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Chronic Cutaneous Lupus Erythematosus: Depression Burden and Associated Factors

Jennifer Hong, MD[1], **Laura Aspey, MD, MPH**[2], **Gaobin Bao, MS, MPH**[3], **Tamara Haynes, MD, PhD**[4], **S. Sam Lim, MD, MPH**[3], and **Cristina Drenkard, MD, PhD**[3]

[1]Department of Medicine, Emory University School of Medicine, Atlanta, GA

[2]Department of Dermatology, Emory University, Atlanta, GA

[3]Department of Medicine, Division of Rheumatology, Emory University, Atlanta, GA

[4]Department of Medicine and Department of Psychiatry and the Behavioral Sciences, Emory University, Atlanta, GA

Abstract

Objective: Depression may occur in up to 30% of individuals with cutaneous lupus erythematosus (CLE), many of whom may also have systemic manifestations. Compared to acute and subacute, chronic cutaneous lupus erythematosus (CCLE) conditions are less likely to present systemic involvement, but more often cause permanent scarirng and dyspigmentation. Little is known, however, about depression in those who have CCLE confined to the skin (primary CCLE). As African Americans are at high risk for primary CCLE and depression, we aimed to investigate the prevalence and explore risk factors of depression in a predominantly Black population-based cohort of patients with primary CCLE.

Methods: Cross-sectional analysis of a cohort of individuals with a documented diagnosis of primary CCLE, which is established in the metropolitan Atlanta. Participants were recruited from the Centers for Disease Control and Prevention (CDC) population-based Georgia Lupus Registry, multi-center dermatology clinics, community practices, and self-referrals. The Patient Reported Outcomes Measurement Information System (PROMIS) was used to measure the primary outcome: depressive symptoms. Stand-alone questions were used to assess sociodemographics and healthcare utilization. Emotional, informational, and instrumental support were measured with PROMIS short forms, interpersonal processes of care with the IPC-29 Survey, and skin-related quality of life with the Skindex-29+ tool.

Results: Of 106 patients, 92 (86.8%) were female, 91 (85.8%) Black, and 45 (42.9%) unemployed or disabled. Twenty-eight (26.4%) reported moderate to severe depressive symptoms. Depression severity was lower in patients aged ≥60, married, or college-graduated. Univariate analysis showed that being employed (OR=0.24, 95% Confidence Interval (CI)=0.10-0.61),

Corresponding Author: Cristina Drenkard, MD, PhD, Emory University, Department of Medicine, Division of Rheumatology, 49 Jesse Hill Jr Dr SE, Atlanta, GA 30303 – USA, Phone: 404 2518901, Fax: 404 688 6352, cdrenka@emory.edu.

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insured (OR=0.23, 95%CI=0.09-0.60), reporting higher instrumental, informational, and emotional support (OR=0.94, 95%CI=0.90-0.99; OR=0.91, 95%CI=0.87-0.95; and OR=0.86, 95%CI=0.81-0.92, respectively), visiting a primary care physician in the last year (OR=0.16, 95%CI=0.04-0.61) and reporting better physician-patient interactions (OR=0.56, 95%CI=0.37-0.87) were negatively associated with depression. Patient's perceptions of staff disrespect (OR=2.30, 95%CI=1.19-4.47) and worse skin-related quality of life (OR=1.04, 95%CI=1.02-1.06) rendered higher risk. In multivariate analysis, only perception of staff disrespect (OR=2.35, 95%CI=1.06-5.17) and lower emotional support (OR=0.48, 95%CI=0.35-0.66) remained associated with depression.

Conclusions: Over one quarter of a predominantly Black population-based cohort of individuals with primary CCLE reported moderate to severe depression, a rate 3 to 5 times higher than those described previously in the general population from the same metropolitan Atlanta area. Our findings suggest that while patient' perceptions of discrimination in the healthcare setting may play a role as determinant of depression, social support may be protective. In addition to routine mental health screening and depression treatment, patients with CCLE and depression may benefit from interventions directed to provide emotional support and improve office staff interpersonal interactions.

1. Introduction

Dermatologic diseases can negatively influence health-related quality of life (QoL) and are associated with psychiatric comorbidity. Between 10-30% of patients with a dermatologic disease have depression, compared to 4-20% in the general population, and severe skin lesions increase the risk of suicidal ideation [1–5]. Despite these clinically significant associations, physicians treating patients with cutaneous disease have low sensitivity in detecting psychiatric disorders [4]. Depression also occurs in 20-60% of patients with systemic lupus erythematosus (SLE), compared to 10% in the general population [6–8], and skin manifestations have been found to be independently associated with depression in SLE [9]. However, depression has not been well characterized in isolated cutaneous lupus erythematosus (CLE).

