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Measures of Anxiety

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INTRODUCTION

This review covers commonly used measures of anxiety. For this review, the author included measures that were 1) measures of general measures of anxiety and severity of anxiety symptoms, 2) administered by self-report, 3) used in rheumatologic populations, and 4) has evidence of adequate psychometric data. To maintain brevity, the majority of the measures reviewed here were selected to provide broad coverage of general symptoms of anxiety, and measures were excluded if they are intended to identify or characterize a specific Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) anxiety disorder (1). Specifically, this author excluded measures typically used to evaluate diagnostic criteria or features of specific anxiety disorders, such as panic disorder, obsessive-compulsive disorder, posttraumatic stress disorder, and others. In addition, broader measures of psychiatric distress, including the Symptom Checklist-90, the General Health Questionnaire, and the Medical Outcomes Study Short Form 36 are not included in this review since they are included elsewhere in this special issue.

However, subscales that have been used frequently in rheumatology as “stand-alone” measures, such as the anxiety scale of the Hospital Anxiety and Depression Scale, are included in this review. Importantly, the measures included in this review should not be interpreted as diagnostically significant for an anxiety disorder, even generalized anxiety disorder, but should be used to measure the presence of symptoms and to calibrate the severity of general symptoms of anxiety commonly occurring in rheumatic disease. The measures reviewed below include the State Trait Anxiety Index, the Beck Anxiety Inventory, and the anxiety subscale of the Hospital Anxiety and Depression Scale. In this review, the content and structure of each measure is presented (number of items, recall period, response options, presence of translations, and adaptations), the use in rheumatic disease when possible is discussed, and the psychometric properties of each measure, particularly when validated in any of the rheumatic diseases, is detailed. In addition, information regarding responsiveness of each measure to longitudinal change is presented, including responsiveness to change in rheumatology when available. Finally, a summary of the strengths and weaknesses specific to rheumatology is presented.

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AUTHOR CONTRIBUTIONS

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THE STATE-TRAIT ANXIETY INVENTORY (STAI)

Description

Purpose—To measure via self-report the presence and severity of current symptoms of anxiety and a generalized propensity to be anxious. Versions of this measure are available for both adults and children.

Content—There are 2 subscales within this measure. First, the State Anxiety Scale (S-Anxiety) evaluates the current state of anxiety, asking how respondents feel “right now,” using items that measure subjective feelings of apprehension, tension, nervousness, worry, and activation/arousal of the autonomic nervous system. The Trait Anxiety Scale (T-Anxiety) evaluates relatively stable aspects of “anxiety proneness,” including general states of calmness, confidence, and security.

Number of items—The STAI has 40 items, 20 items allocated to each of the S-Anxiety and T-Anxiety subscales. There is also a STAI for children (STAI-C) with the same number of items. Short versions of the scales have been developed independently (2–4).

Response options/scale—Responses for the S-Anxiety scale assess intensity of current feelings “at this moment”: 1) not at all, 2) somewhat, 3) moderately so, and 4) very much so. Responses for the T-Anxiety scale assess frequency of feelings “in general”: 1) almost never, 2) sometimes, 3) often, and 4) almost always.

Examples of use—First published in 1970 with the original STAI-X, the STAI was revised in 1983 (STAI-Y) and has been used extensively in a number of chronic medical conditions including rheumatic conditions such as rheumatoid arthritis (5), systemic lupus erythematosus (6), fibromyalgia, and other musculoskeletal conditions (7).

Practical Application

How to obtain—The STAI can be obtained from the publisher, Mind Garden, 855 Oak Grove Avenue, Suite 215, Menlo Park, CA 94025 (URL: <http://www.mindgarden.com/index.htm>.) Description of the shortened S-Anxiety scale has been published (2–4), and used in rheumatic disease (rheumatoid arthritis) (8).

Method of administration—Paper and pencil administration. This is a self-report questionnaire that can be administered in an individual format. Specific instructions are provided for each of the S-Anxiety and T-Anxiety subscales.

