	0.71 (0.12–4.09)	0.699
No physical activity	1 [Ref.]	NA

**Statistically significant result: *P* value ≤ 0.05; OR, odds ratio; CI, confidence interval; Ref., reference group; NA, not applicable; SLE, systemic lupus erythematosus.

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Internationally, one study reported a depressive symptoms prevalence of 78.6% among patients with SLE, which is comparable to our finding of 80% [32]. However, several studies conducted in other countries have reported significantly lower prevalence rates [7,33–36]. Among studies conducted across multiple regions in Saudi Arabia, varying prevalence rates of depressive symptoms have been reported. Studies from Riyadh/Makkah [20], Abha [21], the Eastern region [23], and Jeddah [37] demonstrated prevalence rates of 67.6%, 16%, 46%, and 18.75%, respectively.

The wide variation in reported prevalence rates may be partly explained by differences in assessment tools or scales used across studies; however, methodological differences alone are unlikely to account for these differences. For example, a study conducted in China used the same PHQ-9 scale as the present study and included 300 patients with SLE, yet reported a lower prevalence of depressive symptoms [38]. Additionally, sociocultural factors may influence the reporting and recognition of depressive symptoms among patients with SLE. Variations in healthcare accessibility and availability may also contribute to differences in the prevalence of depressive symptoms across populations and settings.

This study revealed a trend toward an association between low monthly income and depressive symptoms among patients with SLE, although this did not reach statistical significance in the multivariable analysis (P = 0.084). Similar associations have been reported in previous studies [38–40]. Low income, financial strain, and poverty have consistently been reported as important factors related to the onset of depressive symptoms [39].

The presence of comorbidities showed a trend toward association with depressive symptoms, although this did not reach statistical significance in the adjusted model (P = 0.109). In the bivariate analysis, patients with chronic comorbid diseases showed a higher prevalence of depressive symptoms, a finding that is consistent with previous research [23,40,41]. As with other autoimmune diseases, the presence of comorbidities in patients with SLE may worsen clinical outcomes and increase the overall burden of the disease [40,41].

Although physical activity as a categorical variable did not reach overall statistical significance in the multivariable analysis (global p = 0.067), a specific contrast showed that participants engaging in less than 150 minutes of physical activity per week were significantly less likely to experience depressive symptoms compared with those performing no physical activity (OR = 0.28; 95% CI 0.10–0.82; P = 0.020).The prevalence of depressive symptoms was significantly higher among physically inactive participants. Consistent with our findings, a cohort study reported that participants with low levels of physical activity were significantly more likely to develop depressive symptoms over the subsequent 2 years [42]. Physical inactivity is often accompanied by unhealthy lifestyle behaviors, including poor dietary habits, which may contribute to weight gain and obesity. Increased body mass index and obesity are associated with increased disease activity, fatigue,

and depressive symptoms [43]. Conversely, regular physical activity has been shown to significantly improve the quality of life in patients with SLE [44].

The current study did not find any statistically significant relationship between depressive symptoms and either sex or disease duration. This finding is consistent with previous studies by Al-Homood et al., Alsomaily et al., Liao et al., and Figueiredo-Braga et al. [20,21,38,45]. In contrast, other studies have reported that longer disease duration is associated with the presence of moderate-to-severe depression among patients with SLE [16,23].

The chronic nature of SLE and prolonged exposure to the challenges associated with the disease, especially persistent fatigue—one of the most common and debilitating symptoms of SLE—may contribute to psychological distress [46,47]. The bidirectional relationship between physical symptoms and depressive symptoms further amplifies the overall disease burden experienced by patients [48]. Moreover, no significant association between sex and depressive symptoms was observed in our study, which may be attributed to the limited number of male participants in the sample.

Despite the widespread prevalence of depressive symptoms in patients with SLE, evidence suggests that depressive symptoms remain undiagnosed and under-recognized in a significant proportion of patients. Therefore, early identification and timely intervention are essential components of patient care [49].

The factors statistically associated with depressive symptoms are numerous and multifaceted, encompassing both non-modifiable and modifiable characteristics. While certain factors remain consistent across different populations, demographic and social determinants may vary according to the local context [50].

Our study provides valuable regional data that help address a gap in the literature. Our findings complement national evidence regarding the burden of SLE in the KSA, emphasizing the need for greater attention to associated psychological disorders, such as depression, through more localized research and analysis [51].The findings of this study have several clinical implications. Incorporating routine screening for depressive symptoms into SLE care may facilitate early detection and management. Educational and awareness programs could help improve recognition of depressive symptoms among patients with chronic illnesses. Promoting physical activity may represent a potentially beneficial strategy to reduce the burden of depressive symptoms in this population, pending confirmation in future longitudinal studies.

This study had several limitations. First, the sample size was relatively small, which may have limited the statistical power of the analysis. Therefore, larger studies are needed to confirm our findings. Second, the study population consisted predominantly of female participants, which limits the applicability of our results to male patients. Finally, convenience sampling was used rather than random selection because of the practical challenges involved in identifying and recruiting eligible patients with SLE within the study period, and no formal sample size calculation was performed a priori. These factors may affect the generalizability of the findings. Additionally, detailed clinical data including SLE disease activity indices, systemic manifestations, autoantibodies, and treatment information were not collected, as the study focused on sociodemographic and lifestyle-related factors. Future studies should incorporate comprehensive clinical assessments to better characterize the relationship between SLE clinical features and depressive symptoms.

Conclusion

Depressive symptoms were highly prevalent among patients with SLE in the Jazan region of Saudi Arabia. While the overall association between physical activity and depressive symptoms did not reach statistical significance, a specific contrast suggested that some level of physical activity may be associated with lower odds of depressive symptoms. Further research is needed to better understand the burden and determinants of depressive symptoms among patients with SLE.

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Author contributions

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