Development and psychometric properties of the Emotional State Questionnaire, a self-report questionnaire for depression and anxiety

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Anxiety and depression are dimensions of emotional state that can be validly assessed with self-report measures. This article introduces a new self-report questionnaire for depression and anxiety (Emotional State Questionnaire (EST-Q)) and presents data on its reliability and validity. The items of the EST-Q were derived from diagnostic criteria of DSM-IV and ICD-10. Thirty-three items were rated on a five-point frequency scale. The questionnaire was administered to 194 inpatients with depressive and anxiety disorders and to a population sample of 479 subjects. According to the results of factor analysis, five subscales were formed: Depression, Anxiety, Agoraphobia–Panic, Fatigue, and Insomnia. EST-Q and subscales showed acceptable internal consistency ($\alpha = 0.69–0.88$). Significant differences in subscales between patients and population and across diagnostic groups confirmed the discriminant validity of the instrument. Depression, Anxiety, and Agoraphobia–Panic subscales distinguished corresponding diagnostic groups. Fatigue and Insomnia appeared to assess nonspecific psychopathology dimensions characteristic of several psychiatric disorders.
• *Agoraphobia*, *Anxiety*, *Depression*, *Questionnaires*.

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Self-rating scales have become increasingly popular in preliminary detection and assessment of various aspects of mental disorders. They have proved to be applicable for screening in epidemiologic studies, for recognition of psychiatric disorders in primary care, and for assessment of change in treatment programs (1, 2). Although structured diagnostic interviews, such as the Composite International Diagnostic Interview (CIDI) (3) or the Structured Clinical Interview for DSM-III-R (SCID) (4), have the best validity in psychiatric diagnostics, their administration is time-consuming and requires specific training. Self-rating scales lack the diagnostic precision of structured interviews but have the advantage in speed and ease of administration. In the case of well-established psychometric properties these instruments can be used not only as dimensional measures but also for preliminary identification of possible psychiatric cases, which is one of the reasons for development of new and efficient scales. If the main purpose of assessment were detection of mental disorders, it would be reasonable to base the scale on diagnostic criteria used in current psychiatric classifications. This idea is reflected in the recent tendency to use the self-report questions from the DSM-IV or ICD-10 criteria in creating screening instruments (5).

Depressive and anxiety disorders are the most prevalent disorders in many populations (6). These disorders cause considerable distress and also social and occupational impairment to the patients, which could be diminished by early detection and treatment already at the primary health care level. The issue whether self-rating of psychiatric symptoms is in accordance with interviewer ratings is controversial. Kearns et al. (7) showed that in depression self- and observer ratings were poorly correlated. Nevertheless, it has been shown that depression and anxiety symptoms can be reliably assessed by self-report measures, and concordance between self- and interview-based assessment is good (8–10)

Several self-rating scales have been created to assess symptoms of depression (11) and anxiety (12, 13) separately. As these conditions often coexist, it has been

considered reasonable to use rating instruments that encompass both anxiety and depression simultaneously. Some questionnaires, such as the Hospital Anxiety and Depression Scale (HAD) (14) and the Depression Anxiety Stress Scales (DASS) (15), combine only symptoms of anxiety and depression, but multidimensional scales, such as the SCL-90 (16), the Symptom Questionnaire (17), and General Health Questionnaire (GHQ) (18) also include subscales for these emotional states.

Our aim in developing the present scale, the Emotional State Questionnaire (EST-Q), was to create a self-rating instrument for detection of the symptoms characteristic of depressive and anxiety disorders. Such an instrument should be sufficiently short for quick use, but at the same time it must encompass the main symptom dimensions of these disorders on the basis of the DSM-IV and ICD-10 diagnostic criteria. We also consider it important for the questionnaire to be developed and psychometrically assessed in an Estonian population even though based on internationally accepted diagnostic criteria.

The purpose of the present article is to describe the development of the instrument and present the data for reliability and validity of the questionnaire.

