Psychometric properties of the self-report version of the Quick Inventory of Depressive Symptoms (QIDS-SR16) questionnaire in patients with schizophrenia

Lako, Irene M; Wigman, Johanna Tw; Klaassen, Rianne Mc; Slooff, Cees J; Taxis, Katja; Bartels-Velthuis, Agna A

Published in:
BMC Psychiatry

DOI:
10.1186/s12888-014-0247-2

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2014

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):
Lako, I. M., Wigman, J. T., Klaassen, R. M., Slooff, C. J., Taxis, K., & Bartels-Velthuis, A. A. (2014). Psychometric properties of the self-report version of the Quick Inventory of Depressive Symptoms (QIDS-SR16) questionnaire in patients with schizophrenia. BMC Psychiatry, 14(1), [247]. https://doi.org/10.1186/s12888-014-0247-2

Copyright
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment.

Take-down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): http://www.rug.nl/research/portal. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.
Psychometric properties of the self-report version of the Quick Inventory of Depressive Symptoms (QIDS-SR16) questionnaire in patients with schizophrenia

Irene M Lako1, Johanna TW Wigman2,3, Rianne MC Klaassen4, Cees J Slooff5, Katja Taxis1, Agna A Bartels-Velthuis2* and GROUP investigators

Abstract

Background: Self-report instruments for the assessment of depressive symptoms in patients with psychotic disorders are scarce. The Quick Inventory of Depressive Symptoms (QIDS-SR16) may be a useful self-report instrument, but has received little attention in this field. This paper aimed to test the psychometric properties of the QIDS-SR16 questionnaire in patients with a psychotic disorder.

Methods: Patients diagnosed with a psychotic disorder from health care institutions in The Netherlands were included in the study. Depressive symptoms were assessed with the QIDS-SR16 and the Calgary Depression Scale for Schizophrenia (CDSS). Psychotic symptoms were assessed with the Positive and Negative Syndrome Scale (PANSS) and extrapyramidal symptoms (EPS) with three EPS rating scales. Spearman’s correlation coefficients were used to compare the total score of the QIDS-SR16 with the total scores of the CDSS, PANSS-subscapes and EPS rating scales.

Results: In a sample of 621 patients with psychotic disorders, the QIDS-SR16 showed good internal consistency ($\alpha = 0.87$). The QIDS-SR16 correlated moderately with the CDSS ($r = 0.44$) and the PANSS subscale for emotional distress ($r = 0.47$). The QIDS-SR16 showed weak correlation with the PANSS subscale for negative symptoms ($r = 0.28$) and minimal correlation with EPS rating scales ($r = 0.09-0.16$).

Conclusions: The QIDS-SR16 may reliably assess depressive symptoms in patients with psychotic disorders, but its concurrent validity with the CDSS was rather poor in this population. We would recommend developing a new self-report questionnaire for the assessment of depressive symptoms in patients with psychotic disorders.

Background

Depressive symptoms are highly prevalent in patients with schizophrenia, with prevalence rates estimated between 7% and 75% [1,2]. Depressive symptoms are present throughout all phases of the illness [3] and may lead to a higher burden of disease and more frequent relapses [4,5]. Screening and routine monitoring of these symptoms may guide appropriate treatment [6,7]. Depressive symptoms can be difficult to distinguish from negative symptoms and extrapyramidal symptoms (EPS), such as drug-induced parkinsonism [8]. Adequate recognition of depressive symptoms, as well as regular monitoring of symptomatic changes is essential to guide appropriate treatment in patients with schizophrenia [7,9]. Therefore, monitoring depressive symptoms requires reliable instruments with tested validity in patients with schizophrenia. To date, the only instrument designed for the assessment of depressive symptoms in this patient population is the interview-based Calgary Depression Scale for Schizophrenia (CDSS) [10]. The CDSS is a reliable and valid instrument that is able to distinguish depressive symptoms from negative psychotic symptoms and EPS [10]. However, the interview-based assessment method has some drawbacks, such as
the need for trained interviewers and observer bias. Self-report may be as good as interview-based assessments for monitoring change in psychopathology [11] and saves time and costs in routine clinical practice [12]. The availability of self-report depression instruments with comparable reliability and validity in patients with schizophrenia is however limited [13]. The Beck Depression Inventory-II (BDI) is the only self-report depression instrument for which complete information on psychometric properties in a population with schizophrenia are available for review [14]. Review of these properties demonstrated that the concurrent and predictive validity of the BDI was rather poor, perhaps because almost half of the items of the BDI could also be interpreted as negative symptoms [13].