Cutaneous lupus erythematosus (CLE) encompasses multiple conditions classified into acute (ACLE), subacute (SCLE), and chronic (CCLE) [10]. Research on primary CLE (CLE without systemic involvement) is scarce despite recent reports suggesting a higher incidence of primary CLE compared to SLE [11–13].

A recent French study examined mental health conditions in a sample of 74 patients with CCLE and 26 with SCLE restricted to the skin and showed a 44% lifetime prevalence of clinical depression [14]. A study in the U.S. indicated that 26.5% of patients with CLE seen in a dermatology clinic had depressive symptoms in need of psychiatric intervention [2]. Using self-reported data from a U.S. national household sample, a recent study estimated a 29.5% prevalence of depression among people with CLE [15], and a nationwide Danish study found a 2-fold increased risk of depression in individuals with CLE compared to the general population [16]. While these studies pointed to a high rate of depressive symptoms among people living with CLE, none accounted for potential differences in depression risk

across CLE conditions. Moreover, for CLE cases with associated SLE, whether the occurrence of depression was the consequence of systemic inflammation, as opposed to the primary skin condition was not determined.

CCLE is the most common subtype of CLE, making up 60-80% of CLE patients [11, 17]. Patients often exhibit greater skin damage and are less likely to present systemic manifestations compared to other CLE types [10, 18, 19]. Discoid lupus erythematosus (DLE), the hallmark of CCLE, often causes facial and body disfigurement, which could increase the risk of depression [10, 20]. However, little is known about the burden and risk factors of depression in patients with CCLE restricted to the skin.

Additionally, studies examining CCLE have included predominantly White subjects [18, 20, 21], despite recent findings indicating that Black individuals have higher susceptibility for this condition and experience earlier damage compared to White individuals [22, 23]. We examined the prevalence and severity of depressive symptoms in a population-based cohort of patients with primary CCLE from the Southeast U.S. Additionally, we explored demographic characteristics, socioeconomic resources, healthcare and disease-related factors associated with depression in this population.

2. Methods

2.1. Population

We conducted a cross-sectional analysis of data collected among patients with primary CCLE (DLE, lupus panniculitis [LEP], lupus tumidus [LET]), enrolled in the longitudinal Georgia Organized Against Lupus (GOAL) cohort. GOAL is a population-based cohort of predominantly Black individuals with lupus from the Southeast U.S. Details of recruitment and data collection have been published previously [24]. GOAL initially enrolled patients with SLE, primarily derived from the Georgia Lupus Registry (GLR). GLR is a population-based registry funded by the Centers for Disease Control and Prevention (CDC) designed to more accurately estimate the incidence and prevalence of SLE in metropolitan Atlanta, Georgia, where there is a large and socioeconomically diverse Black/White population [24, 25]. In 2014, GOAL received funding from the CDC to further enroll patients with CCLE or SCLE. Sources of recruitment of CLE patients have been the GLR, dermatology clinics of Emory Healthcare and Grady Healthcare, community dermatology practices in metropolitan Atlanta, and self-referrals through the Lupus Foundation of America, Georgia Chapter.

Participants recruited as CCLE went through a diagnosis validation process that included medical records review, physician-assessment, and skin-pictures review. To be classified as CCLE, patients must have had a well-documented diagnosis of DLE, LEP, or LET by their attending board-certified dermatologist, or a skin-examination and/or photographs compatible with those CCLE subtypes according to the study's dermatologist (LA) assessment. Because this study focuses on primary CCLE, we excluded participants with a rheumatologist-documented diagnosis of SLE or those who fulfilled >4 American College of Rheumatology criteria for SLE [26].

As part of GOAL data collection, validated patient-reported tools on a variety of social determinants of health and patient-centered outcomes are assessed annually. In this study, we analyzed data collected for baseline assessment.

