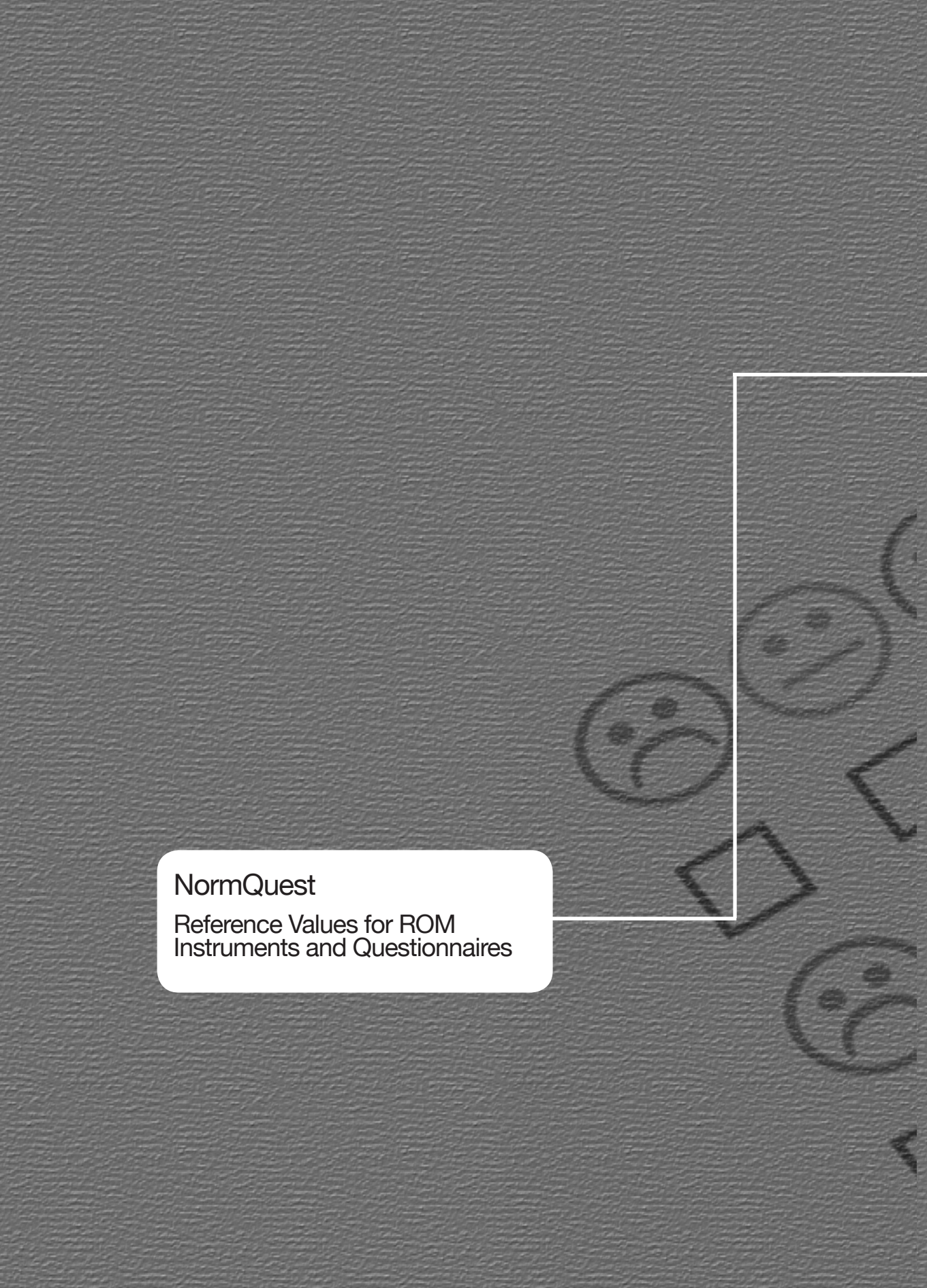

NormQuest

Reference Values for ROM Instruments and Questionnaires

Chapter 7

Development and validation of the 48-item Symptom Questionnaire (SQ-48) in patients with depressive, anxiety and somatoform disorders

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ABSTRACT

Self-report measures of psychological distress or psychopathology are widely used and can be easily implemented as psychiatric screening tools. Positive psychological constructs such as vitality/optimism and work functioning have scarcely been incorporated. We aimed to develop and validate a psychological distress instrument, including measures of vitality and work functioning. A patient sample with suspected depressive, anxiety, and somatoform disorders (N=242) and a reference sample of the general population (N=516) filled in the 48-item Symptom Questionnaire (SQ-48) plus a battery of observer-rated and self-report scales (MINI Plus, MADR, BAS, INH, BSI), using a web-based ROM program. The resulting SQ-48 is multidimensional and includes the following nine subscales: Depression (MOOD, six items), Anxiety (ANXI, six items), Somatization (SOMA, seven items), Agoraphobia (AGOR, four items), Aggression (AGGR, four items), Cognitive problems (COGN, five items), Social Phobia (SOPH, five items), Work functioning (WORK, five items), and Vitality (VITA, six items). The results showed good internal consistency as well as good convergent and divergent validity. The SQ-48 is meant to be available in the public domain for Routine Outcome Monitoring (ROM) and can be used as a screening/monitoring tool in clinical settings (psychiatric and non-psychiatric), as a benchmark tool, or for research purposes.