The Quick Inventory of Depressive Symptoms (QIDS-SR16) is a short and easy-to-use self-report instrument to assess depressive symptoms [15]. The QIDS-SR16 is sensitive to symptomatic change and its psychometric properties are good in patients with depressive disorders [16]. Furthermore, it was found that the presence of psychotic symptoms did not meaningfully affect the ability of self-rating to recognize depressive symptoms in patients with major depressive disorder [17]. To our knowledge, the reliability and validity of the QIDS-SR16 has not been tested in patients with schizophrenia. A question of specific interest is whether the QIDS-SR16 can distinguish depressive symptoms from negative and extrapyramidal symptoms in this population (divergent validity). Furthermore, it is unknown whether the latent structure of the QIDS-SR16 remains one-dimensional [18,19], or that multiple (negative symptom) dimensions can be identified when applied in patients with schizophrenia.

The aim of the current study is to evaluate the psychometric properties of the QIDS-SR16 in a population of patients with psychotic disorders. We examined (1) the internal consistency of the QIDS-SR16, (2) the dimensional structure, (3) the concurrent validity with other depression instruments and (4) the divergent validity with negative and extrapyramidal symptoms.

Methods

Subjects

Subjects were patients participating in the Genetic Risk and Outcome of Psychosis (GROUP) study, a naturalistic longitudinal cohort study. The longitudinal GROUP study is conducted by four academic centers in the Netherlands and a large number of mental health institutes in the Netherlands and the Dutch speaking region of Belgium. The GROUP study was approved centrally by the Ethical Review Board of the University Medical Center Utrecht and all participants gave written informed consent in accordance with the committee's guidelines. For a detailed overview of the GROUP structure, data flow, quality control, recruitment, sample characteristics of the studied patients and training procedures of the assessors see Korver et al. [20]. The current data was collected during the second assessment of the study, three years after the baseline assessment (GROUP data release 3.02). Patients were included in the current study if they had a diagnosis of a psychotic disorder according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria [21] and if data of the following rating scales were complete: the QIDS-SR16, CDSS, and Positive and Negative Syndrome Scale (PANSS) [22], Abnormal and Involuntary Movements Scale (AIMS) [23] and Barnes Akathisia Rating Scale (BARS) [24]. These rating scales were administered by trained research assistants.

All research assistants were very well trained in administering the instruments. Data on interrater reliability of the GROUP study were not yet available for the second assessment, but the intraclass correlation coefficient of PANSS total score of the first assessment was 0.946 (95% confidence interval 0.758 to 0.996) [20].

Two weeks before the assessment patients were sent the self-report questionnaires (i.e., QIDS-SR16), with the request to bring them along completed to the assessment. Interviews and tests were administered in a fixed order (i.e., PANSS, CDSS, EPS scales), normally on the same day.

Measures

Patients completed the self-report version of QIDS-SR16 to assess depressive symptoms [15] (see for English version in Additional file 1, for multiple translations and scoring instructions see http://www.ids-qids.org/). The measure consists of 16 items, covering nine depressive symptom domains. Each domain score is based on the highest score on the pertaining items. Domain scores and item scores are rated on a Likert scale ranging from 0 to 3, with a total score range of 0–27. For an interpretation the QIDS-SR16 total score see http://www.ids-qids.org/. Depressive symptoms were also assessed by the 9-item CDSS interview [10]. Item scores are rated on a Likert scale ranging from 0 to 3. A sum score above 4 out of 27 on the CDSS was used as cut-off scores to establish the presence of a minor depressive episode or clinical depression [10,25]. Psychotic symptoms were assessed with the PANSS [22,26]. For the current analyses, we used the five-factor model of the PANSS [27], consisting of the subscales ‘positive symptoms’, ‘negative symptoms’, ‘disorganization symptoms’, ‘excitement’ and ‘emotional distress’. Item scores of the PANSS range from 1 (not present) to 7 (extreme) and the subscales scores for negative symptoms range from 7–49 and 7–28 for emotional distress. Extrapyramidal symptoms were assessed using the AIMS [23], the BARS [24] and, when available, the ‘motor examination’ subscale of the Unified Parkinson’s Disease Rating Scale (UPDRS) [28].
CDSS interview, the PANSS interview and the EPS rating scales were administered by the same research assistant on the very same day. The self-report QIDS-SR16 was sent to the participant about two weeks prior to the assessment, with the request to fill in the questions and bring the questionnaire along to the research assistant. Different rating scales were used for the assessment EPS because each of the rating scales reflects a different subset of motor symptoms. The AIMS is focused on dyskinesia (involuntary movements), the BARS on akathisia (restlessness) and the UPDRS on parkinsonism. The symptoms measured by these scales may relate themselves differently to depressive symptoms. For example, depressive symptoms have also been associated with parkinsonism [8] and restlessness or psychomotor agitation is also a depressive symptoms (see question 16 of the QIDS-SR16).

