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Detecting mental disorders in general hospitals by the SCL-8 scale

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Abstract

Objective: The objective of this study is to validate the eight-item dichotomised version of the Symptoms Check List (SCL-8d) as a screening tool for psychiatric disorders. **Methods:** The study population included 198 consecutive new neurological inpatients and outpatients and 294 consecutive internal medical inpatients, aged 18 or older. All patients received the SCL-8d questionnaire, and a stratified subsample was interviewed using the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) interview. We tested the external SCL-8d validity using the SCAN interview as gold standard. The test was performed based on weighted data to correct for the skewness introduced by stratification. **Results:** The diagnostic performance of the SCL-8d was excellent in the internal medical setting but not quite as good in the neurological sample. It performed better among the older compared with the younger patients, whereas the scale was not affected by gender. In the combined sample at the cut point 0/1, the sensitivity (SE) of the SCL-8d was 0.73 (confidence interval $[CI]_{95\%}$: 0.60–0.82), the specificity (SP) 0.61 ($CI_{95\%}$: 0.53–0.68) and the positive predictive value (PPV) 0.42 ($CI_{95\%}$: 0.34–0.50), using any International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) psychiatric disorder, excluding somatoform and substance abuse disorders, as gold standard. The risk of a patient having a mental disorder (except phobia, substance abuse or somatoform disorder) was less than 6% in case of a negative screening test. In patients with a current depressive disorder, 87.1% (27/31) were screening positive, and all except 1 (93.0%) of the 14 patients with a modest to severe depression scored 1 or higher on the SCL-8d. All 17 patients with an anxiety disorder, excluding phobias, were screening positive. **Conclusion:** The study suggests that the SCL-8d is a valid, brief screening tool for use in nonpsychiatric medical settings, especially to detect emotional psychiatric disorders (EPDs).

Keywords: Screening; Mental disorders; Validity; Two-phase sampling; SCAN; Weighting; Depression; Anxiety; Questionnaires

Introduction

Psychiatric disorders and emotional distress are common among patients in general hospitals, but the disorders frequently go unrecognised [1–8]. Brief, easy-to-use diagnostic aids and screening tools for use in everyday clinical practice are therefore urgently needed.

In an accompanying paper, we have introduced the eight-item dichotomised version of the Symptoms Check List (SCL-8d) as a serious candidate for detecting psychiatric disorders in diverse medical settings [9].

This study aims to examine the external validity and diagnostic power of the SCL-8d in a general medical and in a neurological setting using a standardised psychiatric research interview as gold standard [10,11].

Method

Study population

The study population (Fig. 1) consists of a neurological sample including 198 of 290 consecutive patients, referred for the first time to a neurological department, and a medical

Abbreviations: SCL-8d, eight-item dichotomised version of the Symptoms Check List; SCAN, Schedules for Clinical Assessment in Neuropsychiatry; ICD-10, International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; DSM-IV, Diagnostic and Statistical Manual of Mental Disorder, Fourth Edition; SE, sensitivity; SP, specificity; PPV, positive predictive value; NPV, negative predictive value; EPD, emotional psychiatric disorder; CI, confidence interval.

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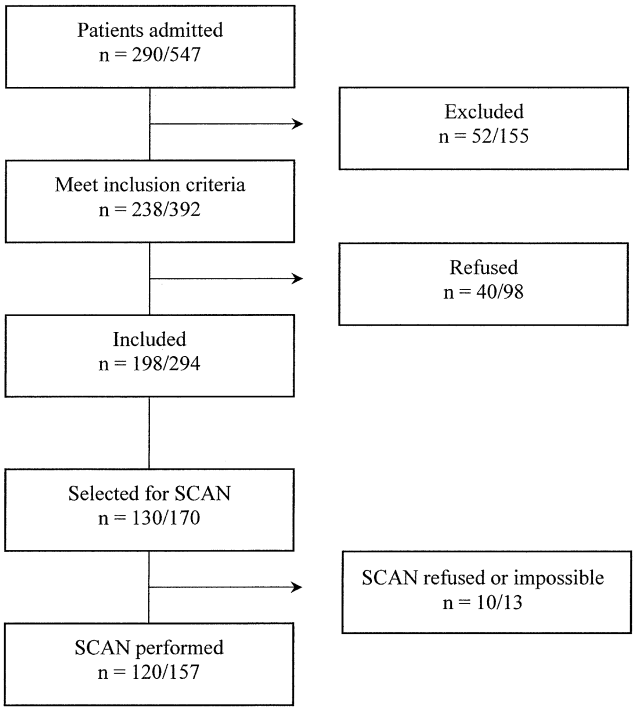

Fig. 1. Inclusion of patients — neurological sample/medical sample.

sample including 294 of 547 consecutive patients admitted to an internal medical department.