INTRODUCTION

The measurement of self-reported psychological distress is prominently represented in both the psychological and psychiatric literature. Historically, assessment of the general psychological status of individuals by means of self-report dates back to the First World War, and the development of the so called Personal Data Sheet by Woodworth [1]. Woodworth's scale provided a means for each man to "interview himself" and created a historical benchmark for a new modality of psychological measurement [2]. Nowadays, self-report measures of psychological distress or psychopathology are widely used as psychiatric screening tool in clinical settings and epidemiological studies.

Many validated self-report questionnaires for measuring psychological distress or psychopathology have been developed [3-6]. For instance, Symptom Checklist-90 [7] and its short-form Brief Symptom Inventory [2,8]; General Health Questionnaire [9]; 50-Item Brief Symptom Rating Scale [10]; Talbieh Brief Distress Inventory [11]; Mood and Anxiety Symptoms Questionnaire [12,13] and its short-form MASQ-D30 [14].

Studies concerning the above-mentioned instruments often used multiple related concepts interchangeably: concepts such as psychological distress, emotional distress, affective distress, mental distress, global distress, symptom distress, psychiatric distress, general psychopathology. Notably, however, these instruments have been useful for assessing the aggregate level of nonspecific psychological distress, and not for diagnosing particular psychiatric disorders [3,5,15]. Elevated scores on the scales are an indicator of possible psychopathology and could assist the clinician to predict the probability of individuals meeting criteria for disorder [3,16,17].

More specifically, "psychological distress" can be described as a reaction of an individual to external and internal stresses, characterized by a mixture of psychological symptoms, such as sadness, anxiety, confused thinking, hopelessness, helplessness, dread, and poor self-esteem [6]. In addition, some instruments, such as the BSI, include somatic distress. Psychological distress was originally considered as a uni-dimensional construct. However, more recent research suggested a multidimensional structure of psychological distress. For instance, Schwannauer and Chetwynd [18] found a three-factor model of depression, anxiety, and general psychological distress.

The assessment of psychological distress is important both in health care and mental health care, because of its relevance for compliance, quality of life, prediction of treatment outcome, and planning of treatment [6,19-21]. Research has shown that pervasive distress may affect the course of illness, symptom expression, as well as levels of social relationships and adaptation [6,22-24].

relationships and adaptation [6,22-24].

More recently, there is a growing awareness that, in addition to distress-based measures, attention must also be paid to more positive constructs such as vitality/optimism

[25,26] and work functioning [27,28]. The importance of both constructs has already been demonstrated. For instance, Burdick et al. [27] showed that poor work functioning was significantly related to subsyndromal depression and course of illness. Emotional vitality, on the other hand, seems to be a critical positive psychological factor (related to but separate from optimism) that may promote psychological health as well as physical health [25,29-31]. In addition, (lack of) vitality/optimism has been shown to be an important defining feature of depression, with distinct implications for prognosis [32].

To date, there is no psychological distress instrument available that also measures vitality and work functioning. Another shortcoming is that most self-report instruments are usually not free of charge, which particularly in Routine Outcome Monitoring (ROM) with repeated assessment is a costly matter. In line with these shortcomings, the purpose of this study was to develop and validate a brief psychological distress instrument (SQ - 48), which also includes measures of vitality and work functioning (or study). In addition, the SQ-48 is developed as a public domain questionnaire, freely available to clinicians and researchers. This practical advantage is in line with growing efforts in other scientific areas to develop instruments that are free of charge [33].

The SQ-48 is meant as a screening tool to improve diagnostic recognition in clinical and nonclinical settings. Therefore, the present study used both clinical and nonclinical samples: a patient sample with suspected depressive, anxiety, and somatoform disorders, and a reference sample of the general population. In this way, the SQ-48 could be useful as a monitoring tool in the context of ROM [4,33,34], for benchmark purposes (Hermann et al., 2006; Minami et al., 2008; Cleary et al., 2010), or as a research tool in for instance epidemiological studies.

METHODS

The present study was conducted with patients and non-patients, and consisted of two phases: (1) instrument development of the SQ-48 and (2) its psychometric evaluation.

Participants and procedures

The total sample among which the SQ-48 was developed and evaluated consisted of participants from two large studies: a Routine Outcome Monitoring (ROM) sample of psychiatric outpatients and a ROM reference sample of the general population.

The Medical Research Ethics Committee at the Leiden University Medical Centre (LUMC) approved the general study protocol and documents presented to participants in both phases. A comprehensive protocol safeguards anonymity of ROM-participants and ensures proper handling of the data. This protocol (Psychiatric Academic Registration Leiden database) is available on request for participants, and informed consent is not required for patients. Non-patients provided written and informed consent.

For details about the web-based ROM programme of the LUMC, Department of Psychiatry, we refer to some relevant publications [26,34-36]; see also www.lumc.nl/psychiatry/ROM-instruments).

The ROM patient-group

A total of 242 psychiatric outpatients was included (61.2% females; mean age=38.8 years; SD=14.0), referred with suspected (not necessarily diagnosed) mood, anxiety or somatoform disorders to the LUMC Department of Psychiatry or to Rivierduinen specialized mental healthcare centres. Data were collected during a 2-3 h ROM baseline assessment in the LUMC or at the home of the participant. The assessment consisted of a face-to-face psychiatric interview by a trained psychiatric research nurse and the administration of observer-rated and self-report questionnaires, including the SQ-48.

