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Research report

The validity of the symptom checklist depression and anxiety subscales: A general population study in Sweden

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ABSTRACT

Background: The Symptom Checklist (SCL) is used as a screening tool in patient settings, but is also used as a diagnostic proxy for depression and anxiety in public health surveys. However, there are few validation studies based on general population samples. This study aims to validate the SCL subscales for depression and anxiety in a general population sample in Stockholm, Sweden.
Methods: We used a stratified random sample answering first a postal questionnaire covering SCL ($n=8613$) and then a semi-structured psychiatric interview based using Schedules for Clinical Assessment in Neuropsychiatry (SCAN, $n=881$). Agreement between SCL depression (SCL-DEP) and anxiety (SCL-ANX) scales and their respective DSM-IV disorder was examined by ROC analysis. Discriminant analysis was performed with factor analysis on the SCL depression and anxiety items. The SCL-DEP scale was also compared with the ability of the Major Depression Inventory (MDI) in detecting depressive disorders.
Results: A factor analysis with two factors differentiated the two subscales, with some cross loading items. The SCL-DEP and ANX subscales agreement with depression and anxiety disorders was good. SCL-DEP MDI performed better in detecting DSM-IV depression.
Limitations: The questionnaire only included the SCL depression, anxiety and hostility subscales and not the full SCL-90. Also, no other anxiety scale was available for comparison.
Conclusion: We conclude that depression and anxiety subscales are suitable instrument for proxies of depression and anxiety disorder in public health surveys.

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1. Background

The Symptom Checklist (SCL, sometimes referred to as Hopkins Symptom Checklist, HSCL) was originally developed to study the efficacy of psychotropic drugs and contains questions referring to symptomatic behavior of outpatients (Derogatis et al., 1974). In its full version the SCL covers nine symptom dimensions, each comprised of 3–13 items. Two of these dimensions, Depression (13 items) and Anxiety (10 items), together with two somatic items make up a short version (the SCL-25), which has been used in its entirety or in part in general population studies to detect mental ill-health (Tambs et al., 1993; Bonicatto et al., 1997; Sandanger et al., 1999; Eich et al., 2003; Strand et al., 2003; Olsen et al., 2006; Magnusson Hanson et al., 2014). It has also been used as a screening instrument in epidemiological samples (Lehtinen et al., 1991; Heistaro, 2008).

The SCL has various minor variations (see e.g. Walker et al. (2010)), but the items typically ask about how much discomfort a specific problem or complaint has caused the respondent in the last 7 days (or a similar pre-defined period). Each item is rated on a five point Likert scale ranging from 'not at all' to 'extremely'. A respondent's total score for a factor is the averaged item score, ranging from 0 to 4.Those scoring ≥ 1.75 are typically considered to have a psychiatric disorder.

While several studies have examined the performance of SCL in patient materials (Goldberg et al., 1976; Brophy et al., 1988; Koeter, 1992; Nettelbladt et al., 1993; Joukamaa et al., 1994; Schmitz et al., 1999, 2000; Aben et al. 2002; Pedersen and Karterud, 2004) few have been carried out using random samples where the psychiatric diagnosis is made by clinicians as gold standard. Among those that have been conducted, several disagree on the effectiveness of the scale (s). In a follow-up study of the Northern Finland 1966 Birth Cohort ($n=209$) conducted in 1997, the SCL-25 was compared to the Structural Clinical Interview for DSM-III-R (SCID) (Veijola et al., 2003). A combined scale of depression and anxiety with a cut off of 1.55 was reported to have acceptable sensitivity and specificity for Mood disorder, but poor sensitivity and specificity for Anxiety disorder. In a Norwegian study ($n=617$) SCL-25 was compared to

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the Composite International Diagnosis Interview (CIDI) ICD-10 for Depression, Panic/Generalized Anxiety, Phobia and Somatoform disorder. The agreement, calculated as Area Under the Receiver Operator Characteristics curve (AUC), was found to be excellent for Depression, good for Panic/Generalized Anxiety and poor for Phobia and Somatoform disorder (Sandanger et al., 1998). In contrast, a study based on the 1997 wave of the Swedish Lundby cohort ($n=1231$) found low concordance between SCL-25 and psychiatric diagnosis (own criteria corresponding to DSM-IV Depressive disorder, Anxiety disorder, Phobia and Somatoform disorder) (Mattisson et al., 2013). The SCL Anxiety and Depression subscales were both poor predictors, although the Anxiety subscale performed acceptably well in men for detecting Anxiety syndrome (Mattisson et al., 2013). The three studies used different psychiatric schedules to compare the SCL with, both structured (SCID and CIDI) and semi-structured (Lundby), which may have caused the discrepancy between the studies.

Since previous population based studies disagree on whether SCL is a good instrument for detecting anxiety and depression, and because these studies exhibit methodological problems (e.g. small sample size, failure to examine subscales), or are based on diagnostic criteria developed before standardization of diagnoses we examined the validity of SCL in a large Swedish population based sample using interviews according to the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) as criterion standard. We also examined the discriminate properties of the scale and compared the SCL depression subscale against the Major Depression Inventory (Bech et al., 1997).

