Retrospective Study
Analysis of Status and Influencing Factors of Mental Health in Patients with Systemic Lupus Erythematosus

Zhang X et al. Systemic lupus erythematosus

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Abstract
BACKGROUND
Systemic lupus erythematosus (SLE) is a heterogeneous autoimmune disorder with varied clinical courses and prognoses, not only did the patients suffer from physical impairment, but also various physical and psychiatric comorbidities. Growing evidence have suggested that mental disorders in SLE patients, can lead to various adverse consequences.

AIM
This paper explored the features and influencing factors of mental health in patients with SLE and clarifying the correlations between mental health and personality characteristics and perceived social support. The results would provide a basis for psychological intervention in patients with SLE.

METHODS
The clinical data of 168 patients with SLE admitted at the First Affiliated Hospital of Hainan Medical University between June 2020 and June 2022 were collected. Psychological assessment and correlation analysis were conducted using the Symptom Checklist-90 (SCL-90) and Perceived Social Support Scale (PSSS), and the collected data were compared with the national norms in China. The relevant factors influencing mental health were identified by statistical analysis. A general information questionnaire, the Revised Life Orientation Test (LOT-R), and Short-Form 36-Item Health Survey (SF-36) were employed to assess optimism level and quality of life, respectively.

RESULTS
Patients with SLE obtained higher scores for the somatization, depression, anxiety, and phobic anxiety subscales than national norms (P < 0.05). A correlation was identified between total social support and total SCL-90 score or each subscale (P < 0.05). The factors significantly affecting patients’ mental health were hormone dosage and disease activity index (P < 0.05). The average optimism score of patients with SLE was 14.36 ± 4.42, and 30 cases were in the middle and lower levels. A positive correlation was found between optimism level and quality of life scores.

CONCLUSION
Patients with SLE develop psychological disorders at varying degrees, which are significantly influenced by hormone dosage and disease activity index. Patients’ mental health should be closely monitored during clinical diagnosis and treatment and provided adequate support in establishing positive, healthy thinking and behavior patterns and improving their optimism level and quality of life.

**Key Words:** Systemic lupus erythematosus; Mental health; Quality of life; Influencing factors

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**Core Tip:** Patients with SLE suffer from various physical and psychiatric comorbidities. These serious forms of the disease can significantly impair activities of daily living and social roles. The identification of the factors that trigger these complications enables the causes to be determined and measures to be implemented to improve patient health.

**INTRODUCTION**

SLE is a heterogeneous autoimmune disorder with varied clinical courses and prognoses [1]. The signs and symptoms can be inconspicuous or apparent, and the disease can affect one or multiple organ systems [2,3]. The high heterogeneity of clinical presentation and autoantibody profiles in SLE pose challenges in clinical decision making. The onset and progression of SLE is generally attributed to genetic factors, environmental exposure, and gene-environment interactions that trigger the collapse of adaptive and innate immunity [4,5]. While SLE is highly prevalent in young women, it can affect patients of any sex or age [6]. SLE can cause arthritis, serositis, nephritis, rash, scar, pigmentation, skin depression, hair loss, and neuropsychiatric problems, seriously impacting patients’ quality of life (QoL) [7-10]. However, in addition to physical impairment, patients with SLE often suffer from various physical and psychiatric comorbidities [11,12]. Patients are at increased risk for mental disorders, including depression and anxiety, due to prolonged illness or long-term use of glucocorticoids (GCs) [13]. The prevalence of depression and anxiety in patients with SLE range from 2.1%–78.6% and 2.9%–84.9%, respectively [14]. More serious cases are accompanied by hallucinations, delusions, suicidal ideation, and other mental disorders and behavioral abnormalities. Studies have linked interactions among
depression, anxiety, and SLE to an increased risk of suicidal ideation, low compliance to treatment, and dysfunction [15, 16]. Growing evidence indicates that mental disorders, especially depression, in patients with SLE can cause multiple adverse outcomes, such as fatigue, neurocognitive difficulties, functional disability, subclinical atherosclerosis, and reduced health-related QoL. In fact, serious forms of the disease can be highly detrimental to activities of daily living and social roles. In a cross-sectional analysis of 80 patients with SLE conducted by Nowicka-Sauer et al [17], anxiety and depression together explained 43% of the differences in disease perception. Therefore, identifying the factors that trigger these complications helps determine the causes and allows the reasonable adjustment of these factors to improve patient health.

Despite the large number of patients with SLE in China, understanding of their mental health is limited. Therefore, we investigated and analyzed the psychological status, perceived social support, and dispositional optimism of patients with SLE to improve understanding of their mental health status and the influencing factors. The data would provide evidence for the development of treatment and intervention.

