Illness perception in systemic lupus erythematosus patients: The roles of alexithymia and depression

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1. INTRODUCTION

Illness perception contributes significantly to the impairment of an individual's ability to manage illness, which implies a dramatic change in lifestyle and documented decline in functional ability and quality of life. This is true also for individuals with systemic lupus erythematosus (SLE), a chronic and complex multisystem disease characterized by a relapsing and remitting clinical course, which often involves major organ system impairment that affects the skin, joints, kidneys, heart, and nervous and hematopoietic systems [1].

The management of SLE is complex and requires treatment adherence and significant lifestyle adjustment. It is important to consider subjective illness representations, based on implicit beliefs, which influence the individual's manner of coping with the disease and adherence to treatment and affect psychological well-being [2,3].

The role of emotion regulation has recently received attention in psychological research and has been recognized by many authors as a relevant addition to existing psychological concepts in the interface between psychology and health [4-11]. In the field of autoimmune diseases, Middendorp et al. [14, 15] emphasized that the style of emotion regulation used may affect health in rheumatoid arthritis (RA) patients in that the regulation of emotional responses plays a significant role in facing the challenge of adjusting to adverse health symptoms and the resultant consequences. They posited that emotion regulation is of importance in psychological well-being and social functioning, and most importantly, predicted changes to perceived health in RA patients. According to these authors, the way in which the illness was perceived was a relevant aspect of functioning in RA patients, which may influence help-seeking behavior, reporting symptoms, and adherence to drug treatment.

Despite the evidence concerning the importance of emotion regulation, to our knowledge, no studies have examined the role of emotion regulation in relation to illness perception in SLE. More generally, a review of the literature suggests that references to emotion regulation and alexithymia in SLE are very scarce. This is a matter of concern, as Barbosa et al. [16, 17, 18] and our previous study [19] emphasized the role and high prevalence of alexithymia in SLE. In particular, Barbosa et al. [16] found that alexithymia was associated with psychological distress and quality of life impairment in SLE and concluded that understanding the role of psychological factors may contribute to a more

comprehensive understanding of SLE, its impact on patients' daily lifestyles, and patients' emotional adaptation to the disease.

Research involving SLE patients and previous prospective and experimental studies involving other patients have shown that emotion regulation influenced perceived health, and emotional styles were stable and unaffected by fluctuations in health [8, 9, 16-18, 20]. In addition, Hanly [21] emphasized disease activity, cumulative damage, and quality of life as independent dimensions of health status in SLE patients. Studies conducted by Sharpe et al. [22] and Kojima et al.[23, 24] examining other autoimmune pathologies (e.g., RA) demonstrated the importance of psychological factors and their relative independence from physical findings, which failed to reflect perceived physical or emotional quality of life.

Among the various features of psychological distress evidenced in SLE patients, depressive disorders are the most frequently observed psychiatric manifestations in the literature. Depressive symptoms are estimated to afflict 11–71% of patients with SLE, and one study reported a 47% lifetime prevalence of depressive disorders in lupus patients [25]. However, findings from studies investigating the link between depressive symptoms and SLE patients' disease activity are inconclusive [26].

Various studies suggest the presence of a link between alexithymia and depressive symptoms. For example, alexithymia has been associated with depression in chronic pain patients [27]. Honkalampi et al. [28] highlighted the link between alexithymia and depression, suggesting that alexithymia was factor in vulnerability to the development and promotion of depressive symptoms, and emphasized the role of alexithymia as a dysfunctional regulatory system that promotes depression. According to this line of thought and research, Lee et al. [29] described a significant link between alexithymia and depressive symptoms. Similarly, Marchesi et al. [30] suggested that depression and alexithymia are separate constructs that may be closely related.

Given the above findings, our study aimed to examine the relationships between alexithymia, depression, and illness perception in SLE patients. In particular, we hypothesized that, in SLE patients 1) alexithymia would be correlated with a negative perception of illness and 2) depression would be a mediator in this relationship.