Scoring—Item scores are added to obtain subtest total scores. Scoring should be reversed for anxiety-absent items (19 items of the total 40). Mind Garden has a service available to administer and score, and there is a web-based interface available through <http://www.mindgarden.com/index.htm>.

Score interpretation—Range of scores for each subtest is 20–80, the higher score indicating greater anxiety. A cut point of 39–40 has been suggested to detect clinically significant symptoms for the S-Anxiety scale (9,10); however, other studies have suggested a higher cut score of 54–55 for older adults (11). Normative values are available in the manual (12) for adults, college students, and psychiatric samples. To this author's knowledge, no cut scores have been validated for rheumatic disease populations.

Respondent burden—For adults, this measure requires ~10 minutes to complete.

Translations/adaptations—The STAI has been translated and adapted in 48 languages.

Psychometric Information

Reliability—Test–retest reliability coefficients on initial development (12) ranged from 0.31 to 0.86, with intervals ranging from 1 hour to 104 days. Not surprisingly, since the S-Anxiety scale tends to detect transitory states, test–retest coefficients were lower for the S-Anxiety as compared to the T-Anxiety. Internal consistency alpha coefficients were quite high ranging from 0.86 for high school students to 0.95 for military recruits (12).

Validity—During test development, more than 10,000 adults and adolescents were tested. To optimize content validity, most items were selected from other anxiety measures on the basis of strong associations with the Taylor Manifest Anxiety Scale (13) and Cattell and Scheier's Anxiety Scale Questionnaire (14); overall correlations between the STAI and these 2 measures were 0.73 and 0.85, respectively. In general, construct validity (15) of the STAI was somewhat limited in discriminating anxiety from depression, with some studies observing higher correlations between the T-Anxiety scale and measures of depression, as compared to other measures of anxiety (5,16). S-Anxiety validity was originally derived from testing in situations characterized by high state stress including classroom examinations, military training programs, etc. Like other measures of anxiety, the STAI is also highly correlated with depression and, in some studies, the STAI did not differentiate anxious from depressed patients (17). Similarly, while the STAI has not been formally validated in rheumatic disease, studies in rheumatology have similarly observed very high correlations among the STAI and measures of depression (e.g., $r = 0.83$) (5). In some populations (elderly), the STAI has shown poor discriminant validity and did not differentiate persons with and without anxiety disorders (16).

Ability to detect change—The intent of the T-anxiety scale is to characterize anxiety “proneness” as a longstanding trait or characteristic, and as such, the T-Anxiety is less responsive to change as compared to the S-Anxiety.

Critical Appraisal of Overall Value to the Rheumatology Community

Strengths—The STAI is among the most widely researched and widely used measures of general anxiety, and is available in many different languages. Many use the STAI in rheumatologic conditions. This measure is relatively brief to administer and does not require costly or time consuming scoring or interpretation procedures. Therefore, this measure lends itself well to general use in research in the rheumatology clinic and comparisons with other healthy, psychiatric, and medical populations.

Caveats and cautions—Limitations include the limited availability of validation data specific to rheumatic disease. Additionally, there exists relatively poor validity of the scale, particularly the T-Anxiety subscale for differentiation anxious from depressed states. Further, because the intent of the T-Anxiety scale is to characterize a longstanding trait, clinicians and researchers should be mindful of this if seeking scales to detect change over a relatively short period of time. In general, for these purposes, many have opted to solely use the S-Anxiety subscale for the detection of longitudinal change.

BECK ANXIETY INVENTORY (BAI)

Description

Purpose—The BAI is a brief measure of anxiety with a focus on somatic symptoms of anxiety that was developed as a measure adept at discriminating between anxiety and depression (18).

Content—The BAI is administered via self-report and includes assessment of symptoms such as nervousness, dizziness, inability to relax, etc.

Number of items—The BAI has a total of 21 items.