Materials and Methods

Subjects

The patient sample consisted of 194 inpatients with depressive or anxiety disorders. The EST-Q was administered to all patients who were hospitalized in the ward for depressive, anxiety, and substance abuse disorders in Tartu University Psychiatric Hospital between 1 April 1997 and 30 September 1998. Patients who were diagnosed as having depression, anxiety, or other neurotic disorder on the basis of the ICD-10 criteria were included in the study. The sample consisted of 49 men and 145 women with the mean age of 39.0 years (standard deviation, 12.7 years; range, 18–72 years). ICD-10 diagnosis was established with an unstructured clinical interview by experienced psychiatrists. One hundred and twenty-three patients were diagnosed as having a depressive disorder (DD); 29 had agoraphobia with panic disorder (AP); 14, generalized anxiety disorder (GAD); 22, somatoform disorder (SF); and 6, neurasthenia (NEUR). Most of the patients with depression had moderate depression (77.5%). The EST-Q was completed on the 1st or 2nd day of admission to the hospital together with the Depression Scale (DEPS). The DEPS is a 10-item self-rating scale for screening of depression which has shown good psychometric properties (19, 20).

The non-patient sample was obtained from the respondents of the Estonian Health Interview Survey (EHIS) (21). The EHIS sample was representative of the Estonian population in January 1996. All respondents who lived in one geographic region, Tartu or Tartu County, altogether 479 subjects, were included in the current study. Of these subjects 216 were men and 263 women. Their average age was 47.0 years (standard deviation, 19.5; range, 15–79 years).

Development of the EST-Q

The items of the EST-Q are presented in Table 1 (copies of the EST-Q can be obtained on request from the corresponding author). The items were derived from the symptoms presented in diagnostic criteria for depression and anxiety disorders on the DSM-IV (22) and ICD-10 (23). We omitted somatic symptoms of anxiety from the item pool because in self-rating format it is difficult to determine whether these symptoms indicate anxiety disorder or some somatic illness. The resulting version consisted of 33 items. Each item was rated on a 5-point scale ranging from 0 to 4: 0 = not at all; 1 = seldom; 2 = sometimes; 3 = often; and 4 = all the time. The subjects were instructed to assess how much the various problems had troubled them during the past 4 weeks, using the scale.

Exploratory factor analysis of the patient group was performed to determine the subscales. Principal-component analysis with varimax rotation was used. Item–total correlations and computing of Cronbach α were used to assess the reliability of the subscales. The discriminant validity of the EST-Q was examined by comparing the mean scores of subscales with the total score in the patient and nonpatient samples and also across the diagnostic groups by using the ANOVA. The concurrent validity of the Depression subscale was assessed by correlating it with the DEPS.

Results

Table 1 presents the results of the factor analysis of the patient sample. In accordance with the eigenvalue criterion of >1 and scree plot, a six-factor solution was selected which explained 56% of the variance. Items with factor loadings greater than 0.4 were chosen to define the meaning of the factors. Factor 1 had highest loadings on items that reflect typical symptoms of depression and also on two items of social anxiety, explaining 16% of the variance. Three items of this factor were double-loading—that is, had loadings greater than 0.4 also on some other factor. Item 8 loaded also on factor 3 (fatigue), and items 27 and 28 also on factor 6. Factor 2 was composed of agoraphobia and panic attack items and an item of fear of illness, explaining 11% of the variance. This factor had one double-loading item. Item 25, occurrence of panic attacks, loaded also on factor 4 (anxiety). Factor 3 was composed of fatigue items (9% of the variance); factor 4 can be described as a general anxiety factor (7% of the variance), and factor 5 as insomnia (7% of the variance). These five factors were easily interpreted (well defined). Factor 6, accounting for 6% of the

Table 1. Factor analysis of the EST-Q items in the patient sample.