The ROM reference-group

A total of 516 participants (67.2% females; mean age=38.8 years; SD=12.8) was included in the reference-group, as part of the 'Leiden Routine Outcome Monitoring Study' [36,37]. These participants were randomly selected from the registration systems of general practitioners (GPs) in the Leiden region, in order to recruit a representative general population sample (all Dutchmen are registered with a GP). Because the group was aimed to be used as a healthy reference-group, participants that received treatment for psychiatric problems and/or dependence on alcohol or drugs within six months prior to the assessment were excluded. The inclusion for the ROM reference-group was stratified for gender (62.6% women), age (mean 40.2 years; SD 12.5) and urbanization-level (62.3% urban), to make the group demographically comparable to the ROM patient-group. The participants in the reference-group completed the same assessments as the patient-group.

Instruments

Development of the SQ-48

The SQ-48 was developed to include separate subscales concerning several psychopathological domains matching diagnostic categories in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; [38]. Three main goals were set to achieve during the SQ-48 item-writing and item-selection procedure. First, the items should be easy and unequivocal to understand for everyone, irrespective of level-of-education. Second, the instrument should include measures of functioning which can judge the actual impact of psychiatric problems on daily life. Third, the instrument should cover (lack of) vitality/optimism.

The initial item development followed commonly accepted methods for the creation of patient-reported instruments [39-44]. The questionnaire was drafted by a multidisciplinary team of psychologists and psychiatrics through a comprehensive review of existing screening tools, relevant literature, as well as psychiatric diagnostic criteria for mood, anxiety, and somatoform disorders on the basis of the DSM-IV.

Existing screening tools reviewed in this context were for instance: MASQ (-D30); Dimensional Assessment of Personality Pathology-Short Form [45]; BSI; Short-Form 36 [46]; Outcome Questionnaire 45 [47,48]; Fear Questionnaire [48]; Aggression Questionnaire [49]; Mental Vitality Scale [50]; Work Home and Leisure Activities Scale [51]; MIRECC Version of the Global Assessment of Functioning Scale [52]; Physical Symptom Checklist [53]; Life Orientation Test-revised concerning optimism [54].

The SQ-48 development was based on consensus within the aforementioned multidisciplinary team. It was decided to create a questionnaire covering nine domains or categories: depression, anxiety, somatization, cognitive problems, social phobia, agoraphobia, aggression, work (or study) functioning, and vitality/optimism. Except work functioning and vitality, these general domains cover the most common psychopathological symptoms. So, items were arranged in subscales according to this organization and chosen from a large pool of items. Each item was evaluated to determine whether it was formulated in the simplest way and whether it was unambiguous in its meaning. If there was any disagreement about this within the team, the item was not included. Additional care was taken to prevent redundancy within subscales and to prevent overlap between subscales, to increase the potential discriminant ability of the subscales. The experimental version of the questionnaire was pre-tested in a reduced sample (n=30) of participants in the ROM programme. The aim of the pre-test was to evaluate the practicality and acceptability by collecting comments of participants, clinicians, investigators, in order to better formulate the items.

The final version of the questionnaire included 48 items based on re-evaluation. Re-evaluation consisted of an Exploratory Factor Analysis with oblique Promax-rotation in both non-reduced samples, to check for items with ambiguous factor loads (loads on more than one factor). On the whole, the following seven items were removed because the factor loads indicated poor fit: “I felt confused” (factor load 0.18); “I had the feeling as if something

terrible was going to happen" (factor load 0.21); "I could not relax in the company of others" (factor load 0.03); "I have threatened people I know" (factor load 0.38); "I was incited by people" (factor load 0.24); "I couldn't enjoy my free time" (factor load 0.01); "In the morning I was full of energy" (factor load 0.61).

The final version of the SQ-48

The nine subscales of the SQ-48 corresponded with the abovementioned domains of interest. Five subscales covered aspects of psychopathology: Depression ("MOOD" subscale: items 3, 7, 13, 19, 38, 40), Anxiety, ("ANXI" subscale: items 24, 28, 33, 41, 46, 48), Somatization ("SOMA" subscale: items 1, 5, 11, 17, 22, 26, 31), and Agoraphobia ("AGOR" subscale: items 4, 8, 14, 25). In addition, four subscales were constructed to assess specific aspects of behaviour and/or functioning: Aggression ("AGGR" subscale: items 10, 16, 21, 43), Cognitive problems ("COGN" subscale: items 2, 6, 39, 44, 47), Social Phobia ("SOPH" subscale: items 23, 27, 32, 36, 45), Work ("WORK" subscale: items 9, 15, 20, 30, 35), and Vitality/Optimism ("VITA" subscale: items 12, 18, 29, 34, 37, 42). Each item is rated by the respondent on a 5-points Likert-scale (0: 'Never', 1: 'Rarely', 2 'Sometimes', 3: 'Often', 4: 'Very often'). Mean administration time was 5.4 minutes (S.D.=1.4).

Respondents received the following instruction in the SQ-48: "Try to answer the following statements honestly and accurately. Please indicate what applies best to you. There are no 'right' or 'wrong' answers. Give the answer that best expresses how often you have felt that way in the last week, including today. The answer which comes to your mind first, is often the best answer. Note: If you did not work or study or have not been able to do so, then you can skip questions 9, 15, 20, 30 and 35".

The scoring of the SQ-48 items is as follows. For the score of all subscales, the scores of the relevant items must be added. The 48 items are scored 0-4.