In addition we tested these hypotheses while controlling for the effect of certain clinical indicators (i.e., organ damage, disease activity, and disease duration) [31-33] and participants' educational levels [34-36], which have shown significant links with clinical outcomes in SLE and may be associated with illness perception in SLE patients. To our knowledge, this is the first study to assess the interrelationships between alexithymia, depression, and illness perception.

2. MATERIALS AND METHODS

2.1 Participants

The study participants were consecutive SLE patients (N=100; 90% females) attending the outpatient clinic of the rheumatology unit at the University of Pisa. The inclusion criteria were age older than 18 years and a definite diagnosis of SLE. The exclusion criteria were as follows: any severe cognitive deficits and psychotic or agitated states that would prevent the subject from being interviewed or completing self-report questionnaires, neurological manifestations of SLE, and serious concomitant organic diseases other than those secondary to SLE (e.g., antiphospholipid syndrome or systemic arterial hypertension). All participants were aged between 21 and 66 years. The approved protocol was explained to participants, and they provided written informed consent to participate in the study. Thereafter, they completed a sociodemographic questionnaire and a short clinical interview was conducted to assess clinical information regarding present and past psychiatric and medical conditions; participants then completed a self-report questionnaire including the Toronto Alexithymia Scale (TAS-20) [37,38], Beck Depression Inventory (BDI-II) [40], and Illness Perception Questionnaire-Revised (IPQ-R) [41] to assess alexithymia, depression, and illness perception, respectively. On the same day, a rheumatological examination was performed to evaluate disease activity and damage. Disease duration was also recorded. Study variables were tested for possible gender differences using t-test (correcting for multiple comparisons): no significant differences emerged. Given the lack of significant gender differences and the relatively low number of male patients, we conducted the subsequent analyses on the whole sample.

2.2 Measures

Disease activity was evaluated using the European Consensus Lupus Activity Measure (ECLAM), and damage was assessed using the Systemic Lupus International Collaborating Clinics/American College of Rheumatology Damage Index (SLICC/ACR). The ECLAM score assesses disease activity over a period of 30 days, with scores ranging from 0 to 10. An ECLAM score of >2 was considered indicative of active disease. The SLICC/ACR score was analyzed as a dichotomous variable, with participants grouped according to damage, as follows: no damage (SLICC/ACR score of 0) and damage (SLICC/ACR score ≥1).

The TAS-20 [37,38] is a frequently used 20-item self-report measure of alexithymia. The psychometric properties of the scale have been validated across cultures. Cutoff criteria differentiating between alexithymic (>61) and nonalexithymic individuals (0–60) have been established and are widely used [37].

The BDI-II [40] is a self-administered tool used to screen for, and assess the severity of, depression. The BDI-II includes 21 items with a list of four statements regarding particular symptoms of depression, arranged in increasing severity according to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition criteria for depression. Each item is scored from 0 to 3, yielding a total possible score of 63. A score of ≥14 indicates the presence of mild to moderate symptoms of depression.

The IPQ-R [41] was used to measure patients' illness perception. It has demonstrated good reliability and validity across several illnesses and includes nine dimensions. This study used seven of the nine subscales of the IPQ-R including timeline-acute/chronic (perceived duration, acute or chronic*);* timeline-cyclical (the degree of predictability of an illness); control/curability (degree of control over the illness and the extent to which the illness is considered curable); personal control (beliefs regarding one's ability to control symptoms); treatment control (belief that treatment is an effective means of controlling the illness); emotional representations; illness coherence; and consequences. The majority of research investigations have measured illness perception using the revised IPQ-R. Questions pertaining to the final two dimensions, illness identity (the extent to which an illness diagnosis influences identity), and cause (perception pertaining to the cause of an illness)

were omitted from the scale. Identity was not critical to the aim of our study, as participants were recruited via outpatient rheumatology disease consultations at a university hospital, which all members attend subsequent to diagnosis. The cause subscale was deemed inappropriate as the etiology of lupus remains unknown [3].