2.2 Measures

2.2.1 Depression—We used the Patient Reported Outcomes Measurement Information System (PROMIS) Depression SF-8a to assess depression. PROMIS are generic instruments designed to be applicable across populations and medical conditions [27]. Because their flexibility and precision, several PROMIS measures have been evaluated in racially diverse samples with lupus, showing adequate reliability and validity [27–29]. PROMIS Depression was adopted by the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5) [30]. PROMIS Depression raw scores (range 8-40) were converted to standardized T-scores (range 0-100; population mean 50; standard deviation [SD] 10) through the HealthMeasures Scoring Service [31]. Higher scores indicate greater frequency of depressive symptoms. For this study, we used the PROMIS Depression cutoff scores estimated to correspond with the Patient Health Questionnaire-9 (PHQ-9) legacy measure through PROsetta Stone linking methodology [32, 33]. A PROMIS T-score ≥60 was used to define positive depression, corresponding with the PHQ-9 cutoff ≥10. A positive depression screen was further categorized as moderate (PROMIS T-scores 60-<65.9), and moderately severe to severe depressive symptoms PROMIS T-score ≥66), corresponding with PHQ-9 cutoff scores 10-14, and ≥15, respectively [32].

2.2.2 Demographics—Age, disease duration, gender, ethnicity, and educational attainment were self-reported.

2.2.3 Socioeconomic Resources—We assessed resources that may protect against depression, including marital status, employment, social support, and living above the poverty level [34]. PROMIS Social Support tools were used to assess emotional (confidant relationships or feelings validation), instrumental (assistance with materials, tasks, or cognition), and informational (advice or assistance) support [35]. PROMIS uses standardized T-scores (range 0-100; population mean 50; SD10) with higher T-scores representing more of the concept being measured. Living above the poverty level was calculated using the U.S. Census Bureau's 2011 estimates as cutoff for 100% poverty threshold.

2.2.4 Healthcare Factors—We assessed insurance and healthcare usage in the last year (visits to primary care physician [PCP], rheumatology, dermatology, and psychological counseling referral). Physician-patient interactions have been found to be associated with depression and disease severity in SLE [36, 37]. Consequently, we used the interpersonal processes of care (IPC-29) survey to assess patients' reports about three domains: physician-patient communication, shared decision-making, and physician/staff interpersonal style [38]. IPC-29 uses 5-point Likert scale questions that are scored as 7 separate scales [38, 39]. Scales represent positive (*e.g. elicited patient's concerns*) or negative (*e.g. hurried communication*) interactions with providers or staff. Higher scores (range 1-5) indicate

higher frequency of the construct (e.g. more frequent reports of *elicited patient's concerns* [positive construct], or *hurried communication* [negative construct]) [38].

2.2.5 Disease-Related Factors—We used Skindex-29+, a modified version of the validated Skindex-29 (Skindex © MM Chren, 1997) [40–42] to assess skin-related quality of life. Skindex-29+ is a 5-point Likert scale that uses 29 items to measure skin-related QoL (symptoms, emotions, functioning), and 3 questions on CLE-specific (photosensitivity and alopecia) domains [21]. Scores for each subscale range from 0 (never) to 100 (all the time), with higher scores indicating worse QoL. Permission to use Skindex-29+ was provided by Mapi Research Trust [43].

2.3 Statistical Analysis

Statistical Analysis Software (SAS) Version 9.4 was used for data analysis. Data were summarized using frequency for categorical variables and mean (SD) for continuous variables. Differences in depression means by sociodemographic and healthcare factors were tested using two-tailed, two-sample t-tests, or ANOVA. Associations between depression with demographics, socioeconomic, healthcare, and disease-related factors were explored using univariate logistic regression analyses. Multivariable regression analyses were then conducted using a purposeful selection process of covariates, with an entry criterion of $p<0.20$ based on univariate analysis. Purposeful selection was used to help guide the retention of significant covariates, given the exploratory nature of the study [44]. Moreover, we used bootstrap bagging methods to create a parsimonious model [45]. The bootstrap sample was analyzed using forward stepwise logistic regression with an entry criterion of $p<0.20$ and a retention criterion of $p<0.05$. Covariates were retained in the final model if they appeared in at least 45% of the models. Odds ratios (OR) with 95% confidence intervals (CI) were reported as measures of association.

3. Results

3.1 Study Population

Among 125 primary CCLE patients enrolled by August 2017, 106 completed the PROMIS Depression questionnaire and were included in this study. Descriptive characteristics are shown in Table 1. Our sample was majority female (86.8%) and Black/non-White (85.8%). The mean age and disease duration were 51.1 years old and 10.6 years, respectively. Educational attainment was nearly evenly distributed between ≤high school (44.8%) and some college or more (55.2%). Approximately one-fourth (24.5%) was married or lived with a partner. Nearly half (42.9%) were unemployed or disabled; 53.9% lived above the poverty threshold; 28.2% and 22.3% had private or Medicare insurance, 15.5% received Medicaid, 8.7% had both Medicare and Medicaid, and 25.2% were uninsured. Patients scored highest in CLE-specific and emotional Skindex-29+ measures and lowest in functioning. Nearly 90% of patients saw a PCP in the previous year, but only 11.4% were referred to psychological counseling. We did not find statistically significant differences in any independent variables between depression survey respondents (n=106) and non-respondents (n=19).