Response options/scale—Respondents indicate how much they have been bothered by each symptom over the past week. Responses are rated on a 4-point Likert scale and range from 0 (not at all) to 3 (severely).

Examples of use—The BAI is used in efforts to obtain a purer measure of anxiety that is relatively independent of depression. Increasing use of this measure has been observed in a number of rheumatic conditions including fibromyalgia (19) and arthritis (20).

Practical Application

How to obtain—The BAI is not in the public domain, but is a copyrighted measure by the developer, Dr. Aaron T. Beck. The measure can be purchased from Pearson Assessment at www.pearsonassessments.com.

Method of administration—Paper and pencil administered. This is a self-report or interviewer administered questionnaire that can be administered in an individual format.

Score interpretation—Scoring is easily accomplished by summing scores for items. The total score ranges from 0–63. The following guidelines are recommended for the interpretation of scores: 0–9, normal or no anxiety; 10–18, mild to moderate anxiety; 19–29, moderate to severe anxiety; and 30–63, severe anxiety. To this author's knowledge, no published cut scores are available for rheumatologic populations.

Respondent burden—For adults, this measure requires ~5–10 minutes to complete.

Translations/adaptations—The BAI is distributed by Pearson Assessments into Spanish and English. A computer-administered version has been developed by Steer and colleagues (21). The BAI has also been translated into French, German, African languages (e.g., Xhosa), Norwegian, and other languages.

Psychometric Information

Validity—Construct validity studies show good convergence of the BAI with other measures of anxiety including the Hamilton Anxiety Rating Scale ($r = 0.51$), the STAI ($r = 0.47$ – 0.58), and the anxiety scale of the Symptom Checklist-90 ($r = 0.81$) (22). Although the BAI appears to be less correlated with depression scales than the STAI, correlations with depression scales remain substantial (e.g., correlation with Beck Depression Inventory $r = 0.61$). While to this author's knowledge, the BAI has not been validated in rheumatology populations, studies among other populations with medical comorbidities (e.g., older adults) suggest that due to the emphasis on somatic symptoms, the BAI did not perform similarly to younger populations (yielded somatic factors in older adults), and therefore the discriminant validity may be less robust than in younger or healthy populations (23).

Reliability—Internal consistency is high with Cronbach's alphas ranging from 0.90 to 0.94 and has been tested in large samples of psychiatric patients, college students, and community-dwelling adults (24–26). Test–retest coefficients are reasonable and range from 0.62 (7-week interval) to 0.93 (1-week interval).

Ability to detect change—The BAI has been demonstrated to be responsive to change over time both on psychiatric populations (27) and in medical populations (28). One study tested the BAI longitudinally over the course of a treatment trial (duloxetine) for the treatment of fibromyalgia and did not show a significant BAI change over time; however, it is important to note that anxiety was not the targeted outcome of this study (19).

Critical Appraisal of Overall Value to the Rheumatology Community

Strengths—The BAI is a relatively brief, easily administered, and easily scored measure of anxiety. It has sound psychometric properties and has demonstrated sensitivity to change. This measure has increasing use in a number of rheumatic conditions including fibromyalgia (19) and arthritis (20).

Caveats and cautions—The primary limitations for the BAI are the relatively limited scope of symptoms evaluated and the lack of validation studies specific to rheumatology populations. The BAI was developed in an attempt to reduce overlap with depressive symptoms, and as a result tends to focus more exclusively on somatic (e.g., heart racing, dizziness) symptoms. In medical conditions, these symptoms have the propensity to overlap with some physical aspects of medical conditions and, therefore, cautious interpretation would be warranted. The BAI does not assess other primary symptoms of anxiety, most notably worry and other cognitive aspects of anxiety. In summary, for rheumatology, unless accompanied by other measures that include cognitive (ruminative) aspects of anxiety, the BAI may provide a limited assessment of anxiety.