Item	Factor loadings					
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
1. Feelings of sadness	0.56*	0.08	0.19	0.24	0.01	−0.06
2. Feeling easily irritated or annoyed	0.15	−0.08	0.09	0.56*	−0.07	0.33
3. Feeling no interest or pleasure in things	0.74*	0.01	0.27	0.18	0.03	−0.26
4. Fatigue or loss of energy	0.16	−0.01	0.78*	0.23	0.09	−0.09
5. Feelings of worthlessness	0.68*	−0.01	0.05	0.28	−0.01	0.27
6. Self-accusations	0.63*	−0.06	0.07	0.27	0.01	0.19
7. Recurrent thoughts of death or suicide	0.61*	0.10	0.10	0.00	0.13	0.17
8. Diminished ability to think or concentrate	0.48*	−0.05	0.45*	−0.01	−0.07	−0.03
9. Feeling slowed down	0.35	0.17	0.58*	−0.09	0.16	0.11
10. Difficulty falling asleep	0.05	−0.02	0.13	0.01	0.83*	0.01
11. Restless or disturbed sleep	0.08	0.03	0.14	0.09	0.86*	−0.06
12. Waking up too early	0.10	−0.11	0.03	0.06	0.69*	−0.20
13. Excessive sleepiness	0.05	0.11	0.53	−0.11	−0.11	0.43*
14. Loss of appetite	0.09	0.21	0.31	0.07	0.31	−0.57*
15. Excessive appetite	0.06	−0.10	0.02	0.15	−0.09	0.57*
16. Feeling lonely	0.64*	0.12	0.00	0.17	0.18	0.02
17. Hopelessness about the future	0.72*	0.06	0.15	0.14	0.08	0.02
18. Impossible to enjoy things	0.79*	0.00	0.26	0.11	−0.01	−0.24
19. Rest does not restore strength	0.35	−0.04	0.60*	0.10	0.16	−0.21
20. Feeling anxious or fearful	0.29	0.32	0.19	0.51*	−0.10	−0.01
21. Being easily fatigued	0.09	0.16	0.74*	0.11	0.17	0.07
22. Tension or inability to relax	0.29	0.21	0.33	0.44*	0.00	−0.13
23. Excessive worry about several different things	0.33	0.07	0.09	0.47*	0.04	−0.10
24. Feeling so restless that it is hard to sit still	0.20	0.03	−0.15	0.63*	0.18	−0.07
25. Sudden attacks of panic with palpitations, shortness of breath, faintness, or other frightening bodily sensations	−0.10	0.51*	0.00	0.50*	0.13	0.15
26. Easily startled	0.21	0.16	0.23	0.49*	0.14	0.32
27. Afraid to be the centre of attention	0.56*	0.34	0.13	0.05	0.05	0.45*
28. Fear of interaction with strangers	0.58*	0.33	0.10	−0.08	−0.01	0.43*
29. Fear of being outside home alone	0.18	0.73*	0.04	0.05	0.13	0.03
30. Feeling afraid in streets or open places	0.19	0.81*	0.10	−0.07	−0.05	0.02
31. Fear of fainting in public	−0.09	0.80*	0.11	0.10	−0.02	−0.07
32. Feeling afraid of travelling by bus, train, or car	0.14	0.79*	−0.02	0.07	−0.04	0.03
33. Fear of having a serious illness that has been not diagnosed by the doctors	−0.05	0.60*	0.06	0.15	−0.15	−0.20

* Loadings more than 0.4.

Table 2. Item–total correlations of the EST-Q subscales in patients.

Subscale with items	Item–total correlations
Depression	
1. Feelings of sadness	0.56
3. Feeling no interest or pleasure in things	0.69
5. Feelings of worthlessness	0.65
6. Self-accusations	0.61
7. Recurrent thoughts of death or suicide	0.55
16. Feeling lonely	0.59
17. Hopelessness about the future	0.68
18. Impossible to enjoy things	0.72
Agoraphobia–panic	
25. Sudden attacks of panic with palpitations, shortness of breath, faintness, or other frightening bodily sensations	0.43
29. Fear of being outside home alone	0.61
30. Feeling afraid in streets or open places	0.66
31. Fear of fainting in public	0.69
32. Feeling afraid of travelling by bus, train, or car	0.67
Anxiety	
2. Feeling easily irritated or annoyed	0.33
20. Feeling anxious or fearful	0.50
22. Tension or inability to relax	0.46
23. Excessive worry about several different things	0.40
24. Feeling so restless that it is hard to sit still	0.37
26. Easily startled	0.47
Fatigue	
4. Fatigue or loss of energy	0.65
8. Diminished ability to think or concentrate	0.46
9. Feeling slowed down	0.50
19. Rest does not restore strength	0.56
21. Being easily fatigued	0.59
Insomnia	
10. Difficulty falling asleep	0.60
11. Restless or disturbed sleep	0.71
12. Waking up too early	0.48

variance, had the highest loadings on appetite and excessive sleepiness items and also two items of social anxiety, which also loaded more than 0.5 on the depression factor. Considering the ambiguous nature of the sixth factor, we maintained only the first five factors as a basis for EST-Q subscales. Still, we tentatively retained the remaining items on the EST-Q questionnaire for further analysis and included them in computing the total score. Inclusion of double-loading items in subscales was based on their accordance with the diagnostic criteria of the DSM-IV. On the same principle we excluded items of social anxiety from depression subscale and the item of excessive fear of illness from the agoraphobia–panic subscale. As a result, the following five subscales were formed (Table 2): Depression with eight items (1, 3, 5–7, 16–18), Anxiety with six items (2, 20, 22–24, 26), Agoraphobia–Panic with five items (25, 29–32), Fatigue with five items (4, 8, 9, 19, 21), and Insomnia with three items (10–12).