3.2 Depression Prevalence and Symptoms Severity

Twenty-eight participants (26.4%) screened positive for depression (T-score≥60), with 18 (17%) reporting moderate (T-score 60-65.9) and 10 (9.4%) moderately severe or severe (T-score≥66) depressive symptoms. Only 8 (29%) of those with moderate to severe depressive symptoms were referred to psychological counseling in the last year (data not shown). The average PROMIS Depression T-score for the overall cohort was 53.7 (SD 9.94).

3.3 Depression Scores by Independent Factors

Depression T-scores were significantly higher in patients younger than 60 and those with educational attainment ≤high school (Table 2). Depression scores were significantly lower in patients who were married/living with a partner, were employed/retired, lived above poverty status, or had insurance. Scores were also lower in patients who visited a PCP in the last year, though the difference was not statistically significant (p=0.06). No significant differences were found based on dermatologist or rheumatologist visits in the last year. Depression scores were significantly higher in patients who visited a psychiatrist or had been referred to psychological counseling in the last year. Patients whose disease duration ranged between 10-19 years had the highest depression scores.

Table 3 depicts the description of independent factors by depression and the univariate analyses results. No statistically significant associations were found between depression and demographic factors. Among social resources, being employed was inversely associated with depression (OR=0.24, p<0.01). Patients with higher scores across all social support types were less likely to be depressed: instrumental (OR=0.94, p=0.01), informational (OR=0.91, p<0.01), and emotional (OR=0.86, p<0.01) per 5 unit increase. Insured patients and those who visited a PCP in the last year were at lower risk of depression (OR=0.23, p<0.01; and OR=0.16, p<0.01, respectively). No significant differences were found for annual dermatology, psychiatry, or rheumatology visits. Depression was directly associated with worse reports of staff disrespect (OR=2.30, p=0.01) and inversely associated with better reports of physicians explaining labs/medications (OR=0.56, p=0.01). Among disease-related factors, Skindex-29+ symptoms, functioning, and CLE-specific domains were significantly associated with depression (ORs 1.04, p<0.01).

The full multivariate model (Table 4) included variables with p<0.20 in univariate regression. After controlling for covariates, emotional support and physicians explaining labs/medications remained inversely associated with depression. A higher IPC-29 score of perceived office staff disrespect was associated with higher depression risk. In the parsimonious model, emotional support remained inversely associated with depression (OR=0.48, p<0.01) and worse report of staff disrespect increased the risk (OR=2.35, p=0.04).

4. Discussion

In a population-based cohort of predominantly Black patients with primary CCLE from the Southeast U.S., 26.4% screened positive for moderate to severe depressive symptoms. This prevalence rate is higher than those reported by the CDC among a representative sample of

household residents drawn from the metropolitan Atlanta area (7.4%), as well as for females (5.6%) and Black individuals (4.9%) in that sample [46]. Our rate is also higher than those reported among European dermatology patients (10.1-14.1%) [1,3], and atopic dermatitis (17.1%) [47]; and comparable to those for CLE (26.5 to 29.7%) [2, 15], dermatomyositis (26.8%) [2], and SLE (20-47%) [7,9].

Depression in people with chronic conditions has been associated with adverse health behaviors, which in turn may lead to poor disease outcomes and increase healthcare utilization and costs [48]. As clinical depression is treatable and screening improves the accurate identification of patients with depression in primary care settings, the U.S. Preventive Services Task Force (USPSTF) recommends early detection, intervention and treatment to the general adult population [49]. In subspecialty clinics, depression screening and mental care referral can be challenging and may best be tackled integrating the social, psychological and biological aspects of the of the patient's experience.