HOSPITAL ANXIETY AND DEPRESSION SCALE-ANXIETY (HADS-A)

Description

Purpose—The HADS (29) depression component is reviewed elsewhere in this special issue. In general the HADS-A was developed as a brief measure of generalized symptoms of anxiety and fear. The purpose of the HADS was to screen for clinically significant anxiety and depressive symptoms in medically ill patients.

Content—The HADS-A includes specific items that assess generalized anxiety including tension, worry, fear, panic, difficulties in relaxing, and restlessness.

Number of items—The HADS-A has 7 items.

Recall period/response items—Respondents indicate how they currently feel. Responses are rated on a 4-point Likert scale and range from 0 to 3. Anchor points for the Likert items vary depending on the item (e.g., “I can sit still and feel relaxed” scores as 0 for definitely to 3 for not at all; and “I get sudden feelings of panic” scores as 0 for not at all to 3 for very much indeed).

Examples of use—This measure evaluates common dimensions of anxiety. This measure can be used to detect and quantify magnitude of symptoms of anxiety, but like other measures is not adequately descriptive to detect specific anxiety disorders. The target population is general medical outpatients age 16 to 65.

Practical Application

How to obtain—The HADS is copyrighted and available from: Nfer Nelson, The Chiswick Centre, 414 Chiswick High Road, London W4 5TF United Kingdom. URL: www.nfer-nelson.co.uk.

Method of administration—Paper and pencil administered. This is an individually administered questionnaire and can be given via self-report or by interviewer.

Score interpretation—Scoring is easily accomplished by summing scores for items, with special attention to reversed items. The total score for the HADS-A can range from 0 to 21. The following guidelines are recommended for the interpretation of scores: 0–7 for normal or no anxiety, 8–10 for mild anxiety, 11–14 for moderate anxiety, and 12–21 for severe anxiety. In some rheumatologic conditions, a cut score for the HADS-A of 9 was recommended as useful for a diagnosis of an anxiety disorder (30).

Respondent burden—For adults, this measure typically requires <5 minutes to complete.

Translations/adaptations—Translations are available in Arabic, Chinese, Dutch, French, German, Hebrew, Japanese, Italian, Spanish, and Urdu.

Psychometric Information

Validity—The majority of psychometric studies observed a 2-factor solution, supporting the use of the anxiety subscale as a “stand alone” measure (11 of 19 studies in a recent review of this measure; however a few studies did find more than 2 factors (see review by Bjelland et al [31]). Using a cut score of 8 overall provided sensitivities and specificities at ~80% and reaching 90% in a community cohort for the HADS-A for detecting anxiety disorders (31). In primary care populations, cut scores of 9 for the HADS-A yielded moderate sensitivity (0.66) and high specificity (0.93) (31). An additional study in the elderly yielded high misclassification rates and suggested that the HADS-A possessed limited sensitivity and specificity to detect anxiety disorders in this population (32). One study comparing the HADS to diagnoses of anxiety and depression in a cohort of patients with osteoarthritis observed greater concordance among the HADS-A and diagnoses of anxiety compared to the concordance among the HADS depression scale and diagnoses of depressive disorders (30). In this study, the HADS-A had a sensitivity and specificity of 88% and 81%, respectively, for a diagnosis of an anxiety disorder (33,34). Overall, concurrent validity of the HADS was deemed “good” to “very good” in a comprehensive review (31), with comparable sensitivity and specificity of longer scales including the General Health Questionnaire, the STAI, and the Symptom Checklist-90 anxiety scales.

Reliability—Internal consistency is high for the anxiety component with Cronbach's alphas ranging from 0.84–0.90 and has been tested in large samples of community dwelling adults, psychiatric samples, and medical samples (33,35,36).

Ability to detect change—There is some evidence, including through the use of change reliability indices, that the HADS-A is sensitive to change (37). In particular, the HADS-A has been found to be responsive to change longitudinally in ankylosing spondylitis (38), and other arthritis populations (39).