The study aimed to examine the concordance between the SCL scale score for depression and anxiety and the DSM-IV depression and anxiety disorders using semi-structured psychiatric interviews as criterion standard. The study also compared the SCL depression scale with the performance of the Major Depression Inventory, and explored the discriminant validity of SCL anxiety and depression scales using factor analysis.

2. Method

2.1. Sample

This study is based on a double-phase random sample of 884 individuals in Stockholm County participating in a semi-structured psychiatric interview conducted between 2001 and 2003. The interview is part of the second wave of a longitudinal (three waves) study called the Mental Health, Work and Relations study (PART by Swedish acronym) that aims to study risk and protective factors for mental illness in the general adult population, and to validate screening instruments. In a first step, five random samples of equal size were drawn from the Stockholm County population register ($N \approx 858{,}000$) at regular intervals between 1998 and 2002 among Swedish citizens age 20–64 residing in Stockholm. In total, 19,742 individuals were sent a questionnaire to which 10,441 responded (53%). These individuals were contacted again with a similar postal questionnaire in 2001–2003, to which 8613 responded (83%). From these 8613 respondents was drawn a stratified random subsample with two equal size strata, using the WHO(ten) Well-Being Index in the postal questionnaire (Bech et al., 1996) as a screening tool. Seven hundred and two screening positives and 702 screening negatives were invited to participate in a psychiatric interview to which 449 and 435, respectively, accepted. The interviews were conducted between 2001-10-10 and 2003-04-07 (median 33 days after the questionnaire was returned). Non-responders received up to four reminders, two by mail (after 2 and 6 weeks) and two by phone (after 4 and 8 weeks), and internal missing items concerning suicide were addressed by telephone checkup, with up to five calls. The ethical committee at the Karolinska Institutet, Stockholm, approved the study, and informed consent was obtained from all participants.

2.2. Symptom checklist

The questionnaire contained the original SCL-90 items for Depression (13 items), Anxiety (10 items) and Hostility (6 items) (Lipman et al., 1979). Two questions about headaches and faintness/dizziness, which were originally placed in a Somatization subscale but were later moved to the Depression subscale, were not included in the questionnaire. Questions on 'amount of distress' refer to the last week and were rated on a five-point Likert scale ranging from 'Not at all' (0), to 'very much' (4). We computed individual means for the depression items (SCL-DEP), anxiety items (SCL-ANX) and for the depression and anxiety items combined, to form a Global Severity Index (SCL-GSI). Indices were only calculated for those with complete information to ensure that the subscale information referred to the same individuals.

2.3. Psychiatric diagnosis

Schedules for Clinical Assessment in Neuropsychiatry, (SCAN), version 2.1 1998 (Wing et al., 1990) Sections 0, 1, 3, 4, 6, 7, 8 11, 13 and 14 were used for the semi-structured interview. All interviewers were psychologists or psychiatrists who participated in a one-week SCAN course under the auspice of the WHO. The interview took on average 1.5 h and the interviewers were not aware of the postal questionnaire results. DSM-IV criteria were used to define past year depressive disorders and anxiety disorders. Depressive disorders encompassed Major Depression, Dysthymia, Mixed Anxiety Depression and Minor Depression. Anxiety disorders encompassed Agoraphobia, Social phobia, Specific phobia, Panic syndrome with agoraphobia and General Anxiety Syndrome.

2.4. The major depression inventory

MDI refers to symptoms in the last 14 days. The original version includes10 items and each has five response categories. MDI is typically scored either by DSM-IV/ICD-10 algorithm or as a summary index ranging from 0–50. Based on a previous validation of the MDI, we chose the summary index over the algorithm scoring method because the index had excellent agreement with depressive disorder (AUC=0.80) (Forsell, 2005).

2.5. WHO (ten) well-being index

The WHO (ten) Well-being Index (Bech et al., 1996) was used as a screening instrument for the stratification in the second stage sampling. This index contains 10 questions covering depression, anxiety, energy and positive well-being derived from a lengthier 22-item instrument. The index was intended as a screening tool. Each item has four response categories: all of the time, often, sometimes and never, which are coded 1–4 (where high is worse). A summary index ranging from 10–40 is also computed, and those scoring $>=30$ were considered screen positives and those scoring <30 screen negatives. The index was in the PART I questionnaire and examined before it was used as a case selection tool in PART II (Forsell, 2004).

2.6. Statistical methods

The internal consistency of the scales was examined using Cronbach's coefficient alpha, α. The discriminant validity of the SCL-DEP and SCL-ANX items was examined with exploratory factor analysis with a two factor solution. Promax oblique factor analysis using SAS PROC FACTOR was used. The overall agreement between the scales and the criterion standard, SCAN-DSM-IV Depression, Anxiety or any

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