For the purpose of this article, the Dutch SQ-48 was translated into English, according to guidelines for translation and cultural adaptation of questionnaires [55-57]. Both English and Dutch SQ-48 are available as Supplementary material associated with this article, and can be found in the online version.

Other measures

In both groups, the same battery of other measures was administered. The presence of DSM-IV diagnoses was determined by a trained psychiatric research nurse by means of the Mini-International Neuropsychiatric Interview (version: MINI Plus; [58]. General psychopathology was assessed with two generic measures. The first was an observational instrument, the CPRS-SF (Comprehensive Psychopathological Rating Scale-Short Form) consisting of: the Montgomery–Åsberg Depression Rating Scale (MADRS; [59], the Brief Anxiety Scale (BAS; [60], and a scale assessing psychomotor inhibition (INH; [61,62]. The second generic instrument, the BSI, is a self-report instrument that assesses psychopathological symptoms in several domains such as depressive -, anxiety-, somatic symptoms, and hostility [2,63].

Statistical analyses

Analyses were performed in both the patient and reference samples and in the combined datasets. In both samples, data were prepared: missing values were substituted by the mean item-response per subject per subscale. Subjects who had more than three missing values for the total sum score (or more than one per subscale) were excluded.

To evaluate the construct validity, Confirmatory Factor Analysis (CFA) was used on the non-reduced samples (N=516 patient sample, N=242 reference sample). The appropriateness of a 9-factor model (the SQ-48 subscale structure) was evaluated and compared with a 1-factor model. In the input model, all items were set to load freely on their hypothesized factor, except for one item per factor, which had its loading set to 1 in order to fix the scale of the model. Because the items were categorical and non-normally distributed, fit-estimations were based on robust maximum likelihood [64], using polychoric correlation matrices [65]. Fit-indices instead of a traditional $\chi 2$-test were used to assess fit, because the $\chi 2$-test is oversensitive to misfit when testing complex models [66]. The used fit-indices were the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA). A CFI of at least 0.90 indicates adequate fit, and an RMSEA that is smaller than 0.08 indicates acceptable fit. The CFA was conducted with EQS 6.1 [65].

To investigate internal consistency, Cronbach's alphas were calculated for the subscales and the total scale. To investigate the extent of differentiation between the subscales, Spearman's (ϱ) correlation coefficients were computed for intercorrelations of the SQ-48 subscales. To evaluate convergent/divergent validity, correlations (Spearman's ϱ) between the subscale scores and other instruments (see paragraph 2.2.3) were calculated. ROC (Receiver Operating Characteristic) analysis provided a cut-off score indicating an optimal discrimination threshold between "healthy" and "diseased". Sensitivity and specificity were chosen to be equal, taking into account the trade-off between the two. AUC's (Area Under Curves) were calculated to indicate the predictive capacities of the instrument subscales.

RESULTS

Sociodemographic and clinical characteristics of the samples

The sociodemographic characteristics of the two research groups are shown in Table 7.1.

Table 7.1: Sociodemographic and clinical characteristics of the samples

	Reference group (n=516)	Patient group (n=242)	p-value
Female gender (%)	347 (67.2%)	149 (61.6%)	0.13
Age (yr), mean (SD)	38.8 (12.7)	37.9 (12.9)	0.38
Marital status[1]: - n (%)			
Married/cohabitating	355 (68.4%)	115 (47.5%)	<0.001
Divorced/seperated/widow	23 (4.5%)	29 (12.0%)	
Single	140 (27.1%)	98 (40.5)	
Housing situation[1]: - n (%)			
Living alone	79 (15.3%)	77 (31.8%)	0.02
Living with partner	357 (69.2%)	115 (47.5%)	
Living with family	80 (15.5%)	50 (20.7%)	
Educational status, n (%)			
Lower	126 (24.4%)	73 (30.1%)	0.07
Higher	390 (75.6%)	149 (69.8%)	
Employment status, n (%)			
Employed part-time	218 (42.2%)	54 (22.3%)	<0.001
Employed full-time	199 (38.6%)	53 (21.9%)	
Unemployed/retired	84 (16.3%)	76 (31.4%)	
Work-related disability	15 (2.9%)	59 (24.4%)	
Ethnic background, n (%)			
Dutch	467 (90.5%)	198 (81.8%)	0.07
Other ethnicity	49 (9.5%)	44 (18.2%)	

Both groups were similar with regards to most sociodemographic variables. As expected – because of the sampling procedure – the mean age and gender distribution were comparable between the reference- and patient-groups. Educational status was also roughly similar; the reference-group had 75.6% higher education compared to 69.8% of the patient-group education. However, the groups also differed on some aspects. In the patient-group, participants were less often married and more often unemployment or with work-related disability compared to the reference group.

Table 7.2: Clinical characteristics according to group.