MATERIALS AND METHODS

Study subjects

The clinical data of 168 patients with SLE treated in the First Affiliated Hospital of Hainan Medical University, were collected. The eligibility criteria were as follows: (1) met the criteria for the revised American College of Rheumatology for SLE; (2) age ≥ 18 years; (3) ability to read, understand, and complete forms; (4) voluntary enrollment; and (5) complete clinical data. The exclusion criteria were as follows: (1) Age < 18 years; (2) severe heart, brain, lung, kidney, and hematopoietic system damage; (3) hypertension, heart disease, diabetes, and other chronic diseases; and (4) mental illness and cognitive impairment.

Investigation methods
The clinical data collected from patients included age, sex, education level, and course of disease. Questionnaires and individual interviews were used to investigate the following items:

(1) An assessment of patients’ mental health status relative to national norms was performed using the Symptom Checklist 90 (SCL-90), a scale covering 90 symptoms categorized into 9 subscales (i.e., somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism). The scale adopts a 5-point scoring system, with 0, 1, 2, 3, and 4 points indicating a little bit, moderately, quite a bit, and extremely, respectively.

(2) Perceived social support: the adequacy of perceived social support was assessed using the PSSS; Cronbach’s α coefficient: 0.90), which consists of 12 items that assess two sources of support (friend and family) and scored on a 5-point Likert scale. The possible total score ranges from 12 to 84 and is classified as low (12–36), intermediate, (37–60), or high (61–84).

(3) Optimism level: Optimism level was assessed using the Chinese version of the Revised Life Orientation Test (LOT-R; Cronbach’s α coefficient: 0.72). The test consisted of 10 items, with 3 measuring optimism, 3 measuring pessimism, and 4 as fillers that are not scored. The other items are scored using a 5-point Likert scale, with the options ranging from “I strongly disagree (0 points)” to "I strongly agree (4 points)” and a maximum total score of 24 points. The score is positively associated with the optimism level. A total score of ≤13, 14–18, or 19–24 indicates a low, moderate, or high dispositional level of optimism, respectively.

(4) Short-Form 36-Item Health Survey (SF-36): We used the SF-36 (Cronbach’s α coefficient: 0.80) to assess patients’ health status. The scale includes 36 items on 8 dimensions, including physical/social functioning (PF/SF), physical/emotional role (RP/RE), bodily pain (BP), general/mental health (GH/MH), and vitality (VT). Each dimension has a score range of 0–100, with higher scores indicating better functional status and QoL for that dimension.

Data gathering
Two nurses who participated in this study were selected as investigators and underwent unified training from the researchers. Questionnaires were distributed to patients by the researchers and investigators. The purpose and significance of the study, content of the survey, and method of completing the questionnaire were explained in detail to the patients with unified guidance. The questionnaire was distributed after obtaining the consent. During the questionnaire survey, any questions were answered on the spot, but no suggestions or hints were given. The questionnaire was anonymous and was returned on the spot after completion. In total, 168 of 180 questionnaires distributed were retrieved, with an effective recovery rate of 93.3%.

Statistical analyses
After reviewing all the data, statistical analyses and data entry were performed using SPSS 25.0. Continuous variables conforming to a normal distribution were expressed as mean ± standard deviation (SD), and the t-test was used for statistical analysis. If nonnormally distributed, the data were expressed as median and interquartile range and compared using the rank-sum test. Categorical variables were expressed as number and percentage and analyzed using the chi-square test. Pearson correlation analysis was performed. P < 0.05 was considered statistically significant.

RESULTS
General information
In total, 168 of 180 (93.3%) questionnaires distributed were retrieved. Of the 168 participants, 38 were male and 130 were female, aged 18–63 years (mean ± SD: 36.33 ± 10.23 years), and had a disease course ranging from 2 months to 8 years (mean ± SD: 3.57 ± 2.43 years) (Table 1).

SCL-90 evaluation results
Compared with the national norms, the SCL-90 scores of the 168 patients with SLE were higher in the somatization, depression, anxiety, and phobic anxiety subscales (Table 2). Correlation of SCL-90 score with disease course, hormone dosage, and disease activity index
Factors with significant differences in Table 2 were selected to analyze their correlation with disease duration, hormone dosage, and disease activity index (DAI). Hormone dosage was strongly correlated with the total, somatization, depression, and anxiety scores (P < 0.05). A significant association was also found between DAI and individual scores of all factors (P < 0.05) but not between disease course and SCL-90 score (P > 0.05; Table 3).

**Correlation between total social support and SCL-90 scores**
Among the 168 patients with SLE assessed by PSSS, the scores for total social support, family support, and friend support were 60.65 ± 7.61, 24.61 ± 2.03, and 36.04 ± 7.39 points, respectively. The total social support and friend support scores were negatively correlated with the total and subscale SCL-90 scores (P < 0.05). The family support score was significantly correlated with obsession-compulsion, interpersonal sensitivity, depression, and psychoticism subscale scores (P < 0.05; Table 4).

