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Psychometric Validation of the Arthritis Helplessness Index in Systemic Lupus Erythematosus

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Abstract

Objective: Helplessness is a relevant construct in systemic lupus erythematosus (SLE), an unpredictable chronic illness with no known cure characterized by relapsing and remitting features. However, no measure of helplessness has been validated in this population. The present study examined the structural validity, reliability, and convergent validity of the Arthritis Helplessness Index (AHI), a measure initially developed for rheumatoid arthritis populations, in a sample of patients with SLE.

Methods: Patients with SLE ($N = 136$) receiving medical care at a private hospital completed the AHI and other self-report measures. The structural validity of the AHI was examined using confirmatory factor analysis. Internal consistency reliability was evaluated with Cronbach's coefficient alpha. Pearson product-moment correlations were used to examine convergent validity with measures of depression, anxiety, and mastery.

Results: The five-item AHI-Helplessness measure demonstrated a tenable factor structure ($CFI = 0.98$, $RMSEA = 0.06$, $SRMR = 0.04$). Internal consistency reliability was fair ($\alpha = 0.69$). Convergent validity was evidenced via significant correlations with measures of depression, anxiety, and mastery.

Conclusion: The five-item AHI-Helplessness scale can confidently be used as a measure of helplessness in SLE.

Building on Seligman's (1) Learned Helplessness Model (LHM), there has been a special interest in understanding learned helplessness, broadly defined as a psychological state wherein one's efforts are perceived to be inefficacious. in relation to health behaviors in individuals living with chronic illnesses (2). Systemic lupus erythematosus (SLE) is a chronic autoimmune disorder with no known cure involving multiple organ systems (3). SLE is a relevant disease to examine in the context of the LHM given its relapsing and remitting features and the unpredictability of flares and remissions (4).

The Arthritis Helplessness Index (AHI) is a 15-item self-report measure developed to assess perceptions of helplessness in coping with rheumatoid arthritis (RA; 5). Since its development, the measure has been widely used across rheumatologic contexts and adapted into several variants (6). Although the measure was initially conceptualized as a single-factor measure of helplessness (5), a subsequent factor analytic study in a sample of patients with RA identified two distinct subscales: a 5-item Helplessness subscale and a 7-item Internality subscale (7). The Helplessness subscale targeted the original intent of the measure, which was to assess an inability to control disease-related outcomes, while the Internality subscale assessed a mastery of one's disease-related outcomes. The two subscales had a significant, negative correlation of a small magnitude ($r = -0.21$; 7), suggesting that the Helplessness and Internality subscales are related but distinct. An adaptation of the measure was published wherein references to "arthritis" were replaced with the more general "condition" to allow the measure to be used in other rheumatologic diseases (8). A five-item version of the AHI that only includes the five Helplessness items is also available (7,9). Among patients with RA, it has been suggested that the Helplessness subscale may have greater clinical utility (i.e., more strongly related to clinical outcomes such as depression and pain) than the Internality subscale given its more robust construct validity (6).

In the factor analysis study that identified the two AHI subscales in RA patients, the internal consistency reliability of the Helplessness and Internality scales were acceptable ($\alpha = 0.63$ and $\alpha = .75$, respectively). Convergent validity analyses for the Internality scale revealed significant ($p < .001$), small, negative correlations with depression ($r = -0.18$), anxiety ($r = -0.16$), and behavioral ineffectiveness ($r = -0.29$), a construct reflecting the inverse of mastery. Convergent validity analyses for the Helplessness scale revealed significant ($p < .001$), moderate, positive correlations with depression ($r = 0.49$), anxiety ($r = 0.39$), and behavioral ineffectiveness ($r = 0.48$).

Although the AHI has been used in the SLE disease context (e.g., 10–11) and the distinct role of helplessness in the SLE experience continues to be highlighted when related to outcomes and quality of life (12), the measure has not been structurally validated in SLE, and there is no consensus on what version of the AHI is most appropriate for this patient population. Thus, the present study evaluated the structural validity, internal consistency reliability, and convergent validity of the AHI in a sample of patients with SLE. Based on previous studies using different variants of the measure (see 6 for a summary), one- and two-factor solutions were examined for the 15-item AHI, as well as a one-factor solution for the 5-item Helplessness scale. Evidence of convergent validity was hypothesized via significant correlations with measures of depression, anxiety, and behavioral ineffectiveness in the similar magnitudes and directions as described above.

Methods

Participants and Procedures

A convenience sample was obtained of adult patients receiving routine care and infusions, who had a physician-confirmed diagnosis of SLE according to American College of Rheumatology 1982 guidelines. Participants were patients at Cedars Sinai Medical Center, a private, academic medical center and tertiary hospital. Exclusion criteria included being diagnosed for the first time during the clinic visit and a medical history significant for a psychiatric diagnosis prior to SLE onset. Research was approved by the Institutional Review Board of Cedars Sinai Medical Center and adhered to the Helsinki guidelines.