	Range of scores	Reference group (n=516)	Patient group (n=242)	p-value
Psychiatric scales, mean (SD)				
MADRS	0-6	3.0 (4.0)	18.5 (9.1)	<0.001
INH	0-6	0.62 (1.5)	3.4 (3.0)	<0.001
BSI	0-4	0.2 (0.3)	1.2 (0.7)	<0.001
BAS	0-6	4.4 (4.2)	13.9 (6.2)	<0.001
SQ-48 scores, mean (SD)				
MOOD	0-24	2.1 (2.5)	11.3 (6.3)	<0.001
ANXI	0-24	3.8 (3.9)	12.1 (5.8)	<0.001
SOMA	0-28	1.7 (3.1)	6.3 (6.2)	<0.001
AGOR	0-16	0.4 (1.1)	2.8 (3.6)	<0.001
AGGR	0-16	1.2 (1.7)	3.7 (3.4)	<0.001
COGN	0-20	4.1 (3.4)	11.3 (4.6)	<0.001
SOPH	0-20	2.4 (3.0)	8.1 (5.1)	<0.001
WORK	–	–	–	<0.001
VITA	0-24	15.8 (4.6)	9.2 (4.9)	<0.001
MINI-Diagnoses, n (%)				
Depressive disorder		1 (0.2%)	64 (26.4%)	<0.001
Anxiety disorders		35 (6.8%)	31 (12.8%)	<0.001
Comorbid depression & Anxiety		6 (1.2%)	66 (27.3%)	<0.001

BSI denotes the short-form Brief Symptom Inventory, BAS denotes Brief Anxiety Scale, INH denotes the scale assessing psychomotor inhibition, and MADRS denotes Montgomery-Åsberg Depression Rating Scale. SQ-48 subscales: MOOD denotes Depression, ANXI denotes Anxiety, SOMA denotes Somatization, AGOR denotes Agoraphobia, AGGR denotes Aggression, COGN denotes Cognitive problems, SOPH denotes Social Phobia, WORK denotes Work functioning, and VITA denotes Vitality. Because of adjustments made to the final version of instructions to the WORK subscale, insufficient data were available as yet.

The clinical characteristics of the two groups are shown in Table 7.2.
As expected, the scores on all psychopathology ratings were much higher in the patient-group than in the reference-group. Specifically, the mean total SQ-48 score in the patient-group (73.0) was twice as high compared to the reference-group (36.6). The majority of the patient-group met criteria for depression and anxiety disorder (27.3%) versus a neglectable few in the reference-group (1.2 %).

Confirmatory Factor Analyses

CFA was conducted to test the fit of a 9-factor structure to the SQ-48 data. The hypothesized model fitted well with the data in both the reference-group (CFI=0.96; RMSEA=0.05) and the patient-group (CFI=0.97; RMSEA=0.06). In addition, the fit of a simple 1-factor model was worse in both samples (reference group: CFI=0.88; RMSEA=0.08; patient group: CFI=0.88; RMSEA=0.13).

Scale intercorrelations

The Spearman rho's intercorrelations of the SQ-48 subscales are shown in Table 7.3.
The correlations ranged from 0.38 to 0.81, with the highest correlations between MOOD and ANXI (ϱ=0.81), MOOD and COGN (ϱ=0.78), COGN and ANXI (ϱ=0.76), and between ANXI and SOPH (ϱ=0.73). The lowest correlations were found between VITA and AGGR (ϱ=0.38), and between AGOR and AGGR (ϱ=0.39).

Table 7.3: Correlations between the subscales of the SQ-48 in all 758 subjects.

	MOOD	ANXI	SOMA	COGN	SOPH	AGOR	AGGR
ANXI	0.81						
SOMA	0.52	0.59					
COGN	0.78	0.76	0.55				
SOPH	0.69	0.73	0.47	0.72			
AGOR	0.51	0.57	0.50	0.49	0.56		
AGGR	0.60	0.60	0.44	0.56	0.54	0.39	
VITA	–0.66	–0.57	–0.43	–0.60	–0.54	–0.45	–0.38

Data are Spearman's (rho) correlation coefficients. All P-values <0.001.
SQ-48 subscales: MOOD denotes Depression, ANXI denotes Anxiety, SOMA denotes Somatization, AGOR denotes Agoraphobia, AGGR denotes Aggression, COGN denotes Cognitive problems, SOPH denotes Social Phobia, WORK denotes Work functioning, and VITA denotes Vitality.
Because of adjustments made to the final version of instructions to the WORK subscale, insufficient data were available as yet.

Internal consistency

The internal consistency coefficients of the SQ-48 subscales were as follows. In general, the Cronbach's alpha coefficients ranged from 0.78 to 0.98 across the different SQ-48 subscales: 0.97 (Total); 0.93 (MOOD); 0.92 (ANXI); 0.89 (SOMA); 0.89 (COGN); 0.91 (SOPH), 0.84 (AGOR); 0.78 (AGGR); 0.90 (VITA); 0.78 (WORK). So, none of the subscales had alphas below the critical cut-off of 0.70, indicating overall adequate to high internal consistency.

Convergent/divergent validity

Correlations between the SQ-48 subscales and other instruments are shown in Table 7.4.

Table 7.4: Correlations between the subscales of the SQ-48 in all 758 subjects.

Scale	MADRS	INH	BAS	BSI
MOOD	0.77	0.61	0.69	0.82
ANXI	0.73	0.52	0.72	0.84
SOMA	0.51	0.35	0.53	0.59
AGOR	0.47	0.42	0.50	0.58
AGGR	0.47	0.32	0.50	0.60
COGN	0.73	0.54	0.64	0.82
SOPH	0.60	0.49	0.57	0.77
VITA	–0.64	–0.56	–0.59	–0.66

Data are Spearman's (rho) correlations coefficients are presented. All P-values <0.05.
BSI denotes the short-form Brief Symptom Inventory, BAS denotes Brief Anxiety Scale, INH denotes the scale assessing psychomotor inhibition, and MADRS denotes Montgomery-Åsberg Depression Rating Scale. MOOD denotes Depression, ANXI denotes Anxiety, SOMA denotes Somatization, AGOR denotes Agoraphobia, AGGR denotes Aggression, COGN denotes Cognitive problems, SOPH denotes Social Phobia, VITA denotes Vitality. Because of adjustments made to the final version of instructions to the WORK subscale, insufficient data were available as yet.