Statistical analyses

Psychometric properties of the QIDS-SR16 were examined using SPSS, version 16.0, and R (v.3.0.1) running in R-studio. The internal consistency of the QIDS-SR16 was assessed by calculating ordinal alpha, the conceptual equivalent to Cronbach’s alpha for ordinal data [29] with the R packages ‘psych’ [30], and ‘GPArotation’ [31]. A value of 0.80 or higher indicated good internal consistency [32]. Additionally, polychoric inter-item correlations of the QIDS-SR16 were calculated. Average values of $r > 0.15$ were deemed acceptable, since depressive symptoms as covered by the QIDS-SR16 may represent a broad construct [33]. The dimensional structure

Table 1 Patient characteristics (N = 621)

|                           | Mean (SD; range) or N (%) |
|---------------------------|---------------------------|
| Age                       | 30.1 (7.3; 18–59)         |
| Male (%)                  | 478 (77%)                 |
| Education                 |                           |
| Primary school            | 39 (6%)                   |
| Secondary school/high school | 322 (52%)               |
| Vocational education      | 150 (24%)                 |
| Vocational higher education| 65 (11%)                  |
| University                | 45 (7%)                   |
| Illness duration (years)  | 7.3 (4.1; 2.0–43.1)       |
| Age of onset first psychosis (years) | 22.3 (6.7; 5–51) |
| Primary diagnosis         |                           |
| Schizophrenia             | 398 (64%)                 |
| Schizoaffective disorder  | 80 (13%)                  |
| Schizophreniform disorder | 37 (6%)                   |
| Delusional disorder       | 14 (2%)                   |
| Brief psychotic disorder  | 13 (2%)                   |
| Psychotic disorder NOS    | 64 (10%)                  |
| Other psychotic disorder  | 15 (2%)                   |
| Antidepressants$^a$       | 81 (17%)                  |
| Antipsychotics$^a$        |                           |
| No antipsychotics         | 67 (14%)                  |
| Risperidone               | 58 (12%)                  |
| Olanzapine                | 91 (19%)                  |
| Quetiapine                | 28 (6%)                   |
| Clozapine                 | 71 (15%)                  |
| Haloperidol               | 16 (3%)                   |
| Aripiprazol               | 50 (10%)                  |
| Other antipsychotics      | 35 (7%)                   |
| Combination therapy       | 65 (14%)                  |
| QIDS-SR16 (total)         | 6.6 (4.9; 0–26)           |
| CDSS (total)              | 2.0 (2.8; 1–16)           |
| PANSS Total               | 61.8 (18.9; 41–148)       |
| PANSS-EMO (emotional distress) | 13.1 (4.8; 8–33)     |
| PANSS-NEG (negative symptoms) | 12.6 (5.4; 4–41)   |
| PANSS-POS (positive symptoms) | 11.3 (5.4; 3–39)  |
| PANSS-DIS (disorganized symptoms) | 14.2 (5.1; 10–46) |
| PANSS-EXC (excitement symptoms) | 10.6 (3.2; 2–29) |
| AIMS (total)              | 0.1 (0.2; 0–1.9)          |
| BARS (total)              | 0.3 (0.6; 0–4.0)          |
| UPDRS (subtotal motor symptoms)$^b$ | 0.2 (0.1; 0–1.4) |

| QIDS-SR16 items   | Mean | SD  |
|-------------------|------|-----|
| 1 Sleep onset insomnia | 0.93 | 1.09 |
| 2 Mid-nocturnal insomnia | 0.76 | 0.99 |
| 3 Early morning insomnia | 0.41 | 0.86 |
| 4 Hypersomnia (excessive sleep) | 1.03 | 0.92 |
| 5 Feeling depressed | 0.65 | 0.76 |
| 6 Decreased appetite | 0.20 | 0.50 |
| 7 Increased appetite | 0.35 | 0.69 |
| 8 Weight reduction | 0.39 | 0.79 |
| 9 Weight gain | 0.36 | 0.77 |
| 10 Concentration/decision making | 0.64 | 0.81 |
| 11 Self-view | 0.69 | 1.09 |
| 12 Suicide ideation | 0.32 | 0.68 |
| 13 General interest | 0.40 | 0.75 |
| 14 Energy level | 0.55 | 0.77 |
| 15 Feeling slowed down | 0.35 | 0.72 |
| 16 Feeling restless | 0.49 | 0.82 |

Abbreviations: SD Standard Deviation; QIDS-SR16 Quick Inventory of Depressive Symptomatology 16-item self-report version; CDSS Calgary Depression Scale for Schizophrenia; PANSS Positive and Negative Syndrome Scale; AIMS Abnormal Involuntary Movement Scale; BARS Barnes Akathisia Rating Scale and UPDRS Unified Parkinson’s Disease Rating Scale.

$^a$ Data on medication was available for n = 481 (77%) patients.