2.3 Data analysis

Descriptive statistics were produced for each study variable; means and standard deviations were computed for continuous variables, while percentages were calculated for dichotomous variables. In order to investigate the relationships between study variables, Pearson zero-order correlation coefficients were also computed and examined. A set of hierarchical ordinary least squares regression models were then implemented with the following dependent variables: IPQ-R consequences, timeline (both acute/chronic and cyclical), personal control, treatment control, illness coherence, and emotional representations. The clinimetric variables (ECLAM, SLICC) and disease duration were included as control variables in the first step of the regression, in addition to educational level; TAS-20 and BDI scores were entered in the model in the second and final steps, respectively. In order to detect potential multicollinearity problems, we examined the variance inflation factor (VIF) and tolerance statistic for each predictor included in the models, prior to conducting regression analyses. Results of preliminary diagnostic analyses showed that the VIF results for all variables included in the model were <2; therefore, problematic multicollinearity was excluded.

In order to test the hypothesis that depression would have a mediating effect on the relationship between alexithymia and the illness perception measures, the Sobel mediation test, with covariates, was used [42,43]. Specifically, we implemented a preliminary regression analysis to examine the significance of the regression path between alexithymia and depression while controlling for disease duration, clinimetric variables, and educational level. The unstandardized regression parameter ($B = 0.36$; $SE = 0.08$; $p < .01$) and unstandardized regression parameters between depression and each of the illness perception variables, obtained in the final step of the hierarchical

regression analysis, were used as input in the set of mediation tests. All analyses were performed using SPSS for Windows, version 18 [44]. Results were deemed significant at $p < .05$ in all analyses.

3. RESULTS

3.1. Patient characteristics and associations between psychological variables

Descriptive statistics for the variables of the study are reported in Table 1, and correlations between the study variables are reported in Table 2. The presence of organ damage, measured using the SLICC/ACR, was positively correlated with disease duration and IPQ-R consequence scores and negatively correlated with educational level, which was also negatively correlated with TAS-20 scores. Disease activity was not significantly correlated with the other study variables.

TAS-20 scores were strongly positively correlated with BDI, IPQ-R consequence, and emotional representation scores. We also found a moderate-to-strong negative correlation between TAS-20 scores and IPQ-R treatment control and illness coherence scores. Relative to TAS-20 scores, BDI scores showed a similar pattern of relationships with IPQ-R scores, while also moderately positively correlated with IPQ-R timeline-cyclical scores.

The IPQ-R scales showed several significant intercorrelations. IPQ-R consequence scores were positively correlated with timeline-cyclical, timeline-acute/chronic, and emotional representation scores but negatively correlated with treatment control and illness coherence scores. Both timeline-cyclical and timeline-acute/chronic scores were moderately negatively correlated with treatment control scores, which were negatively correlated with emotional representation scores and positively correlated with personal control and illness coherence scores. Additional negative correlations were found between illness coherence and emotional representation scores and personal control and timeline-cyclical scores, while a positive correlation was found between timeline-cyclical and emotional representation scores.

3.2. Alexithymia, depressive symptoms, and illness perception

Table 3 shows the results of the hierarchical regression models. In all models, results of the first step of analysis, in which educational level, disease duration, and clinimetric variables were included as predictors, showed low explanatory power for IPQ-R scores. Educational level positively

predicted personal control scores; no further significant effects were detected for the remaining variables. In the second step of the model, the inclusion of TAS-20 scores significantly improved the model's explanatory power for four of the seven models tested: alexithymia positively predicted consequence and emotional representation scores, while a significant negative effect of alexithymia was observed for treatment control and illness coherence scores. Concomitant to the inclusion of alexithymia in the model, the presence of organ damage was found to predict consequence scores. The inclusion of BDI score in the final step of analysis further improved the explanatory power of five of the seven models tested. BDI score positively predicted consequence and timeline-cyclical scores and negatively predicted treatment control, illness coherence, and emotional representation scores. As expected, a significant decrease in the significance of the predictive power of TAS-20 scores for IPQ-R scores was observed subsequent to the inclusion of BDI score in the models, suggesting the presence of a mediating effect of depression.