In line with its coverage of depression-related symptomatology, the MADRS was most strongly correlated with the MOOD subscale (ϱ=0.77), the ANXI and COGN subscales (ϱ=0.73), and the VITA subscale (ϱ=0.64). In line with its anxiety-related symptomatology, the BAS was most strongly correlated with the ANXI subscale (0.72), the MOOD subscale (ϱ=0.69) and the COGN subscale (ϱ=0.64). The INH scale was most strongly correlated with the MOOD subscale (ϱ=0.61) and VITA subscale (ϱ=0.56), in line with its presumed role in both depression and its counterpart vitality. The BSI was moderately to strongly correlated with all subscales, indicating that all subscales are associated with overall psychopathology severity.

Reference values

Finally, percentiles and mean values on the SQ-48 subscales in the ROM reference (n=516) - and patient (n=242) groups are shown in Table 7.5.

Table 7.5 shows the following P_{95} cut-off values for the subscales, i.e., MOOD-8.0; ANXI-11.2; SOMA-8.0; AGOR-2.0; AGGR-5.0; COGN-11.0; SOPH-9.0; and VITA-15.0. These cut-off points are more conservative (with higher specificity but lower sensitivity for MAS disorders) than ROC cut-off points (AUC). Table 5 also shows the cut-off values with almost equal (optimal) sensitivity and specificity values, i.e., MOOD-4.0 (0.91); ANXI-6.5 (0.88); SOMA-1.5 (0.74); AGOR-0.5 (0.75); AGGR-1.5 (0.74); COGN-7.5 (0.89); SOPH-3.5 (0.83); and VITA-10.5 (0.87). Because of adjustments made to the final version of instructions to the WORK subscale, insufficient data were available as yet. These adjustments were related to the fact that many patients no longer worked or could no longer work. As a result, there were also no sufficient data available regarding the total scale of the SQ-48.

Table 7.5: 95th percentiles, mean, and cut off values (with their accompanying sensitivity and specificity) of the ROM reference (n=516) and patient (n=242) groups for subscales of the SQ-48.

	Reference group (n=516)				Receiver Operating Characteristics analysis				Patient group (n=242)
	Mean ± SD	P_{95}	Sensiitivity	Specivicity	Optimal cut-off	AUC	Sensitvity	Specificity	Mean ± SD
Aggression (AGGR)	1.20 ± 1.65	5.0	0.31	0.96	1.5	0.74	0.66	0.70	3.70 ± 3.35
Agoraphobia (AGOR)	0.38 ± 1.14	2.0	0.49	0.94	0.5	0.75	0.62	0.83	2.79 ± 3.59
Anxiety (ANXI)	3.80 ± 3.86	11.2	0.59	0.96	6.5	0.88	0.80	0.80	12.14 ± 5.77
Cognitive complaints (COGN)	4.08 ± 3.40	11.0	0.55	0.96	7.5	0.89	0.79	0.83	11.25 ± 4.57
Depression (MOOD)	2.14 ± 2.50	8.0	0.68	0.96	4.0	0.91	0.86	0.84	11.32 ± 6.27
Somatic complaints (SOMA)	1.71 ± 3.05	8.0	0.34	0.95	1.5	0.74	0.72	0.66	6.25 ± 6.22
Social phobia (SOPH)	2.36 ± 3.02	9.0	0.44	0.96	3.5	0.83	0.79	0.73	8.09 ± 5.06
Vitality/optimism (VITA)	7.66 ± 3.93	15.0	0.54	0.95	10.5	0.87	0.80	0.80	15.04 ± 4.99

In the Receiver Operating Characteristic (ROC) analysis, the optimal cut-off was considered when the sensitivity was equal to the specificity.
Because of adjustments made to the final version of instructions to the WORK subscale, insufficient data were available as yet.

DISCUSSION

The primary purpose of this study was to construct a psychometrically sound self-report measure for psychopathology (depression, anxiety, somatization, agoraphobia, aggression, cognitive problems, social phobia), which also measures vitality and work functioning. The main advantages of the present study were the use of two samples of both patients and non-patients, as well as the broad composition of a naturalistic outpatient population with mood, anxiety, and somatoform disorders.

The resulting SQ-48 is a multidimensional scale with good internal consistency and validity. Our results also indicated that – as intended – the two samples represent quite different populations, which makes them suitable to test the generalizability of the SQ-48 psychometric properties across different population strata. Also, the large range of correlations in both groups indicated that there is sufficient differentiation across the nine subscales.

Outcome assessment is essential in order to determine treatment effectiveness. Preferably, outcome assessment should be implemented as part of an outcomes evaluation programme [67].With the rapidly growing dissemination of computer-based assessment and feedback tools, the monitoring of psychotherapeutic processes and patients' outcome is becoming feasible in routine clinical practice [33,68]. ROM, in the sense of continuous monitoring of patient progress, requires valid measures, which are sensitive to change but also allow inexpensive repeated assessment [4,33]. In this context, self-report questionnaires are a cost-effective option, because they are inexpensive in terms of professional time needed for administration.