Measures

Arthritis Helplessness Index (AHI; 5).

The AHI is a 15-item measure of perceptions of helplessness and mastery over disease-related outcomes. Response options range from “*Strongly disagree*” to “*Strongly agree*.” A total score was calculated by reverse-scoring nine of the 15 items, and then summing the items. Subscale scores were calculated for the 7-item Internality (scores range from 7 to 42) and 5-item Helplessness (scores range from 5–30) subscales. Higher scores reflect greater internality and helplessness, respectively.

Hospital Anxiety and Depression Scale (HADS; 13).

The HADS is a 14-item measure of symptoms of anxiety and depression experienced over the past week. Response options range from “*Hardly at all*” to “*Most of the time*.” The measure is scored by summing items for two subscales: Anxiety and Depression. Subscale scores range 0 to 21, with higher scores indicating greater frequency of symptoms. In the present sample, internal consistency was good for both subscales (Anxiety: $\alpha = 0.86$; Depression: $\alpha = 0.80$).

Personal Mastery Scale (PMS; 14).

The PMS is a 7-item measure of the degree to which individuals perceive that they can exert mastery and control over events impacting their lives. Response options range from “*Never have that feeling*” to “*Always have that feeling*.” Scores range from 0 to 42, with higher scores indicating greater perceptions of mastery and control. Internal consistency in the present sample was good $\alpha = 0.82$).

Methods

Data Analysis

Confirmatory factor analysis (CFA) was conducted in MPlus version 7.12 to examine the factor structure of the AHI. CFA was conducted for the different variants of the AHI found in the literature, including a one-factor structure using all 15 items, a two-factor structure (i.e., Helplessness and Internality subscales) using all 15 items, and a one-factor structure using the 5-item AHI-Helplessness measure. If the CFA did not identify a tenable solution, an exploratory factor analysis (EFA) was planned.

Overall model fit was determined using multiple descriptive indices, per the recommendations of Bentler (15). Three indicators of model fit were utilized: (a) the Root Mean Square Error of Approximation (RMSEA), (b) the Standardized Root Mean Residual (SRMR), and (c) the Comparative Fit Index (CFI). For the RMSEA and SRMR, values less than .08 indicate acceptable model fit; for the CFI, values greater than .90 indicate acceptable model fit. A model was determined to fit well if at least two of the three indicators met criteria for acceptable fit. Although the chi-square (χ^2) test of model fit was also reported for completeness, this statistic is influenced by sample size and thus was not a key indicator of model fit.

Descriptive statistics for sociodemographic and medical variables, internal consistency reliability, and convergent validity were calculated for the sample with SPSS Version 23.0. Internal consistency reliability was calculated using Cronbach's coefficient alpha. Pearson product-moment correlations were used to calculate convergent validity. Cohen's guidelines were used to describe the strength of correlations (small = $|r| \leq 0.3$, moderate = $0.3 < |r| < 0.5$, and large = $|r| \geq 0.5$).

Results

Descriptive statistics for the sample are reported in Table 1. Participants ($N = 136$) were predominantly female (93%), married (76%), and had a mean age of 48.6 years ($SD = 13.9$). Mean scores on the 15-item AHI fell mid-range ($M = 14.5$; $SD = 5.4$; IQR = 11.0 – 18.8).

Structural validity, internal consistency reliability, and convergent validity

The one- and two-factor solutions for the 15-item AHI did not fit well statistically or descriptively. The one-factor solution for the 5-item AHI-Helplessness measure fit well descriptively (CFI = 0.98, RMSEA = 0.06, SRMR = 0.04; $\chi^2 [5] = 7.54$, $p = 0.18$). In addition, individual item factor loadings ranged from .38 to .79, and were all significant, providing further evidence of a one-factor solution (see Table 2). Internal consistency reliability per Cronbach's alpha for the 5-item AHI-Helplessness scale was fair ($\alpha = 0.69$). AHI-Helplessness scores had large, positive correlations with measures of depression ($r = .67$, $p < .005$) and anxiety ($r = .60$, $p < .005$) and a large negative correlation with a measure of mastery ($r = -.51$, $p < .005$).

Discussion

Given the relevance of the construct of helplessness among patients with rheumatologic diseases, the development of the AHI was an important addition to the literature. Although a more extensive review of the helplessness construct is beyond the scope of the present paper, a review examining measures of helplessness, self-efficacy, mastery, and control in rheumatologic contexts described a number of measures, including the AHI, Arthritis Self-Efficacy Scale, Generalized Self-Efficacy Scale, Mastery Scale, Multi-Dimensional Health Locus of Control Scale, and Rheumatoid Arthritis Self-Efficacy Scale, as options toward which researchers and clinicians can turn (6). Across the measures described, the AHI-Helplessness has the fewest number of items and most closely captures the construct of helplessness rather than related but distinct constructs such as self-efficacy. One potential

challenge with using the AHI has been that multiple variants of the measure exist. Moreover, lack of a formal evaluation of the psychometric properties of the measure in SLE had precluded identification of the optimal form of the measure for this patient population.