The internal reliability of the total scale and subscales was assessed by computing Cronbach's α reliability coefficients in patient group. The total EST-Q had an α of 0.88, the Depression scale, 0.87; Anxiety, 0.69; Agoraphobia–Panic, 0.82; Fatigue, 0.77; and Insomnia, 0.76. All subscales were internally consistent, with α values exceeding 0.6. Correlations of items with sum scores of subscales are reported in Table 2. In the Depression scale all items correlated with the total score with r greater than 0.55. The lowest item–total correlations were found in the Anxiety scale. At the same time, when we computed the same data only in a group of patients with anxiety disorders, the correlations turned out to be satisfactory (0.56 for item 2, 0.61 for item 20, 0.66 for item 22, 0.44 for item 23, 0.54 for item 24, and 0.67 for item 26). Other subscales had satisfactory item–total correlations. The reliability data in the nonpatient sample were similar and therefore are not separately reported.

Table 3 shows the mean values of the EST-Q total score and subscale scores of the patient sample and the population sample. The nonpatient group had significantly lower values on all subscales and also on the total score. The mean scores of the subscales across the diagnostic groups are presented in Table 4. The diagnostic groups differed significantly with regard to all EST-Q subscales. The post-hoc Tukey HSD test showed the following significant differences between patient groups. The Depression subscale had the highest score in the group of depressive patients. The DD group had statistically significant differences in Depression score compared with the AP, GAD, and SF patients ($P < 0.05$). The Agoraphobia–Panic subscale score was significantly higher in the AP patient group than in all other diagnostic groups ($P < 0.05$).

The Anxiety score was highest in the GAD patients, distinguishing this group significantly from DD, AP, and SF patients ($P < 0.05$). Fatigue and Insomnia subscales showed significant difference only between DD and AP groups ($P < 0.05$).

Table 5 shows the Pearson product–moment correlations between EST-Q total score, subscales, and the DEPS, an additional measure of depression in the patient group. All subscales had moderately significant correlations with each other except Insomnia, which was not related to Agoraphobia–Panic and Anxiety. All subscales correlated significantly with the EST-Q total score and the DEPS. The DEPS had the strongest relationship with the Depression subscale.

Discussion

The EST-Q showed satisfactory psychometric properties. Factor-analytically derived subscales had adequate internal consistency, indicating that the EST-Q is a reliable instrument in the assessment of such psychopathology dimensions as depression, general anxiety, agoraphobia–panic, fatigue, and insomnia. The Depression subscale had the highest internal consistency, and the Anxiety subscale the lowest. This is similar to the results found with other multidimensional instruments in which subscales assessing depression have higher internal consistency than those measuring anxiety (24–26). Possibly, depression is a better-defined and more unitary construct than anxiety. The factor structure of the EST-Q confirmed the expectation of separate depression and anxiety factors containing items corresponding to diagnostic criteria of depression and generalized anxiety. As in other questionnaires measuring general and phobic anxiety separately (16), these constructs were also separated by factor analysis in our study. Unexpected was emergence of a distinct fatigue factor. Symptoms of low energy and easy fatigability are usually included in diagnostic criteria for depressive disorders and constitute part of rating scales for depression (11, 19).

The scores on the EST-Q of patient and population samples differed sufficiently to conclude that the instrument has a good discriminative validity. The comparison of diagnostic groups supports the idea that three subscales are diagnosis-specific and can be used in

Table 3. Mean EST-Q scores in patient and nonpatient groups.

	Patient		Nonpatient			
Subscales	Mean	*s*	Mean	*s*	*F* (DF)	*P*
Depression	17.9	6.6	5.0	4.9	780.65 (1, 671)	<0.001
Agoraphobia–panic	5.5	4.8	0.9	2.3	290.30 (1,671)	<0.001
Anxiety	15.4	3.9	5.0	4.2	893.32 (1, 671)	<0.001
Fatigue	12.8	3.8	4.7	3.8	622.23 (1, 671)	<0.001
Insomnia	7.3	3.1	2.7	3.1	304.98 (1, 671)	<0.001
EST-Q total score	67.8	17.8	20.6	16.1	1115.97 (1, 671)	<0.001

s = Standard deviation.