The clinical relevance of self-report measures has been demonstrated [6]. A major problem, however, is the fact that the licence policy of many self-report questionnaires is often restrictive. As a result, computerized assessments may not be possible due to copyright regulations. In addition, there can be serious economic obstacles to frequent assessments for the patient [33]. The SQ-48 is partly developed to overcome these problems, and can be used as a public domain questionnaire in both mental health care and general health care. As an example of the latter, Lee et al. [69] described the use of routine distress screening of newly admitted patients to an acute haematology and oncology ward.

Most scales of the SQ-48 measure psychopathology or psychological distress. Psychological distress also incorporates other nonspecific psychological manifestations, has stronger relations with common psychosocial factors, and tends to be milder and more transient than for instance depression [70]. A growing number of studies place specific emphasis on the need to expand the focus from only negative mental health (symptom- or distress-based outcome measures) to also positive mental health [67,71]. Examples of positive mental health outcome measures are work functioning, vitality, dispositional optimism. For this reason, the SQ-48 also assesses work functioning and vitality. Our results showed low correlations between work functioning and vitality, indicating a clear subscale

differentiation. For clinicians it may be helpful to focus on both reducing psychopathology and promoting positive emotions, skills, and engagement with life [29]. Further research in this area is worthwhile.

The endorsing reliability and validity evidence as produced by this study justifies further research on the psychometric properties and utility of the SQ-48. In particular, future research can be pursued in the following five directions (see also [72]. First, cross-validation of the factor analytic solution in an independent sample would enhance confidence in the nine factor structure which was found. Second, it would be informative to compare the results of the SQ-48 to other relevant instruments like for instance the OQ-45, MASQ(-D30). A related research area concerns the possible association between psychological distress measured by the SQ-48 on the one hand and quality of life on the other hand [73]. Third, it would be useful to study the temporal stability of the SQ-48 in a community sample by means of test-retest reliability at for instance one-month interval. Fourth, additional research could explore possible intergroup differences in levels of psychological distress as measured by the SQ-48. More specifically, research could focus on possible differences in psychological distress as a result of for example gender and age [5,74]. Fifth, further research could also determine whether the SQ-48 is useful in predicting treatment outcome.

In summary, the SQ-48 provides a broad and comprehensive survey of psychological distress as well as vitality and work functioning. It has satisfactory psychometric properties and therefore can be used in clinical, research and service settings. Further testing of the utility and validity of the SQ-48 (Dutch and English version) is planned by our department of Psychiatry, including assessment of its use in other cultural settings, psychiatric inpatients, and other diagnostic categories such as personality disorders. Further research is also planned to determine whether the SQ-48 is suitable for measuring changes in symptoms during the course of treatment. Finally, additional data will be collected regarding the subscale WORK and the SQ-48 total scale.

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Supplementary Material

Naam patiënt: Datum: Nummer: Geboortedatum:

Instructie:
Probeer de volgende stellingen eerlijk en accuraat te beantwoorden. Geef aan wat op u van toepassing is. Er zijn geen 'goede' of 'foute' antwoorden. U geeft het antwoord dat het beste uitdrukt hoe vaak u zich **de afgelopen week, met vandaag** erbij, zo hebt gevoeld. Wat het eerste in u opkomt, is vaak het beste .

NB: Indien u niet werkt of studeert, of indien u dat de afgelopen week niet hebt kunnen doen, dan kunt u de volgende vragen overslaan: 9, 15, 20, 30 en 35.

HOEVEEL LAST HAD U VAN:	Nooit	Zelden	Soms	Vaak	Zeer Vaak
1. Ik was kortademig zonder dat ik mij inspande	0	1	2	3	4
2. Ik voelde mij vertraagd of langzaam	0	1	2	3	4
3. Ik was ontevreden.	0	1	2	3	4
4. Ik werd angstig in een menigte van mensen	0	1	2	3	4
5. Ik had hartkloppingen.	0	1	2	3	4
6. Ik had moeite met het nemen van beslissingen.	0	1	2	3	4
7. Ik kon nergens van genieten.	0	1	2	3	4
8. Ik durfde open ruimtes, zoals een plein, niet over te steken.	0	1	2	3	4
9. Ik voelde stress op mijn werk of studie.	0	1	2	3	4
10. Ik had onenigheid met anderen.	0	1	2	3	4
11. Ik voelde pijn of druk op de borst.	0	1	2	3	4
12. Ik zag naar dingen uit.	0	1	2	3	4
13. Ik dacht aan mijn dood of zelfmoord.	0	1	2	3	4
14. Ik durfde niet alleen met het openbaar vervoer te reizen.	0	1	2	3	4
15. Mijn werk of studie gaf me geen voldoening.	0	1	2	3	4
16. Ik was opvliegend zonder aanleiding.	0	1	2	3	4
17. Ik voelde mij duizelig of licht in het hoofd.	0	1	2	3	4
18. Ik had zin om dingen te doen.	0	1	2	3	4
19. Ik had geen zin in het leven.	0	1	2	3	4
20. Ik had het gevoel dat ik teveel werkte of studeerde.	0	1	2	3	4
21. Ik had moeite om mijn woede te beheersen.	0	1	2	3	4
22. Ik voelde tintelingen, bijvoorbeeld in mijn handen.	0	1	2	3	4
23. Ik kon moeilijk voor mijn mening uitkomen.	0	1	2	3	4
24. Ik was bang of angstig.	0	1	2	3	4
25. Ik durfde niet alleen naar een drukke winkel te gaan..	0	1	2	3	4
26. Ik trilde of beefde.	0	1	2	3	4
27. Ik was bang om afgewezen te worden in een groep.	0	1	2	3	4