$^b$ UPDRS ratings were available for n = 531 (85%) patients.
of the QIDS-SR\textsubscript{16} was examined by using a parallel analysis to determine how many principal components should be extracted from the data (PCA) \cite{34}. In parallel analysis, the factors are retained as long as the \textit{i}\textsuperscript{th} eigenvalue from the actual data is greater than the \textit{i}\textsuperscript{th} eigenvalue extracted from a randomly drawn dataset that is similar to the actual dataset in its number of cases and variables. The parallel analysis was based on the polychoric inter-item correlations and conducted with the R-package ‘psych’ \cite{30}. If a 1-component structure was found, this would suggest that the items that are covered by the QIDS-SR\textsubscript{16} are best represented by one underlying construct, i.e. depression. The total score of the QIDS-SR\textsubscript{16} was compared with the scores on the CDSS, PANSS and EPS rating scales. Concurrent validity was investigated by calculating Spearman correlations ($\rho$) of the QIDS-SR\textsubscript{16} with the CDSS and the PANSS subscale for emotional distress. Divergent validity was examined by calculating Spearman correlations of the QIDS-SR\textsubscript{16} with the PANSS-Negative symptoms subscale and the three EPS rating scales. Spearman correlations were used because of non-normality of the data. Bootstrapping was used to calculate the 95% confidence intervals (95% CI) of the correlations.

**Results**

**Sample**
Overall, 809 (72\%) of the 1119 patients with a psychotic disorder who presented at baseline participated in the study.

| Table 3 Polychoric correlation coefficients (95\%CI) between the individual items of the QIDS-SR\textsubscript{16} |
|---|---|---|---|---|---|---|---|---|---|
|   | Sleep | Depressed mood | Appetite/weight | Concentration | Self-view | Suicidal ideation | Interest | Energy | Psychomotor |
| Sleep | 1 | \(0.33\) (0.23-0.42) | \(0.19\) (0.10-0.29) | \(0.33\) (0.24-0.41) | \(0.36\) (0.25-0.46) | \(0.36\) (0.26-0.47) | \(0.38\) (0.27-0.48) | \(0.39\) (0.30-0.47) | \(0.24\) (0.12-0.34) |
| Depressed mood | | 1 | \(0.22\) (0.12-0.32) | \(0.47\) (0.39-0.56) | \(0.58\) (0.52-0.66) | \(0.59\) (0.50-0.68) | \(0.52\) (0.42-0.61) | \(0.44\) (0.36-0.54) | \(0.46\) (0.36-0.56) |
| Appetite/weight | | | 1 | \(0.37\) (0.28-0.44) | \(0.29\) (0.17-0.42) | \(0.30\) (0.20-0.42) | \(0.29\) (0.17-0.42) | \(0.42\) (0.33-0.54) | \(0.46\) (0.35-0.55) |
| Concentration | | | | 1 | \(0.52\) (0.44-0.61) | \(0.39\) (0.28-0.48) | \(0.42\) (0.33-0.52) | \(0.42\) (0.33-0.52) | \(0.47\) (0.39-0.55) |
| Self-view | | | | | 1 | \(0.61\) (0.52-0.69) | \(0.49\) (0.37-0.59) | \(0.35\) (0.24-0.46) | \(0.38\) (0.35-0.55) |
| Suicidal ideation | | | | | | 1 | \(0.53\) (0.42-0.63) | \(0.42\) (0.33-0.52) | \(0.47\) (0.39-0.55) |
| Interest | | | | | | | 1 | \(0.53\) (0.42-0.63) | \(0.42\) (0.33-0.52) |
| Energy | | | | | | | | 1 | \(0.38\) (0.24-0.46) |
| Psychomotor | | | | | | | | | 1 |

Abbreviations: QIDS-SR\textsubscript{16}, Quick Inventory of Depressive Symptoms 16-item self-report version.
second assessment. Patients who participated in the second assessment did not differ in age \( \chi^2(1) = 3.15; p = 0.076 \), gender \( \chi^2(1) = 0.71; p = 0.40 \) or duration of illness \( \chi^2(1) = 3.26; p = 0.071 \) from those who only completed baseline assessment. Of the 809 patients who participated in the second assessment, 621 patients completed all questionnaires that were required for inclusion in the current study (QIDS-SR16, CDSS and PANSS). Demographic and clinical descriptive information of this sample can be found in Table 1. The mean scores on the individual items of the QIDS-SR16 are given in Table 2. According to the CDSS, clinical depression was present among 17% (N = 103) of the patients.

### Internal consistency and dimensionality

The QIDS-SR16 showed good internal consistency (ordinal alpha = 0.87). All individual inter-item correlations were within an acceptable range of 0.19-0.63 (Table 3) with an average inter-item correlation of 0.42. The parallel analysis results suggested that the data of the QIDS-SR16 can be reduced to one component in this sample (Figure 1).