**Optimism level and QoL scores**
The total optimism score of the 168 patients with SLE was (14.36 ± 4.42), with low, medium, and high levels of optimism found in 30 (17.8%), 26 (15.5%), and 112 (66.7%) patients, respectively. The 168 patients obtained lower SF-36 scores in all dimensions than the national norms (Table 5).

**Correlation between optimism level with QoL**
The optimism level of patients with SLE was positively correlated with physical functioning, general health, vitality, social functioning, and mental health scores on the SF-36 scale (P < 0.05; Table 6).

**DISCUSSION**
So far, SLE has not been fully clarified etiologically. Due to disease recurrence, unsatisfactory therapeutic effect, high financial burden, and other unfavorable factors, patients with SLE develop significant negative emotions during treatment that seriously affect their physical and mental health [18]. Despite progress in diagnosis and treatment, patients with SLE have a high prevalence of mental health disorders that profoundly
impact QoL, leading to an increase in disability and premature death \[19\]. Hence, monitoring their mental health and analyzing the influencing factors is crucial.

In this study, SCL-90 was used to evaluate the psychological status of 168 patients with SLE relative to the 2006 national norms in China. The results showed significantly higher somatization, depression, and anxiety scores in patients with SLE vs the national norms, indicating worse mental health in patients with SLE than the general population. Hormone dosage and DAI were identified as important influencing factors. SLE is a chronic disorder with a long disease course and recurrence. Drug treatment can induce multiorgan side effects, and hormone use may cause facial changes, which in turn predispose patients to psychological problems, such as anxiety, fear, loneliness, and depression \[20\]. In some studies, DAI, especially diseases of the cutaneous mucous membrane and musculoskeletal areas, has been associated with increased symptoms of depression and anxiety \[21, 22\]. However, higher disease activity in SLE has not been associated with depression and anxiety \[23-25\]. However, our study found that the level of disease activity was significantly related to psychological scores, such as those for depression and anxiety. We believe that the higher the disease activity, the more serious the dysfunction in various systems and organs of the body and the worse the psychological status and QoL. Nery et al \[26\] reported that disease activity in SLE as determined using the systemic lupus erythematosus DAI (SLEDAI) was related to depression severity. In addition, GCs, both immunosuppressants and biologics, have always been the cornerstone of SLE treatment \[27\]. However, long-term use of GCs may cause irreversible organ impairment, leading to QoL decline and even increased mortality. For instance, the risk increases significantly when the prednisone maintenance dose is more than 7.5 mg/day; however, lower doses have also been demonstrated to be potentially harmful \[28-30\]. Therefore, the hormone dosage also affects patients’ physical and mental health.

We also evaluated patients’ optimism level and QoL. The average optimism level score of the 168 patients with SLE was 14.36 ± 4.42. Among them, 30 (17.8%) had a low optimism level, 112 (66.7%) had a medium optimism level, and 26 (15.5%) had a high
optimism level. Optimism is an important component of psychological reserve ability and plays a vital role in regulating patients’ physiological function and psychological state. A sense of optimism helps patients cope with the heavy burden associated with chronic diseases, thereby alleviating the physical and mental pain caused by disease. On the contrary, pessimistic and negative coping strategies may affect patients’ medication compliance. A low optimism level can worsen the patient’s fragile psychology, resulting in ineffective responses to the problems associated with or caused by the disease, inducing anxiety and depression, aggravating the disease burden, and even inducing suicidal thoughts in serious cases. The scores for all dimensions of the QoL scale were lower than those of the national norms, indicating that patients with SLE have a lower QoL. Subsequently, optimism level was positively correlated with QoL, similar to the findings of Kepka et al. Those with lower optimism levels are more likely to use abnormal and inappropriate coping strategies when faced with stressful events, resulting in lower QoL scores. However, optimism level had little effect on PF and BP, possibly because the SF-36 components are mostly objective and less affected by individual patients’ psychological resilience, optimism, and response pattern to threats. Therefore, encouraging patients to maintain an optimistic and balanced state of mind is conducive to their development of a corresponding psychological reserve, thereby alleviating anxiety and depression symptoms and enabling patients to calmly face the burden brought by diseases and improve their QoL. However, this study has some limitations. The results obtained in this study only provide a theoretical explanation of the psychological state of patients with SLE. Intervention measures should be implemented according to the severity of the psychological disorder. Thus, further longitudinal studies and interventional trials are warranted to validate the current findings and confirm the efficacy of tailored psychological interventions in improving mental health outcomes among patients with SLE.

CONCLUSION
In conclusion, patients with SLE develop psychological disorders, among which somatization, depression, anxiety, and phobic anxiety are the most significant. Hormone dosage and DAI are significant factors influencing mental health. In clinical practice, medical staff should be patient-centered, understand the disease burden of patients in all aspects, and consider the psychological distress of patients while monitoring disease activity and severity.
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