The results of the present study suggest that the 5-item AHI-Helplessness scale is a reliable and valid one-factor measure of helplessness for patients with SLE. Moreover, the results suggest that the 15-item AHI total score and 7-item AHI-Internality subscale should not be used in patients with SLE given the lack of structural validity. In the present study, the internal consistency reliability for the 5-item AHI-Helplessness scale was fair ($\alpha = .68$), but similar to the internal consistency identified in previous research with RA patients (7). Similar to the factor analysis study with RA patients (7), the present study identified large correlations with measures of anxiety, depression, and mastery in expected directions with Helplessness. Using empirically derived cut-off scores for the AHI-Helplessness that were identified using RA patients (6), scores in the present population fell within normal limits [Low helplessness (< 11), Normal (11–19, combines low normal, normal and high normal), High helplessness (≥ 20)]. It would be useful to undertake future research specifically in SLE to identify whether the aforementioned cut-points are appropriate in this population. Moreover, examining the relationships among disease flares/activity, functioning, and helplessness scores in SLE and assessing the stability of scores longitudinally would add to our understanding of how disease activity impacts helplessness in these patients. In RA, the relationship between greater disease activity or poorer self-reported functioning and helplessness has been explored (e.g., 8), but the findings have been mixed.

These results should be interpreted in light of study limitations. The sample was a convenience sample of patients receiving care at a private, academic medical center, potentially limiting generalizability. In addition, the cross-sectional design of the study precluded analysis of test-retest reliability or sensitivity to change. Finally, it is possible that as the measure was initially conceived of and developed for patients with RA, there are unique features of helplessness in the SLE context not captured by the present measure. Despite these limitations, the present study provides the psychometric support necessary for future researchers and clinicians to confidently use the 5-item AHI-Helplessness scale to measure helplessness among patients with SLE.

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Table 1.

Sociodemographic, disease, and psychosocial variables for sample (N = 136)

<u>Sociodemographic Variables</u>	
Age (<i>mean, SD</i>)	48.6 (13.9)
Female (<i>n, %</i>)	126 (92.6)
Race/Ethnicity (<i>n, %</i>)	
White	62 (45.6)
Black	19 (14.0)
Latin American/Hispanic	28 (20.6)
Asian	22 (16.2)
Multiethnic/Mixed	5 (3.7)
Years of Formal Education (<i>mean, SD</i>)	15.2 (2.8) ^a
Employed Full or Part-time (<i>n, %</i>)	71 (52.2)
Married or Living as Married (<i>n, %</i>)	76 (55.9)
<u>Disease Variables</u>	
Disease Duration in Years (<i>mean, SD</i>)	16.9 (11.9) ^b
<u>Medication</u> (<i>n, %</i>)	
Prednisone	59 (43.4)
Immunosuppressant	88 (64.7)
Cytotoxic	24 (17.6)
Biologic	62 (45.6)
Anti-anxiety	35 (25.7)
Anti-depressant	34 (25.0)
<u>SLEDAI Disease Activity</u> (<i>n, %</i>)	
Seizure	0 (0)
Psychosis	0 (0)
Organic brain syndrome	0 (0)
Visual disturbance	0 (0)
Cranial nerve disease	0 (0)
Headache	1 (0.7)
Cerebrovascular	0 (0)
Vasculitis	0 (0)
Arthritis	47 (34.6)
Myositis	0 (0)
Urinary cast	0 (0)
Hematuria	1 (0.7)
Proteinuria	7 (5.1)
Pyuria	0 (0)
Rash	20 (14.7)
Alopecia	12 (8.8)
Mucosal ulcers	8 (5.9)
Pleurisy	1 (0.7)

Pericarditis	0 (0)
Low complement	13 (9.6)
Increased DNA binding	18 (13.2)
Fever	0 (0)
Thrombocytopenia	0 (0)
Leukopenia	11 (8.1)
<u>Psychosocial Measures)^c</u>	
AHI-Helplessness (<i>mean, SD</i>)	14.5 (5.4)
HADS-Anxiety (<i>mean, SD</i>)	7.6 (4.2) ^b
HADS-Depression (<i>mean, SD</i>)	5.4 (4.0) ^b
PMS (<i>mean, SD</i>)	30.5 (6.2)

Note. Due to missing values

^a*N* = 132;

^b*N* = 135;

^cAHI-Helplessness = Arthritis Helplessness Index-Helplessness; HADS-Anxiety = Hospital Anxiety and Depression Scale-Anxiety Subscale; HADS-Depression = Hospital Anxiety and Depression Scale-Depression Subscale; PMS = Personal Mastery Scale