Our findings underscore a biopsychosocial context associated with depression in a predominantly Black population with primary CCLE. As opposed to previous studies that reported a higher burden of depression in females and racial minorities from the general population [46, 50, 51], we did not find significant differences in either the risk or the severity of depressive symptoms by gender or race in our CCLE sample. A plausible explanation is the low numbers of White subjects and males in our cohort, which in turn reflects the demographic disparities of the patient population affected by primary CCLE in the Southeastern US [22]. We found that participants aged <60 had higher depression scores than those ≥60, paralleling the age-related psychological vulnerability described in the general population [52, 53]. Interestingly, patients with longer disease duration (10-19 years) had higher depression scores, contrasting with previous reports in patients with SLE, who had higher depression incidence within 3 years of diagnosis [9]. Our results suggest a link between social and biological factors that might lead to poorer disease control and increasing depressive symptoms in this population. Disease-related factors as measured by Skindex-29+ symptom severity, functioning, and lupus-specific domains were significantly associated with depression in the univariate analysis, consistent with previous reports of psychiatric comorbidity impacting QoL in skin disease and lupus outcomes in general [54, 55]. However, after controlling for other covariates, skin-related QoL no longer remained significant, suggesting that in this population, the social context may have a stronger impact on psychological disorders than skin-specific factors.

Socioeconomic resources (being married/living with a partner, employed, having health insurance) were associated with lower depression scores. These results are consistent with previous findings in the general population that support an association between depression and unemployment [56]. Because insurance is often provided as an employment benefit, these factors may be conflated. In consistency with recent studies in the general population, as well as among patients with SLE and other skin conditions, our findings suggest a protective role of social support on depression [57–59]. While in patients with SLE physical health limitations, unemployment, and lack of understanding of the disease by others may lead to social isolation and depression[58]; social stigma, low self-steem related to physical appearance, and limitations to develop outdoor recreational activities may pose significant

phychological challenges and barriers to interacting with others in the CCLE population [60, 61]. Our multivariate analysis showed that emotional support was the only social resource that independently reduced the risk of depression, suggesting that psychosocial interventions involving patients, as well as patients's family and friends may be beneficial to prevent or reduce depressive symptoms in patients with CCLE.

This study also highlights the importance of understanding the clinical environment and encounters as potentially modifiable factors for CCLE patients with depressive symptoms. After adjusting for covariates, poorer quality of interpersonal care processes, specifically perceived staff disrespect increased the odds of depression. In contrast, better physician communication was shown to be protective. Previous reports have described a negative impact of social stigma on the mental health of people with skin conditions [60, 62], and on the same vein, our findings suggest that perceived discrimination in the healthcare setting can potentially contribute to depressive symptoms in patients with CCLE. However, given the cross-sectional nature of our data, we cannot rule out that depression may negatively influence patients' perceptions about their encounters with providers and office staff [63, 64]. Elucidating the direction and underpinning mechanisms of these associations are of interest as they are potentially modifiable through staff training and provider education.

We found lower scores and reduced depression risk among CCLE patients who visited a PCP in the last year, underscoring the potentially valuable role of the primary care team in mental health management. This effect was not seen across other specialties, suggesting that primary care visits may protect against depression possibly due to the perception of the PCP as a component of the patient's support system. Moreover, PCPs are more likely to implement systematic early depression screening and management interventions, including antidepressant medication and referrals to psychotherapy, social, and care coordination resources [65]. As depression is a major factor associated with low medication adherence in lupus patients [66] and recent findings indicate that CLE patients with depression incur in higher utilization and costs related to Emergency Department visits and hospitalizations, compared to those without depression [15], connecting depressed CCLE patients to mental healthcare providers could be another area for care optimization in dermatology practices.

Our study has limitations, including the sample size, which may not have enough power to find statistically significant differences in relation to the number of covariates that were examined. The cross-sectional design does not allow to assess for causality. Moreover, because this is a population-based cohort, we primarily collected patient-reported data and did not conduct physician assessments of cutaneous activity and chronicity, location of lesions, or comorbidities, all which can potentially be linked to depression [15, 67]. However, we assessed skin-related QoL as a surrogate of disease severity, which has been shown to be a stronger predictor of psychiatric morbidity than physician-rated clinical severity in patients with cutaneous conditions [3]. Similarly, because we used a self-reported depression tool, some of those who screened positive for moderate to severe depressive symptoms may not be diagnosed with clinical depression. Moreover, this is a prevalent cohort and we were not able to examine time-dependent confounders that may have occurred before enrollment.