Only patients aged 18 years or older and of Scandinavian origin were included. Excluded were patients who were unable to be interviewed because of their medical condition (for details, see Refs. [3,12]).

Selection of patients for diagnostic psychiatric interview

At admission or first contact with the relevant setting, all patients were interviewed by a research health care professional (i.e., nurse, medical student, doctor) using a highly structured interview, which they had briefly been trained to use. It included among other things the SCL-8d questionnaire [9,13] and the seven-item Whiteley index [14], measuring illness worrying. The patients could either fill in the SCL-8d questionnaire themselves during the interview, or if they were unable to do so, the interviewer could do it for them.

Each SCL-8d item had four response categories ranging from 'not at all' to 'severe.' In the statistical analysis, the responses were dichotomised in the way that the categories 'not at all' and 'mild' were categorized as negative responses and 'moderate' and 'severe' as positive responses.

All patients scoring 2 or higher on the SCL-8d and/or 3 or higher on the Whiteley-7 were selected for diagnostic psychiatric interview. We also chose to have a random sample of one third of the remaining patients to obtain a stratified subsample consisting of all high scores and one third of the low scores.

The psychiatric research interview

The psychiatric interviews were done by means of the Schedules for Clinical Assessment in Neuropsychiatry (SCAN), version 2.1 [15,16], a standardised psychiatric research interview endorsed by the WHO. The two interviewers (i.e., MSH and LS) were trained in psychiatry and certified at the WHO centre in Aarhus. They were blinded to the patients' responses on the questionnaires. The interrater agreement was high (agreement on 16 of 17 patients; kappa = .88). (For details, see Ref. [17].)

The interviews were done as soon as possible after the index contact, either in the hospital facilities or in the patients' own homes if discharged before the interview could be done. Patients were excluded after the third failed

Table 1
Diagnostic performance of the SCL-8d as to specific ICD-10 psychiatric disorder

ICD-10 diagnoses	Prevalence ($CI_{95\%}$)	Cut point	Number detected	SE	95% CI	SP	95% CI	PPV	95% CI	NPV	95% CI
Any disorder	*N* = 146	0/1	109	0.60	(0.51–0.69)	0.62	(0.53–0.71)	0.59	(0.50–0.67)	0.64	(0.54–0.7)
	0.47 (0.41–0.54)	1/2	91	0.46	(0.37–0.54)	0.82	(0.76–0.87)	0.70	(0.62–0.77)	0.63	(0.54–0.7)
		2/3	74	0.37	(0.30–0.45)	0.88	(0.83–0.92)	0.74	(0.64–0.82)	0.61	(0.53–0.7)
Any disorder excluding somatoform and alcohol and substance abuse disorders	*N* = 94	0/1	79	0.73	(0.60–0.82)	0.61	(0.53–0.68)	0.42	(0.34–0.50)	0.85	(0.8–0.9)
	0.28 (0.23–0.33)	1/2	71	0.61	(0.49–0.72)	0.81	(0.75–0.85)	0.55	(0.46–0.63)	0.84	(0.77–0.9)
		2/3	60	0.51	(0.40–0.62)	0.87	(0.82–0.90)	0.60	(0.50–0.69)	0.82	(0.76–0.9)
Depression (F32–F33)	*N* = 31	0/1	27	0.76	(0.52–0.90)	0.54	(0.48–0.61)	0.15	(0.10–0.21)	0.96	(0.89–0.98)
	0.09 (0.06–0.13)	1/2	24	0.61	(0.39–0.79)	0.72	(0.67–0.77)	0.18	(0.13–0.26)	0.95	(0.89–0.98)
Depression modest/severe (F32.1–2, F33.1–2)	*N* = 14	0/1	13	0.86	(0.42–0.98)	0.53	(0.47–0.60)	0.07	(0.04–0.12)	0.99	(0.93–1.00)
	0.04 (0.02–0.6)	1/2	12	0.72	(0.35–0.92)	0.71	(0.65–0.76)	0.09	(0.05–0.16)	0.98	(0.94–1.00)
Anxiety (F40, F41.0–1, F41.9)	*N* = 72	0/1	61	0.74	(0.60–0.85)	0.58	(0.51–0.65)	0.32	(0.25–0.40)	0.90	(0.82–0.94)
	0.21 (0.16–0.26)	1/2	56	0.64	(0.50–0.76)	0.78	(0.73–0.82)	0.43	(0.35–0.52)	0.89	(0.83–0.93)
Anxiety excluding phobias (F41.0–1, F41.9)	*N* = 17	0/1	17	[a]	(—)	0.54	(0.47–0.60)	0.09	(0.06–0.14)	–[a]	(–)
	0.04 (0.03–0.07)	1/2	15	0.81	(0.46–0.95)	0.71	(0.66–0.76)	0.11	(0.07–0.18)	–[a]	(–)