28. Ik was schrikachtig.	0 1 2 3 4
29. Ik was optimistisch over mijn toekomst.	0 1 2 3 4
30. Ik werkte of studeerde minder hard dan voorheen.	0 1 2 3 4
31. Ik voelde mij rillerig.	0 1 2 3 4
32. Ik voelde mij de mindere van anderen.	0 1 2 3 4
33. Ik was zenuwachtig en nerveus.	0 1 2 3 4
34. Ik had plannen of stelde mezelf doelen.	0 1 2 3 4
35. Ik had het gevoel dat het niet goed ging met mijn werk/studie.	0 1 2 3 4
36. Ik voelde mij ongemakkelijk als anderen naar mij keken.	0 1 2 3 4
37. Ik had interesse in dingen.	0 1 2 3 4
38. Ik voelde mij hopeloos.	0 1 2 3 4
39. Ik was vergeetachtig.	0 1 2 3 4
40. Ik voelde mij somber of depressief.	0 1 2 3 4
41. Ik voelde mij onrustig.	0 1 2 3 4
42. Ik voelde me energiek en levenslustig.	0 1 2 3 4
43. Ik wilde mensen het liefst slaan als dat werd uitgelokt.	0 1 2 3 4
44. Ik had moeite om op gang te komen.	0 1 2 3 4
45. Ik voelde mij onzeker in gezelschap.	0 1 2 3 4
46. Ik voelde mij gespannen.	0 1 2 3 4
47. Ik kon mij niet goed concentreren.	0 1 2 3 4
48. Ik piekerde.	0 1 2 3 4

Name of the Patient:
Today's Date:
Number:
Date of Birth:

Instruction:
Try to answer the following propositions fairly and accurately. There are no 'right' or 'wrong' answers. Give the answer that best expresses the number of times you have felt the following ways **last week, including today**. The answer which comes to your mind first is often the best answer.

Note: If you did not work or study or have not been able to do so, then you can skip the questions 9, 15, 20, 30 and 35.

HOW MUCH TROUBLE DID YOU HAVE:	never	rarely	sometimes	often	very often
1. I was short of breath with minimal excursion.	0	1	2	3	4
2. I felt weak or slow.	0	1	2	3	4
3. I was irritable and dissatisfied.	0	1	2	3	4
4. I felt anxious while I was in a crowd (of people).	0	1	2	3	4
5. I felt palpitations.	0	1	2	3	4
6. I had trouble making decisions.	0	1	2	3	4
7. I could not enjoy anything at all.	0	1	2	3	4
8. I did not dare to cross open spaces, such as a public square.	0	1	2	3	4
9. I felt stressed at my work or study.	0	1	2	3	4
10. I argued with others.	0	1	2	3	4
11. I felt chest pain (or pressure).	0	1	2	3	4
12. I looked forward to things.	0	1	2	3	4
13. I considered my death or suicide.	0	1	2	3	4
14. I did not dare to travel on my own using public transport.	0	1	2	3	4
15. I was dissatisfied with my work or study.	0	1	2	3	4
16. I was hot-tempered without good reason.	0	1	2	3	4
17. I felt dizzy or lightheaded.	0	1	2	3	4
18. I felt like doing things.	0	1	2	3	4
19. I did not want to live anymore.	0	1	2	3	4
20. I had the feeling that I have been working or studying very hard.	0	1	2	3	4
21. I had trouble with controlling my anger.	0	1	2	3	4
22. I felt a tingling, for example in my hands.	0	1	2	3	4
23. I could hardly express myself.	0	1	2	3	4
24. I was afraid or anxious.	0	1	2	3	4
25. I did not dare to go alone to a crowded shop.	0	1	2	3	4
26. I was shaking or trembling.	0	1	2	3	4
27. I was afraid of rejection by others.	0	1	2	3	4
28. I was scared.	0	1	2	3	4
29. I was optimistic about my future.	0	1	2	3	4

30. I worked or studied less intensely than before.	0 1 2 3 4
31. I felt shaky or I had shivers.	0 1 2 3 4
32. I felt low and less than others.	0 1 2 3 4
33. I felt jittery and nervous.	0 1 2 3 4
34. I looked forward to my plans and goals for the future.	0 1 2 3 4
35. I had the feeling that I did not do well with my work or study.	0 1 2 3 4
36. I felt uncomfortable when other people looked at me.	0 1 2 3 4
37. I took interest in things.	0 1 2 3 4
38. I felt hopeless.	0 1 2 3 4
39. I was forgetful.	0 1 2 3 4
40. I felt down or depressed.	0 1 2 3 4
41. I felt restless.	0 1 2 3 4
42. I felt energetic and high-spirited.	0 1 2 3 4
43. I wanted to hit people if I was provoked.	0 1 2 3 4
44. I struggled to get the day started.	0 1 2 3 4
45. I felt insecure in the company of others.	0 1 2 3 4
46. I felt tense.	0 1 2 3 4
47. I could not concentrate well.	0 1 2 3 4
48. I worried.	0 1 2 3 4