### Concurrent and divergent validity

The correlations of the individual domains of the QIDS-SR16 with the CDSS ranged between 0.14 and 0.46 (Table 4). The total score of the QIDS-SR16 correlated moderately with the CDSS \( \rho = 0.44; p < .001 \) and the PANSS subscale for emotional distress \( \rho = 0.47; p < .001 \), as displayed in Table 5. The QIDS-SR16 showed weaker correlations with negative symptom ratings of the PANSS \( \rho = 0.28; p < .001 \) and extrapyramidal symptom ratings of the AIMS \( \rho = 0.09; p < .05 \), BARS \( \rho = 0.16; p < .001 \) and UPDRS-motor subscale \( \rho = 0.13; p < .001 \).

### Discussion

The current study was, to the best of our knowledge, the first to investigate the psychometric properties of the QIDS-SR16 in a large sample of patients with psychotic disorders. The QIDS-SR16 remained unidimensional in the current sample, representing depressive symptoms as an independent domain from negative symptoms and other psychotic symptoms in patients with schizophrenia [19,35]. Furthermore, the internal consistency of the QIDS-SR16 was good in our patient population, and comparable to that previously reported for the CDSS [36]. This suggests that patients with a psychotic disorder are able to rate their depressive symptoms in a reliable way [11]. The QIDS-SR16 agreed moderately with the CDSS, suggesting conceptual differences with the rating scale that is currently considered as the gold standard for assessment depressive symptoms in patients with schizophrenia.

These conceptual differences may reflect differences in item selection between the QIDS-SR16 and the CDSS. Unlike the CDSS, the QIDS-SR16 is not specifically designed to assess depressive symptoms in patients with psychotic disorders. Especially the QIDS-SR16 symptom domains on ‘sleep’ and ‘appetite’ showed low agreement with the CDSS in our study. The scores on the sleep domain were relatively high compared to other domains of the QIDS-SR16; this was in most cases driven by the

### Table 4 Spearman correlations (95% CI) of QIDS-SR16 symptom domains with the CDSS total score

| QIDS-SR16 domains          | Correlation |
|----------------------------|-------------|
| Sleep disturbance          | 0.22 (0.14-0.30) |
| Depressed (sad) mood       | 0.46 (0.38-0.52) |
| Change in appetite or weight | 0.14 (0.07-0.22) |
| Concentration/decision making | 0.27 (0.19-0.34) |
| Self-view                  | 0.36 (0.28-0.43) |
| Suicidal ideation          | 0.38 (0.31-0.45) |
| Interest                   | 0.33 (0.24-0.40) |
| Energy/fatigue             | 0.28 (0.21-0.35) |
| Psychomotor agitation/retardation | 0.28 (0.20-0.35) |

Abbreviations: QIDS-SR16: Quick Inventory of Depressive Symptoms 16-item self-report version; CDSS: Calgary Depression Scale for Schizophrenia.

Values are Spearman correlation coefficients (95% CI). Significant correlations were indicated by * = p < .05; ** = p < .001.
'hypersomnia' item (excessive sleep) (see Table 2). Excessive sleep and increased appetite may reflect side effects of antipsychotics [37,38] and hence not necessarily be related to the 'physical' symptoms of depression [21]. Indeed, post hoc analysis using ordinal logistic regression demonstrated that those patients using antipsychotics with high antagonistic affinity for the histamine receptor (olanzapine or clozapine) reported higher scores on excessive sleep than patients using other antipsychotics (OR [95%CI] = 1.88 [1.31-2.68]). Similarly, patients using olanzapine or clozapine were more likely to report increased appetite (OR [95%CI] = 1.94 [1.28-2.95]). It can be argued that antipsychotic side effects confounded changes in sleep and appetite as measured by the QIDS-SR16 in the current sample. In contrast, the CDSS measures 'early awakening' and 'morning depression' as a proxy for the physical symptoms of depression, in a way less sensitive to confounding by antipsychotic side effects. Another conceptual difference is that the CDSS and other self-report questionnaires like the Center of Epidemiologic Studies-Depression [39], but not the QIDS-SR16, cover hopelessness. Patients with schizophrenia may be prone to psychological depressive symptoms like hopelessness and self-deprecation, possibly related to demoralization in response to the severe mental illness [40]. Thus careful item selection targeting only those depressive symptoms specific for patients with a psychotic disorder may be relevant for the validity of a self-report depression instrument in this population.