Mediation analyses were performed for IPQ-R scores, for which alexithymia was a significant predictor in the second step of the hierarchical regression analysis. The results supported the existence of a mediating effect of depression in the relationships between alexithymia and consequence ($z = 2.72$, $p < .01$), treatment control ($z = -2.19$, $p < .05$) and emotional representation scores ($z = 2.76$, $p < .01$); however, this effect was not observed for illness coherence scores ($z = -.185$, $p > .05$).

4. DISCUSSION

In a previous article [19], in line with existing literature [17, 18], we reported that alexithymia may play an important role in SLE patients. In the present study, we provided additional information by studying the effects of alexithymia and psychological variables, such as depression, on illness perception in SLE patients while controlling for clinimetric variables such as the SLE disease activity index, accumulated damage, and duration of disease. Our analyses failed to find any associations between clinical variables, alexithymia, and depression. We can therefore conclude that disturbances in affect regulation did not occur as a result of patients' actual disease state, and compromised emotion regulation and changes in depressed mood were independent of the disease itself.

These findings support the hypothesis that SLE patients' emotion regulation style exerts a significant effect on their perceived health. In particular, alexithymic patients reported worse perceived consequences of the disease upon their lives and lower treatment effectiveness, were less able to understand the disease, and registered higher emotional response to the illness. These results may be explained by difficulty in identifying, managing, and expressing emotions, which may have led the patients into situations involving great distress that would not have developed with emotion regulation. Alexithymic patients demonstrate amplification and misinterpretation of the somatic sensations that accompany emotional arousal in response to stress, thereby preventing them from coping with stressful events, such as illness, effectively. We found no significant effects for other IPQ-R scales; alexithymia did not influence patients' beliefs regarding the chronic/acute course of illness, their ability to make predictions regarding the course and complications of disease, or their belief that the disease was influenced by their own actions. This data may be explained by the specific characteristics, such as unpredictability and variable manifestation, of the disease.

Depressed mood showed a similar pattern of influence on perceived health. In general, the inclusion of depressed mood in the models resulted in an increase in their explanatory power and a decrease in the significance of the role of alexithymia, with depressed mood emerging as the main predictor of five of the IPQ-R facets of perceived health. In particular, patients who experienced greater depressed mood perceived their disease as chronic with worse disease consequences and lower treatment effectiveness, were less able to understand the disease, and displayed stronger emotional responses to the illness. For three of these facets, namely consequences, treatment control, and emotional representations, depressed mood also served as a full mediator in the relationship between alexithymia and perceived health. These findings seem to indicate that, while alexithymia is a determinant of many aspects of illness perception, its effect is mediated by its negative influence on the development of depressive symptoms.

These results highlighted an existing problem in the treatment of SLE patients, that of perceived health, which undoubtedly influences their adherence to treatment, therapeutic compliance, and quality of life. A reduction in depressive symptoms may influence patients' illness perception, leading to improved quality of life (improved adherence and less disability and healthcare utilization).

Our results indicated that depression may be a potentially useful target for treatment in SLE patients and highlight the need to assess vulnerability in emotion regulation, which has an indirect impact on mood functioning. Results from a study by Foran & O'Leary [39] identified alexithymia as a potentially useful target for treatment due to the indirect impact it exerts on illness perception and psychological well-being. Interventions that focus on improving alexithymia have shown some degree of effectiveness in improving relationships and reducing depressive symptoms and risk of negative physical health outcomes. Therefore, interventions geared toward alexithymia may have a far-reaching impact on psychological and physical health.

Considering the construct of alexithymia, which reflects deficits in cognitive processing and emotion regulation, we may conclude that alexithymia plays a role in disease control and health promotion in SLE patients[24]. We could also have sustained the hypothesis that a developmental deficit in emotion regulation may predispose individuals to depression, but unfortunately, the cross-sectional design of our study does not allow such an interpretation.