Prevalence, SE, SP, PPV and NPV were obtained by weighted logistic regression.
[a] Could not be estimated.

Table 2
Diagnostic performance of the SCL-8d as to ICD-10 any EPD[a]

	Prevalence ($CI_{95\%}$)	Cut point	SE	95% CI	SP	95% CI	PPV	95% CI	NPV	95% CI
Medical setting	$N=274$; 0.22 (0.16–0.29)	0/1	0.92	(0.72–0.98)	0.61	(0.51–0.71)	0.40	(0.30–0.51)	0.97	(0.86–0.99)
		1/2	0.74	(0.55–0.87)	0.79	(0.72–0.85)	0.51	(0.40–0.61)	0.92	(0.82–0.96)
		2/3	0.58	(0.42–0.73)	0.86	(0.80–0.91)	0.55	(0.42–0.67)	0.88	(0.80–0.93)
Neurological setting	$N=197$; 0.33 (0.25–0.42)	0/1	0.61	(0.45–0.75)	0.62	(0.51–0.72)	0.45	(0.33–0.57)	0.76	(0.63–0.86)
		1/2	0.53	(0.38–0.68)	0.84	(0.75–0.90)	0.62	(0.48–0.75)	0.78	(0.67–0.86)
		2/3	0.50	(0.35–0.65)	0.88	(0.81–0.93)	0.68	(0.52–0.81)	0.78	(0.67–0.86)
Age 18–55	$N=229$; 0.35 (0.27–0.44)	0/1	0.69	(0.53–0.81)	0.55	(0.43–0.66)	0.45	(0.35–0.56)	0.76	(0.62–0.87)
		1/2	0.56	(0.42–0.70)	0.79	(0.70–0.85)	0.59	(0.47–0.70)	0.77	(0.65–0.86)
		2/3	0.50	(0.36–0.64)	0.85	(0.77–0.90)	0.64	(0.51–0.76)	0.76	(0.65–0.84)
Age 56 or higher	$N=242$; 0.20 (0.14–0.27)	0/1	0.73	(0.56–0.85)	0.71	(0.60–0.80)	0.54	(0.41–0.66)	0.85	(0.73–0.92)
		1/2	0.55	(0.40–0.69)	0.85	(0.77–0.90)	0.63	(0.50–0.75)	0.80	(0.70–0.88)
		2/3	0.44	(0.31–0.59)	0.91	(0.85–0.95)	0.71	(0.55–0.83)	0.78	(0.68–0.86)

Prevalence, SE, SP, PPV and NPV were obtained by weighted logistic regression.
[a] Any psychiatric disorder excluding somatoform disorders and alcohol and substance abuse disorders.

attempt to conduct an interview. In cases where the patient could not be interviewed immediately, the period inquired about excluded the period after the index contact.

We interviewed 120 of the 130 selected patients from the neurological sample (10 refused or had died) and 157 of 170 patients from the medical sample (13 refused or had died) (Fig. 1).

The SCAN interviews were used for establishing computerized International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) psychiatric diagnoses with reference to the "Present State." The diagnosis of somatoform disorders was subsequently revised in order to fit the ICD-10 criteria.

Statistics and data analysis

Estimation of sensitivity (SE), specificity (SP), positive predictive value (PPV), etc., and their 95% confidence intervals (CIs), was performed by weighted logistic regression analysis with the observed sampling fractions of second-phase patients as sample weights [18]. Twenty patients from the medical sample and one from the neurological were excluded from the analysis as their response to at least one of the eight items was missing.

Data were processed by means of the SPSS Windows release 10.0 [19] and STATA [20].