Our study has several strengths. First, to our knowledge, this is the first description of depression in a large and predominantly Black population with primary CCLE. Prior studies that assessed psychiatric comorbidity in CLE included patients with a heterogeneous spectrum of CLE conditions or cases with systemic manifestations of lupus [2, 14–16, 20]. Given that depression is highly prevalent and potentially associated with inflammation in SLE [8–9], the mental health of CLE may be influenced not only by the wide variety of cutaneous phenotypes but also by the presence of systemic symptoms. By assessing patients with primary CCLE (without systemic involvement), we establish the foundation to identify aspects of depression that may be more specific to CCLE subpopulations, where illness is primarily characterized by visible and permanent skin lesions. In addition, our study is demographically unique, consisting of majority Black women and a wide range of socioeconomic levels and degrees of social support, providing broader reflection of the patient population affected by CCLE in the US [22].

5. Conclusion

Our study underscores the high prevalence of depressive symptoms in a predominantly Black cohort of individuals with primary CCLE. We identified individual, clinical, and social factors that can serve to inform future research and interventions to address depression in patients with CCLE. Our data suggest that in addition to depression screening and management, interventions to train healthcare staff on courteous interpersonal interactions and enhanced emotional support throughout patients' networks may contribute to reduce psychiatric comorbidity in vulnerable populations with primary CCLE. These results encourage hypothesis generation and further study regarding biological and psychosocial determinants of mental health in CCLE.

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Key Points

- Little is known about depression in chronic cutaneous lupus erythematosus (CCLE).
- Over a quarter of patients with primary CCLE reported moderate to severe depressive symptoms.
- Depressive symptoms in this predominantly Black population were more likely related to psychosocial interactions than socioeconomic or disease-related factors.
- Patients with CCLE may benefit from mental healthcare, effective interpersonal interactions in the clinical setting, and emotional support.

Table 1.

Description of 106 Patients with Chronic Cutaneous Lupus Erythematosus

Characteristic	Value
Age at Survey, mean (SD), years	51.1 (13.3)
Disease Duration, mean (SD), years	10.6 (9.0)
Female Sex (%)	92 (86.8)
Race (%)	
Black/African-American or Non-White *	91 (85.8)
White	15 (14.2)
Education Level (n = 105) mean (SD), years (%)	13.5 (2.8)
High School or Less, ≤12	47 (44.8)
Some College, 13-15	25 (23.8)
College or Above, ≥16	33 (31.4)
Marital Status (%)	
Married or Living with Partner	26 (24.5)
No Partner Δ	80 (75.5)
Current Work Status (n = 105) (%)	
Employed (Full or Part-Time)	40 (38.1)
Retired/Homemaker/Student	20 (19.0)
Unemployed/Disabled	45 (42.9)
Living above the Poverty Line ^	48 (53.9)
Insurance Status (n = 103) (%)	
Uninsured	26 (25.2)
Private	29 (28.2)
Medicare	23 (22.3)
Medicaid	16 (15.5)
Medicare/Medicaid	9 (8.7)
Skin-Specific Quality of Life (Skindex-29+) (SD)	
Emotions	55.3 (31.8)
Symptoms	48.2 (24.9)
Functioning	37.3 (30.7)
CLE-Specific Questions	65.2 (29.2)
Seen Provider in Last 12 Months (%)	
Primary Care Physician	95 (89.6)
Dermatologist	70 (66.7)
Psychiatrist	21 (20.0)
Rheumatologist	64 (61.5)
Referred to Psychological Counseling	12 (11.4)
PROMIS Depression Score, mean (SD)	53.7 (9.9)

Characteristic	Value
Negative (T-score <60)	78 (73.6)
Positive (T-score ≥60)	28 (26.4)

Values indicate N (%), unless otherwise specified.

* non-White includes: American Indian (n=1), Asian (n=2), Hispanic/Latino (n=2), and other (n=1).

Δ Separated, divorced, widowed, or never married;

^ Data collected for 89 participants.

Abbreviations: SD, standard deviation; CLE, cutaneous lupus erythematosus.

Table 2.

Severity of Depressive Symptoms by Sociodemographic, Healthcare and Disease-Related Factors