Table 4. Mean values of the EST-Q subscales across the diagnostic groups.

	Diagnostic group											
	DD		AP		GAD		SF		NEUR			
Subscale	Mean	*s*	Mean	*s*	Mean	*s*	Mean	*s*	Mean	*s*	*F* (DF)	*P*
Depression	19.6	6.1	15.5	5.6	14.9	5.5	14.9	7.7	12.3	8.0	6.67 (4, 189)	<0.001
Agoraphobia–panic	4.2	3.9	11.2	5.3	6.9	2.9	5.5	4.3	2.0	2.3	19.08 (4, 189)	<0.0001
Anxiety	15.5	3.5	14.7	4.2	18.8	2.5	13.6	4.7	14.8	4.3	4.55 (4, 189)	<0.005
Fatigue	11.5	2.9	9.4	3.3	11.6	2.8	10.6	3.4	11.2	3.3	3.73 (4, 189)	<0.01
Insomnia	7.9	4.0	5.5	3.0	8.3	2.5	7.3	3.4	5.7	4.0	3.75 (4, 189)	<0.01

s = Standard deviation.

Table 5. Correlations of the EST-Q subscales, total score, and the Depression Scale in the patient group.

	Total score	DEPS	Depression	Agoraphobia–panic	Anxiety	Fatigue	Insomnia
Total score	1.00						
DEPS	0.79*	1.00					
Depression	0.81*	0.89*	1.00				
Agoraphobia–panic	0.55*	0.20*	0.20*	1.00			
Anxiety	0.73*	0.49*	0.55*	0.32*	1.00		
Fatigue	0.73*	0.67*	0.59*	0.18*	0.45*	1.00	
Insomnia	0.34*	0.34*	0.18*	−0.01	0.14	0.27*	1.00

* Significant correlations, $P < 0.05$.

differentiating anxiety and depressive disorders. One subscale, Agoraphobia–Panic, is highly discriminative. The validity of the Depression scale is further confirmed by its high correlation with another measure of depression, the DEPS. Two subscales, Fatigue and Insomnia, are not discriminative across diagnostic categories. This finding supports results from other studies indicating that self-rated symptoms of fatigue and insomnia are equally characteristic of depressive and anxiety states (27). We therefore suggest that these subscales assess general symptom dimensions, which characterize several psychiatric disorders.

Usually, high correlations have been found between measures of anxiety and depression (24, 28, 29). This and high comorbidity of corresponding disorders have led to the proposition of a large common component in anxiety and depression (30). This overlap may constitute difficulties in separating anxiety and depression by means of self-report measures. It has even been suggested that self-rating scales assess general negative mood, not distinct constructs of anxiety and depression, and therefore are not suitable for distinguishing these mood states (31, 32). Our data show correlations between anxiety and depression which are significant but not so large that we could conclude that they are different facets of the same phenomenon. Moreover, the factor structure of the EST-Q suggests that, at least in clinical samples, although significantly correlated, depression and anxiety are separate constructs and represent distinct symptom dimensions. This is in accordance with the results of Burns & Eidelson (33), who also obtained separate anxiety and depression factors. Keeping items of fatigue and insomnia apart from core symptoms of anxiety and depression may be one factor that improves the discriminative power of the respective subscales. Often questionnaires for anxiety and depression contain similar items of both fatigue and sleeping problems (12, 13), which may be one reason for the high overlap of the self-rating of these conditions. The EST-Q therefore appears to be promising in distinguishing depressive and anxiety disorders, as it has disorder-specific and nonspecific symptoms in separate subscales.

Some limitations of this study should be mentioned. This report is based on the assessment of psychiatric patients and a population sample. As no diagnostic interview was used in the population sample, we could not determine the exact cut-off points of subscales for screening purposes. Another limitation is the unequal size of patient groups, with the overrepresentation of depressive disorders compared with anxiety disorders.

In conclusion, the EST-Q is a reliable and valid instrument for assessing such psychopathology dimensions as depression, general anxiety, agoraphobia–panic, fatigue, and insomnia. Good differentiating properties suggest its usefulness as a screening instrument. Whether this scale is also sensitive to change and could be used as an assessment tool in treatment efficacy research remains a topic for further research.

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