Although there was some overlap, the QIDS-SR16 discriminated depressive symptoms from negative symptoms in an acceptable way, in line with previous work on the full 30-item Inventory of Depressive Symptoms (IDS) in a mixed population of patients with schizophrenia and bipolar disorder [41]. In addition, a latent factor for negative symptoms was not identified for the QIDS-SR16, despite that several items overlap with negative symptoms, such as of concentration difficulties (question #10), lack of interest (#13) and lack of energy (#14). The current results suggest that, although the QIDS-SR16 may partly tap into the negative symptom dimension and thus should be interpreted with care, its divergent validity is acceptable in patients with psychotic disorders.

An unexpected result is the relatively high correlation of the CDSS with negative symptoms in comparison to previous reports of the CDSS in patients with schizophrenia [13]. Some correlation with negative symptoms is acceptable, as patients may often experience both negative and depressive symptoms at the same time [42]. Another caveat when interpreting the current results is that the majority of the patients had low EPS ratings. The relatively young and possibly well stabilized sample of patients may explain the rare presence of EPS, as previously described for the baseline measurement of the current sample [43]. We therefore remain inconclusive about the divergent validity of the QIDS-SR16 with respect to the extrapyramidal symptoms in this population.

An important strength of the study is its large sample size. A limitation of the study design may be that the same research assistant rated both the CDSS and the PANSS interview. This may have led to an overestimation of the correlation between the CDSS and the PANSS subscale for emotional distress, because of prior knowledge of the raters based on the previous interview. Therefore, the PANSS subscale for emotional distress does not necessarily outperform the QIDS-SR16 on its concurrent validity with the CDSS.

To conclude, we showed that patients with a psychotic disorder can reliably rate their depressive symptoms by means of the self-report. However, despite the fact that the QIDS-SR16 can provide clinicians with useful additional and clinically relevant information, we would not recommend applying the QIDS-SR16 for the assessment of depressive symptoms in this population, based on the poor concurrent validity of the QIDS-SR16 with the CDSS. Future research may focus on the development of a new self-report instrument, especially designed to assess depressive symptoms in patients with psychotic disorders.

Conclusions
Seventeen percent of patients with psychotic disorders suffered from depressive symptoms. Although the Quick Inventory of Depressive Symptoms (QIDS-SR16) may provide unique and clinically relevant information on depressive symptoms, this self-report instrument is not suitable for the use in patients with psychotic disorders. There is a need for a new self-reporting instrument covering depressive symptoms specific for patients with a psychotic disorder.

Additional file
Additional file 1: The Quick Inventory of Depressive Symptomatology (16-Item) (Self-Report) (QIDS-SR16).

Competing interests
All other authors declare that they have no competing interests. ZON-MW and VCVGZ had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. This study was supported by unconditional grants from the Christian Fellowship of Care for Mental and Neurological Disorders (VCVGZ), the Dutch Foundation for Mental Health and the Mental Health Centre Drenthe (GGZ Drenthe).

Authors’ contributions
IML, JTWW and AABV analyzed the data and wrote the first draft of the manuscript. RMCK, CJS and KT helped with the drafting of the manuscript. GROUP investigators designed the study and wrote the protocol. All authors contributed to and have approved the final manuscript.

Authors’ information
GROUP investigator:
Richard Bruggeman and Dirk Wiersma: University of Groningen, University Medical Center Groningen, University Center for Psychiatry, Rob Giel Research Center, Groningen, The Netherlands.

Wepke Cahn and René S. Kahn: University Medical Center Utrecht, Department of Psychiatry, Rudolf Magnus Institute of Neuroscience, Utrecht, The Netherlands.

Lieve de Haan and Carin J. Meijer: Academic Medical Center University of Amsterdam, Department of Psychiatry, Amsterdam, The Netherlands.

Inez Myin-Germeys and Jim van Os: Maastricht University Medical Center, South Limburg Mental Health Research and Teaching Network, EURON, Maastricht, The Netherlands.

Acknowledgements

The authors wish to thank all patients and their families, healthy subjects, and all researchers who gave their time and effort to make this GROUP project possible. The infrastructure for the GROUP study is funded by the Geestkracht program of the Dutch Health Research Council (ZON-MW, grant number 10-000-1002) and matching funds from participating universities and mental health care organizations (Site Amsterdam: Academic Psychiatric Centre AMC, Ingeest, Arkin, Dijk en Duin, Rivierdieren, Erasmus MC, GGZ Noord Holland Noord; Site Utrecht: University Medical Center Utrecht, Atrecht, Symfora, Meerkantens, RIAAG Amersfoort, Delta; Site Groningen: University Medical Center Groningen, Lents, GGZ Friesland, GGZ Drentse, Dimence, Mediant, GGNet, Yulius and Pammasia Bavo Groep; Site Maastricht: Maastricht University Medical Center, GGZ Eindhoven en de Kempen, GGZ Midden-Brabant, GGZ Oost-Brabant, GGZ Noord-en-Midden-Limburg, Mondriaan Zorggroep, Prins Clauscentrum Sittard, RIAGG Roermond, Universitair Centrum Sint-Jozef Kortenberg, CAPRI University of Antwerp, PC Ziekeren Sint-Truiden, PSZ Sancta Maria Sint-Truiden, GGZ Overpelt, OPZ Rekem). The research leading to these results has received funding from the European Community’s Seventh Framework Program under grant agreement No. HEALTH-F2-2009-241909 (Project EU-GEI).