Variable	Subjects N	Depression Score^ mean (SD)	p-value
Demographics			
Gender			
Male	14	53.4 (6.97)	0.90
Female	92	53.8 (10.4)	
Age at Survey (years)			
≤39	23	55.9 (10.2)	<0.01
40-59	59	55.1 (9.77)	
≥60	24	48.1 (8.35)	
Race			
Black & non-White*	91	54.2 (9.84)	0.21
White	15	50.7 (10.5)	
Educational attainment (years)			
High school or Less (≤12)	47	55.7 (9.74)	0.02
Some College (13-15)	25	54.5 (10.6)	
College or Above (≥16)	33	49.8 (8.60)	
Socioeconomic Resources			
Marital Status			
Married/Living with Partner	26	49.6 (8.97)	0.01
No PartnerΔ	80	55.0 (9.93)	
Work Status			
Employed (Full/Part-Time)	40	51.3 (8.37)	<0.01
Retired/Homemaker/Student	20	49.0 (9.48)	
Unemployed/Disabled	45	58.1 (10.0)	
Living above the Poverty Line			
Yes	48	51.2 (10.5)	0.04
No	41	55.5 (8.84)	
Healthcare Factors			
Insurance Status			
Insured	80	52.4 (9.77)	0.02
Uninsured	26	57.8 (9.56)	
Type of Insurance			
Medicaid	26	54.2 (10.6)	0.05
Medicare	26	50.2 (9.96)	
Private	28	52.8 (8.72)	
Uninsured	26	57.8 (9.56)	
Visited a Primary Care Physician$\Diamond$			

Variable	Subjects N	Depression Score^ mean (SD)	p-value
Yes	95	53.1 (9.65)	0.06
No	11	59.0 (11.4)	
Visited a Dermatologist◊			
Yes	70	55.8 (8.95)	0.15
No	35	55.8 (11.7)	
Visited Psychiatrist◊			
Yes	21	59.7 (9.99)	<0.01
No	84	52.3 (9.47)	
Visited Rheumatologist◊			
Yes	40	54.4 (9.72)	0.41
No	64	52.7 (10.6)	
Referred to Psychological Counseling◊			
Yes	12	63.1 (8.5)	<0.01
No	93	52.5 (9.5)	
Disease-Related Factors			
Disease Duration (years)			
≤4	37	50.6 (8.96)	0.04
5-9	25	54.7 (9.63)	
10-19	24	58.1 (9.64)	
≥20	18	52.8 ± 11.6	

^PROMIS Depression SF8a T-score (higher values indicate greater depression symptoms; cutoff T-score for moderate to severe depression is ≥60);

ΔSeparated, divorced, widowed, or never married;

◊in the last 12 months.

Abbreviations: SD, standard deviation.

Table 3.

Factors Associated with Depression in Chronic Cutaneous Lupus Erythematosus

Variable	Depression[Δ]		Odd Ratio[^] (95%CI)	P value
	Yes (n=28)	No (n=78)		
Demographics				
Age (years), mean ± SD	47.4 ± 11.1	52.4 ± 13.9	0.87 (0.74 - 1.02)	0.09
Disease Duration (years), mean ± SD	11.2 ±7.5	10.4 ± 9.5	1.05 (0.83 - 1.34)	0.66
Gender (female)	25 (89.3)	67 (85.9)	1.37 (0.35 - 5.31)	0.65
Black/Non-White Race	26 (92.9)	65 (83.3)	2.60 (0.55 - 12.33)	0.23
Graduated High School	13 (48.2)	45 (57.7)	0.68 (0.28 - 1.64)	0.39
Socioeconomic Resources				
Married/Living with Partner	3 (10.7)	23 (29.5)	0.29 (0.08 - 1.05)	0.06
Currently Employed	9 (32.1)	51 (66.2)	0.24 (0.10 - 0.61)	<0.01
Living Above the Poverty Level	9 (42.9)	39 (57.4)	0.56 (0.21 - 1.50)	0.25
PROMIS Instrumental Support (5-unit ↑)	47.2 ± 10.0	53.0 ± 9.64	0.94 (0.90 - 0.99)	0.01
PROMIS Informational Support (5-unit ↑)	43.4 ± 12.0	54.9 ± 9.74	0.91 (0.87 - 0.95)	<0.01
PROMIS Emotional Support (5-unit ↑)	42.9 ± 9.59	55.3 ± 8.06	0.86 (0.81 - 0.92)	<0.01
Healthcare Factors				
Currently Insured	15 (53.6)	65 (83.3)	0.23 (0.09 - 0.60)	<0.01
Visited Primary Care Physician[◊]	21 (75.0)	74 (94.9)	0.16 (0.04 - 0.61)	<0.01
Visited Dermatologist[◊]	15 (53.6)	55 (71.4)	0.46 (0.19 - 1.13)	0.09
Visited Psychiatrist[◊]	7 (25.0)	14 (18.2)	1.50 (0.53 - 4.21)	0.44
Visited Rheumatologist[◊]	15 (53.6)	49 (64.5)	0.64 (0.26 - 1.53)	0.31
IPC-29 Hurried Communication (1-unit ↑)	2.12 ± 0.85	1.84 ± 0.87	1.43 (0.83 - 2.33)	0.16
IPC-29 Elicited Patient's Concerns (1-unit ↑)	3.80 ± 0.88	4.14 ± 0.81	0.61 (0.37 - 1.03)	0.07
IPC-29 Explained Labs/Meds (1-unit ↑)	3.53 ± 1.03	4.14 ± 0.97	0.56 (0.37 - 0.87)	0.01
IPC-29 Shared Decision Making (1-unit ↑)	2.98 ± 1.42	3.34 ± 1.31	0.81 (0.59 - 1.13)	0.21
IPC-29 Compassionate/Respectful (1-unit ↑)	3.73 ± 0.93	4.04 ± 0.96	0.73 (0.47 - 1.13)	0.16
IPC-29 Discriminated (Race/SES) (1-unit ↑)	1.61 ± 0.59	1.36 ± 0.67	1.71 (0.89 - 3.27)	0.11
IPC-29 Office Staff Disrespect (1-unit ↑)	1.63 ± 0.73	1.26 ± 0.58	2.30 (1.19 - 4.47)	0.01
Disease-Related Factors				
Skindex-29+ Symptoms	63.6 ± 20.9	42.6 ± 24.0	1.04 (1.02 - 1.06)	<0.01
Skindex-29+ Functioning	60.0 ± 28.7	29.1 ± 27.3	1.04 (1.02 - 1.05)	<0.01
Skindex-29+ Lupus Measure	82.7 ± 22.1	58.9 ± 29.0	1.04 (1.02 - 1.06)	<0.01
Disease Duration (years), mean ± SD	11.2 ± 7.5	10.4 ± 9.5	1.05 (0.83 - 1.34)	0.66