Critical Appraisal of Overall Value to the Rheumatology Community

Strengths—The HADS-A is a very brief, easy to use screening measure to detect the presence of clinically significant symptoms of anxiety designed for use in medical populations. This measure is widely used and easily obtained. The splitting of the subscales (anxiety and depression) is a commonly used practice, and there are data supporting the use of the HADS-A as a stand-alone measure of general anxiety. The HADS has been widely used in rheumatologic populations including Sjögren's syndrome (40), ankylosing

spondylitis (38), various forms of arthritis (39,41,42), and systemic lupus erythematosus (43).

Caveats and cautions—Weaknesses include some evidence of reduced validity in some populations, particularly in the elderly. Like other measures reviewed here, this measure does not adequately detect the presence of specific anxiety disorders, but rather provides some evidence towards generalized anxiety symptoms.

DISCUSSION

Three measures were reviewed above: the STAI, the BAI, and the HADS-A. These 3 measures were selected for review based on the previous use in rheumatology, sound psychometric properties, and detection of generalized symptoms of anxiety. As mentioned above, measures targeted towards the assessment of specific anxiety disorders including other DSM-IV anxiety disorders (including post-traumatic stress disorder, obsessive-compulsive disorder, etc.) are not included in this review. While assessment of some of these features may be beneficial in rheumatology, for example, some studies in other populations have observed posttraumatic stress type reactions to receiving specific medical diagnoses (44,45), these instances are more unique considerations and, therefore, such measures are not included in this review.

It becomes evident, based on the brevity of this review, that few stand-alone measures of anxiety are currently used in rheumatology. Reasons for the decreased emphasis on the assessment of anxiety in these populations may be multifaceted and include a relative increased emphasis on depression in comparison to anxiety, use of larger scale measures detecting a range of features related to psychological distress (e.g., Symptom Checklist-90), or an under-appreciation of the prevalence and severity of anxiety in many rheumatic conditions. Moving forward, it may be warranted to explore these factors more fully and determine if the current measures in use are adequately detecting the presence and severity of symptoms of anxiety that are important to patients or that need to be addressed in the course of medical care. Nonetheless, based on this review, there currently exist measures that have good psychometric properties and adequate responsiveness to change that would warrant use in rheumatology.

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Glossary

STAI	State-Trait Anxiety Inventory
BAI	Beck Anxiety Inventory
HADS-A	Hospital Anxiety and Depression Scale-Anxiety

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Summary Table for Measures of Anxiety*

Scale	Content	No. items	Response format	Administration	Time, minutes	Primary scale outputs	Validated populations	Psychometric properties			Strengths	Cautions
								Reliability	Validity	Responsiveness		
STAI	Current "state" anxiety; pervasive "trait" anxiety	40, 20 per scale	4-point Likert scale State: symptom intensity Trait: symptom frequency	Self-report (individual or group)	10	Severity of state/trait anxiety	General and psychiatric	Good	Moderate	State anxiety more responsive to change than trait anxiety subscale	Widely used Available in many languages Detection of pervasive anxiety "proneness", and current symptoms	Trait scale measures longstanding traits and therefore is less sensitive to change over a short period of time
BAI	Symptoms of anxiety with a focus on somatic symptoms	21	4-point Likert scale (0 = not at all; 3 = severely)	Self report or interviewer administered	5-10	Total anxiety score	General and psychiatric	Good	Moderate	Established responsiveness to change in psychiatric and medical populations	Brief Sound psychometrics	Relatively narrow scope of symptom assessment with focus on somatic symptoms
HADS-A	Generalized symptoms of anxiety and fear	7	Total anxiety 4-point Likert scale (0 = symptom absent; 3 = symptom present)	Self-report	5	Total anxiety score	Medical including arthritis	Excellent	Good	Sensitive to change	Brief Widely used in rheumatology Strongest psychometric properties	Not appropriate to detect specific anxiety disorders May have reduced validity in some populations (e.g., elderly)

* STAI = State-Trait Anxiety Inventory; BAI = Beck Anxiety Inventory; HADS-A = Hospital Anxiety and Depression Scale-Anxiety.