In addition, these findings highlight the link between organ damage and the perception of more adverse illness consequences; this is expected, due to the well-known association between organ damage and severe clinical outcomes [31, 45]. Our results also indicated that educational level was associated with an increased sense of personal control over SLE; in fact, according to the literature, education boosts the sense of control that shapes the perception that one's life and health are a result of one's own actions and decisions [46, 47]. The findings regarding educational level are also congruent with the literature documenting its consistent relationships with more positive health status in SLE [35, 36] and emotion regulation [48,49].

The study was subject to some limitations. First, comparison of our results to a control cohort with another incurable rheumatologic disease, such as rheumatoid arthritis, would have allowed for investigation into whether our findings were unique to the lupus population. Second, the cross-sectional design of the study only allowed for correlation between our independent variables and illness perception, and it was impossible to make any causal statements regarding these relationships. Do patients view their illness more negatively because they are depressed, or do they become depressed because they view their illness seriously and feel that they have no control over it? [2]. It

should be noted that because of the correlational and cross-sectional nature of the study, conclusions regarding directionality could not be confirmed. The mediation modeling results can only suggest a theorized direction, and an experimental design is required to confirm conclusions regarding directionality. Third, self-report data collection and measuring subjective assessments via questionnaire are controversial, and the study design did not allow us to draw causal inferences.

Fourth, the study did not assess the IPQR identity or causal subscales. Based on the recruitment criteria applied and the unknown etiology of SLE, the identity and causal dimensions of illness perception were not investigated, as they were not considered relevant to the study. However, given that various studies have highlighted the importance of the identity and causal dimensions of rheumatological diseases, resulting from their association with depression [50-53], further studies that recruit samples using broader inclusion criteria and include these aspects as potential outcomes of emotion regulation are required. Fifth, the study did not measure patients' health-related quality of life (HRQoL). Recent findings have highlighted the existence of significant connections between HRQoL and both depressive symptoms and illness perception in SLE patients and indicated that interventions designed to modify illness perception directly could improve HRQoL [53] . However, given the omission of this construct from the data collection (and the cross-sectional nature of the study), no conclusions concerning the specific roles of emotion regulation, depressive symptoms, and illness perception in shaping patients' HRQoL can be drawn from the present study.

5. CONCLUSIONS

In conclusion, our findings highlight the existence of significant links between emotional dysregulation and different aspects of illness perception in SLE patients. Moreover, depressive symptoms were found to intervene in some of these relationships, playing a key role in modulating patients' perception of treatment efficacy and emotional responses to illness. Overall, these findings contribute to a more comprehensive understanding of patients' emotional adaptation to SLE and highlight the need for clinicians to include measures of depression and alexithymia as part of more

comprehensive patient evaluation. This would improve the understanding of SLE patients' special features and problems and assist in planning treatment protocols. In light of this, rheumatologists' attention to patients' psychological problems and collaboration with expert clinical psychologists are essential to the provision of appropriate treatment options.

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COMPETING INTEREST STATEMENT

The authors report no financial or other relationships relevant to the subject of this paper.

Table 1.
Descriptive statistics for the study variables

	Mean/%	S.D.	Observed Range
Active SLE (ECLAM)	27.4		
Damage present (SLICC)	36.9		
Educational level	12.29	3.44	5–20
Disease duration	13.92	8.07	1–34
TAS-20	49.89	13.97	24–84
BDI Total score	10.85	10.16	0–40
IPQ-R consequences	19.53	4.31	9–29
IPQ-R timeline (acute/chronic)	25.27	3.70	9–30
IPQ-R timeline (cyclical)	13.77	2.85	4–20
IPQ-R personal control	20.14	4.04	7–28
IPQ-R treatment control	19.11	2.71	13–25
IPQ-R illness coherence	18.15	3.81	6–26
IPQ-R emotional representations	18.39	5.31	7–30

BDI: Beck Depression Inventory; ECLAM: European Consensus Lupus Activity Measure; IPQ-R: Illness Perception Questionnaire-Revised; SLE: systemic lupus erythematosus; SLICC: Systemic Lupus International Collaborating Clinics/American College of Rheumatology Damage Index; TAS: Toronto Alexithymia Scale