Results

Patients in the medical sample were older (mean age 59.5 years (S.D. 16.4) vs. 52 years (16.4), $P<.001$) and had a higher proportion of men than the neurological sample (54.1% vs. 46.5%, $P=.10$). The latter included only new cases, which may partly explain the age difference, whereas the medical sample contained all hospitalised patients.

In the combined sample, the maximum SE of the SCL-8d was 0.60 with an SP of 0.62 and a PPV of 0.59 using any ICD-10 psychiatric disorder as gold standard (Table 1). Considering emotional psychiatric disorders (EPDs), exclusion of somatoform disorders and substance abuse disorders from the gold standard caused the SE to rise to 0.73, the SP was almost unchanged and the PPV decreased to 0.42. The predictive value of negative test (NPV) was 0.85 ($CI_{95\%}$: 0.77–0.91) using any EPD as gold standard at the cut point 0/1. If further phobias were excluded from the analyses, the NPV rose to 0.94 ($CI_{95\%}$: 0.86–0.97). This implied that there was 6% or lesser risk of having a mental disorder (except phobia, substance abuse or somatoform disorder) if the screening test was negative.

The SCL-8d had a high SE regarding depressive disorders (Table 1). Thus, 27 out of 31 (87.1%) scored 1 or higher on the SCL-8d, and among the 14 patients with a moderate to severe depression, all except one (93.0%) scored 1 or higher on the SCL-8d. All of the 17 patients with an anxiety disorder excluding phobias scored 1 or higher on the SCL-8d. All of the three patients with an OCD scored 5 or higher. One patient with schizophrenia F20.0 scored 8 on the SCL-8d, and one patient with schizotypal disorder F21 scored 1. No other psychoses were diagnosed.

Table 2 shows that the performance of the SCL-8d was better in the medical than in the neurological sample, and better among the older than the younger patients. Men and women responded in much the same way and gender figures are therefore not displayed. More detailed information on other psychometric parameters and cut points is available from the authors.[1]

Discussion

Despite the brevity of the SCL-8d, the present study suggests that it has good diagnostic power in two medical

[1] Web site: www.auh.dk/cl_psych/dk/index.htm, or e-mail: flip@akh.aaa.dk.

specialities concerning EPDs, whereas its ability to detect somatoform disorders and substance abuse was rather poor. The latter is not unexpected as the SCL-8d was originally a reduced version of the SCL-90 depression and anxiety subscales [13,21,22]. The high NPVs indicate that it is excellent to rule out mental disorders and that it detects almost all the severe cases. The SCL-8 scale was also analysed without dichotomising the response categories, but this did not make any difference.

The SCL-8d performed better among the old than among the young patients. The prevalence of mental disorders was extremely high among the young patients [3,23], and age alone is thus a strong predictor of psychiatric illness among general hospital patients. It may consequently be difficult to add diagnostic power to age.

The SCL-8d was a far better tool in the medical sample than in the neurological sample. This may partly be ascribed to the dissimilar age distribution between samples.

Previous reports have not succeeded in demonstrating performance differences between various screening instruments [24–28].

Compared to other instruments the performance of the SCL-8d may not appear impressive [29–32]. However, most other validation studies on screening instruments of this type are hampered by grave methodological weaknesses and drawbacks in the statistical analyses [26–28]. It is therefore dubious to compare the SCL-8d to other instruments if they have not been tested in the same rigorous way. We used a state-of-the-art independent standardised psychiatric research interview [33] performed by trained psychiatric interviewers as external criteria or gold standard. We included all types of psychiatric diagnoses in the analysis, and few patients refused to be interviewed. We used a statistical weighting procedure to correct for skewnesses in sampling and reported CIs on all estimates. The study is free of any apparent selection biases due to sociodemographic factors as all secondary health care in Denmark is free of charge for the patients, and the included neurological and medical departments delivered all hospital-based neurological and medical services for the catchment areas.

Elsewhere, we have demonstrated the instrument's high internal validity by use of advanced psychometric methods in the form of item response theory, whereas other studies have used classical psychometric methods only [9].

Beside, the SCL-8d enjoys the advantages of being short, taking only a few minutes to fill in, and the patients reported to find it feasible.

Weaknesses of the study are the relatively small number of included patients and that we did not test the SCL-8d's ability to measure changes over time and its SE for monitoring intervention effect. Furthermore, we do not know if the SCL-8d improves detection rates for psychiatric disorders and emotional distress and the impact of this on clinical practice. Studies of the effect on the detecting rate using diagnostic aids have so far been disappointing [27].

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