Author details

1Division of Pharmaceutical Therapy and Pharmaceutical Care, Department of Pharmacy, University of Groningen, Groningen, The Netherlands. 2University of Groningen, University Medical Center Groningen, University Center for Psychiatry, Rob Giel Research Center, Groningen, The Netherlands.

3Department of Psychiatry and Psychology, Maastricht University Medical Center, Maastricht, The Netherlands. 4Rivierdieren Mental Health, Leiden, The Netherlands. 5Department of Psychotic Disorders, Mental Health Center Assen (GGZ Drenthe), Assen, Netherlands.

Received: 30 May 2013 Accepted: 19 August 2014 Published: 3 September 2014

References

1. Sris SG, Bench C: Depression and schizophrenia. In Schizophrenia 2nd edition. Edited by Hirsch SR, Weinberger D. Oxford, UK: Blackwell; 2003:140–167.

2. Buckley PT, Miller BJ, Lehrer DS, Castle DJ: Psychiatric comorbidities and schizophrenia. Schizophr Bull 2008, 35(2):383–402.

3. Leff J: Depressive symptoms in the course of schizophrenia. In Depression in Schizophrenia. Edited by DeLuise LW. Washington, DC: American Psychiatric Press; 1993:23.

4. Conley RR, Ascher-Svanum H, Zhu B, Faries DE, Kinon BJ: The burden of depressive symptoms in the long-term treatment of patients with schizophrenia. Schizophr Res 2007, 90(1–3):186–197.

5. Tollefsen GD, Anderson SW, Tran PV: The course of depressive symptoms in predicting relapse in schizophrenia: a double-blind, randomized comparison of olanzapine and risperidone. Biol Psychiatry 1999, 46(3):365–373.

6. Lako IM, Taxis K, Bruggeman R, Kneegtering H, Burger H, Wiersma D, Stolf CJ: The course of depressive symptoms and prescribing patterns of antidepressants in schizophrenia in a one-year follow-up study. Eur Psychiatry 2012, 27A(4):240–244.

7. Schennach-Wolff R, Obermeyer M, Seemuller F, Jager M, Messer T, Laux G, Pfeiffer H, Naber D, Schmidt LG, Gaebel W, Klosterkotter J, Heuser I, Maier W, Lemke MR, Ruther E, Klingberg S, Gastpar M, Riedel M: Evaluating depressive symptoms and their impact on outcome in schizophrenia applying the Calgary Depression Scale. Acta Psychiatr Scand 2011, 123(3):226–238.

8. Norman RM, Malla AK, Cortese L, Diaz F: Aspects of dysphoria and symptoms of schizophrenia. Psychiatr Mol 1998, 28(6):1433–1441.

9. Bressan RA, Chaves AC, Plowsky LS, Shirakawa I, Mari JJ: Depressive episodes in stable schizophrenia: critical evaluation of the DSM-IV and ICD-10 diagnostic criteria. Psychiatry Res 2003, 117(1):47–56.

10. Morettin D, Morettin M, Gattinoni P, Pecorelli S, Asin C, Lepore J, Piacentini C, Angius F, Tosti S, Rizzetti U: Assessing depression in schizophrenia - the Calgary depression scale. Br J Psychiatry 1993, 163:39–44.

11. Lindemayer JP, Gay SR, Plutchik R: Multivantaged assessment of depression in schizophrenia. Psychiatr Res 1992, 42(3):199–207.

12. Roll H: Standardised rating scales in psychiatry: methodological basis, their possibilities and limitations and descriptions of important rating scales. World J Biol Psychiatry 2009, 10(1):6–26.

13. Lako IM, Bruggeman R, Kneegtering H, Wiersma D, Schoevers RA, Stolf CJ, Taxis K: A systematic review of instruments to measure depressive symptoms in patients with schizophrenia. J Affect Disord 2012, 140(1):38–47.

14. Beck AT, Steer RA, Ball R, Ranieri W: Comparison of beck depression inventories -I and -II in psychiatric outpatients. J Pers Assess 1996, 67(3):588–597.

15. Rush AJ, Trivedi MH, Ibrahim HM, Carmony TJ, Arnow B, Klein DN, Markowitz JC, Nisan PT, Kornstein S, Manber R, Thase ME, Kocsis JH, Keller MB: The 16-item Quick Inventory of Depressive Symptomatology (QIDS), clinician rating (QIDS-C), and self-report (QIDS-SR): a psychometric evaluation in patients with chronic major depression. Biol Psychiatry 2003, 54(3):573–583.