Table 2.
Correlations between study variables

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	Educational level	-												
2	Disease duration	-.12	-											
3	Active SLE (ECLAM)	-.04	-.10	-										
4	Damage present (SLICC)	-.23*	.27*	.19	-									
5	TAS-20	-.27**	.06	.02	.09	-								
6	BDI	-.05	-.02	.04	.06	.47**	-							
7	IPQ-R consequences	-.04	.05	.04	.22*	.40**	.49**	-						
8	IPQ-R timeline (acute/chronic)	-.05	.07	-.21	.01	-.04	.15	.28**	-					
9	IPQ-R timeline (cyclical)	-.09	.05	.04	.12	.17	.35**	.31**	.10	-				
10	IPQ-R personal control	.22	-.06	-.10	.00	-.13	-.09	-.09	.01	-.24*	-			
11	IPQ-R treatment control	.00	-.08	.13	-.13	-.30**	-.40**	-.45**	-.30**	-.30**	.37**	-		
12	IPQ-R illness coherence	.15	.02	.04	.08	-.48**	-.50**	-.34**	.07	-.15	.15	.29**	-	
13	IPQ-R emotional representations	.07	.03	-.02	-.10	.34**	.48**	.38**	.15	.21*	-.19	-.30**	-.48**	-

*p < .05 **p < .01

BDI: Beck Depression Inventory; ECLAM: European Consensus Lupus Activity Measure; IPQ-R: Illness Perception Questionnaire-Revised; SLE: systemic lupus erythematosus; SLICC: Systemic Lupus International Collaborating Clinics/American College of Rheumatology Damage Index; TAS: Toronto Alexithymia Scale

Table 3
Hierarchical regression models: IPQ-R scales on Education level, Clinimetric variables, Alexithymia and Depression.

		CON	T-AC	T-C	PC	TC	IC	ER
	Disease duration	-.04	.02	.04	-.14	-.07	-.07	.00
	Active SLE	.03	-.13	.00	-.08	.15	.03	.02
	Damage present	.22	-.09	.08	.11	-.17	.15	-.09
	Educational level	.00	-.03	-.07	.24*	-.06	.16	.10
Step 1	***R^2***	***.05***	***.02***	***.02***	***.08***	***.05***	***.04***	***.02***
	Disease duration	-.06	.02	.03	-.13	-.06	-.05	-.02
	Active SLE	.005	-.13	-.00	-.07	.16	.05	.01
	Damage present	.23*	-.01	.09	.10	-.17	.14	-.08
	Educational level	.13	-.05	-.03	.20	-.15	.03	.20
	TAS-20	.41**	-.08	.11	-.16	-.28*	-.41**	.33**
Step 2	***R^2***	***.20***	***.02***	***.03***	***.10***	***.12***	***.19***	***.12***
	R^2 change	***.15****	***.00***	***.01***	***.02***	***.07****	***.15****	***.10****
	Disease duration	-.05	.03	.04	-.13	-.07	-.06	.00
	Active SLE	.01	-.13	-.00	-.07	.16	.05	.01
	Damage present	.22*	-.02	.07	.10	-.16	.15	-.10
	Educational level	.08	-.08	-.06	.19	-.11	.06	.16
	TAS-20	.22	-.22	-.02	-.17	-.12	-.28*	.12
	BDI	.39**	.28*	.26	.02	-.31*	-.24*	.41**
Step 3	***R^2***	***.32***	***.09***	***.8***	***.11***	***.19***	***.24***	***.25***
	R^2 change	***.11****	***.06****	***.05***	***.01***	***.07****	***.05****	***.13****

*p < .05 **p < .01

BDI: Beck Depression Inventory; CON: consequences; ER: emotional representations; IC: illness coherence; PC: personal control; SLE: systemic lupus erythematosus; T-AC: timeline acute/chronic; T-C: timeline cyclical; TAS: Toronto Alexithymia Scale; TC: treatment control

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