[Δ] Values for each variable indicate N (%) unless otherwise specified;

[◊] in last 12 months;

[^] calculated with logistic regression analysis.

Cutoff score for depression is based on a T-score ≥60 for the PROMIS Depression SF8a. IPC-29: Interpersonal Processes of Care-29 Survey; SES: socioeconomic status. Abbreviations: SD, standard deviation.

Table 4.

Factors Associated with Depression. Multivariate Analysis

	Full Model		Parsimonious Model*	
Variable	**Odds Ratio (95% CI)**	**p-value**	**Odds Ratio (95% CI)**	**p-value**
Demographics				
Age (5-year ↑)	0.97 (0.68 - 1.39)	0.86		
Socioeconomic Resources				
Married/Living with Partner	0.98 (0.09 - 11.0)	0.98		
PROMIS Instrumental Support (5-unit ↑)	1.02 (0.56 -1.84)	0.95		
PROMIS Informational Support (5-unit ↑)	1.19 (0.65 - 2.18)	0.57		
PROMIS Emotional Support (5-unit ↑)	0.38 (0.15 - 0.95)	0.04	0.48 (0.35 - 0.66)	<0.01
Healthcare Factors				
Currently Insured	0.26 (0.04 - 1.84)	0.18		
Visited Primary Care Physician◊	0.10 (0.01 - 1.49)	0.10		
Visited Dermatologist◊	0.46 (0.08 - 2.49)	0.37		
IPC-29 Hurried Communication (1-unit ↑)	0.46 (0.11 - 1.86)	0.27		
IPC-29 Elicited Patient Concerns (1-unit ↑)	0.96 (0.28 - 3.24)	0.94		
IPC-29 Explained Labs/Meds (1-unit ↑)	0.35 (0.12 - 1.04)	0.06		
IPC-29 Compassionate/Respectful (1-unit ↑)	1.49 (0.30 - 7.49)	0.63		
IPC-29 Discriminated (Race/SES) (1-unit ↑)	1.96 (0.46 - 8.44)	0.36		
IPC-29 Office Staff Disrespect (1-unit ↑)	4.32 (1.16 – 16.1)	0.03	2.35 (1.06 – 5.17)	0.035
Disease-Related Factors				
Skindex-29+ Symptom (1-unit ↑)	1.01 (0.95- 1.07)	0.73		
Skindex-29+ Functioning (1-unit ↑)	1.01 (0.96 - 1.06)	0.81		
Skindex-29+ Lupus Measure (1-unit ↑)	1.02 (0.98 - 1.07)	0.32		

*Variables were selected if they met >45% reliability by bootstrap bagging methods.

Abbreviations: CI, confidence interval; IPC-29, Interpersonal Processes of Care-29 Survey;

◊in last 12 months.

Cutoff score for depression is based on a T-score ≥60 for the PROMIS Depression SF8a.