16. Trivedi MH, Rush AJ, Ibrahim HM, Carmony TJ, Biggs MM, Suppes T, Crismon ML, Shores-Wilson K, Toprac MG, Dennehy EB, Witte B, Karger TM: The Inventory of Depressive Symptomatology, Clinician Rating (IDS-C) and Self-Report (IDS-SR): a psychometric evaluation in patients with chronic major depression. Biol Psychiatry 2004, 55(5):494–505.

17. Rush AJ, Carmony TJ, Ibrahim HM, Trivedi MH, Biggs MM, Shores-Wilson K, Crismon ML, Toprac MG, Karger TM: Comparison of self-report and clinician ratings on two inventories of depressive symptomatology. Psychiatr Serv 2006, 57(6):829–837.

18. Bernstein IH, Wendt B, Naur SJ, Rush AJ: Screening for major depression in private practice. J Psychiatr Pract 2009, 15(2):87–94.

19. Bernstein IH, Rush AJ, Stegman D, Matickhande E, Witte B, Trivedi MH: A Comparison of the QIDS-C16, QIDS-SR16, and the MADRS in an adult outpatient clinical sample. CNS Spectr 2010, 15(7):458–468.

20. Kover N, Quee PJ, Boos HB, Simons CJ, De Haan L: GROUP Investigators: Genetic Risk and Outcome of Psychosis (GROUP), a multi site longitudinal cohort study focused on gene-environment interaction: objectives, sample characteristics, recruitment and assessment methods. Int J Methods Psychiatr Res 2012, 21(3):205–221.

21. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders: DSM-IV: Washington, Washington, D.C.: American Psychiatric Association; 1994.

22. Kay SR, Fiszbein A, Opler LA: The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophr Bull 1989, 15:291–316.

23. Kay SR, Fiszbein A, Opler LA: The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophr Bull 1989, 15:291–316.

24. Kay S: CGIUE Assessment Manual for Psychopharmacology (DHHS Pub No ADM 91–388). Washington, DC: Rockville MD, U.S. Department of Health, Education, and Welfare; 1976.

25. Barnes TR: A rating scale for drug-induced akathisia. Br J Psychiatry 1989, 154(7):627–676.

26. Bressnan RA, Chaves AC, Shikakawa I, De Mari J: Validity study of the Brazilian version of the Calgary depression scale for schizophrenia. Schizophr Res 1998, 32(1):41–49.

27. Bentsen H, Munkvold OG, Notland TH, Boye B, Bjerrege H, Lersbryggen A, Oskarsson K, Berg-Larsen R, Mørt UF: The interrater reliability of the Positive and Negative Scale (PANSS). Int J Methods Psychiatr Res 1996, 6:227–235.

28. Van der Gaag M, Hoffmann T, Remmersen M, Hijman R, De Haan L, Van Meijel B, Van Harten PN, Valmaggia L, De Hert M, Cuijpers A, Wiersma D: The five-factor model of the Positive and Negative Symptom Scale II: a ten-fold cross-validation of a revised model. Schizophr Res 2006, 85(1–3):280–287.

29. Hughes AJ, Daniel SE, Kiford L, Lees AJ: Accuracy of clinical diagnosis of idiopathic Parkinson’s disease: a clinicopathological study of 100 cases. J Neural Neurosurg Psychiatry 1992, 55(3):181–184.
29. Gadermann AM, Guhn M, Zumbo D: Estimating ordinal reliability for Likert-type and ordinal item response data: a conceptual, empirical, and practical guide. Practical Assess Res Eval 2012, 17(3):1–13.
30. Revelle W: An overview of the psych package. 2011. Retrieved from https://sapa-project.org/r/.
31. Bernaards CA, Jennrich RI: Gradient projection algorithms and software for arbitrary rotation criteria in factor analysis. Educ Psychol Meas 2005, 65:676–696.
32. Streiner DL: Starting at the beginning: an introduction to coefficient alpha and internal consistency. J Pers Assess 2003, 80(1):99–103.
33. Clark LA, Watson D: Constructing validity: basic issues in objective scale development. Psychol Assess 1995, 7:309–319.
34. O’Connor BP: SPSS and SAS programs for determining the number of components using parallel analysis and velicer’s MAP test. Behav Res Methods Instrum Comput 2000, 32(3):396–402.
35. Müller MJ, Szegedi A, Wetzel H, Benkert O: Depressive factors and their relationships with other symptom domains in schizophrenia, schizoaffective disorder, and psychotic depression. Schizophr Bull 2001, 27(1):19–28.
36. Addington D, Addington J, Maticka-Tyndale E: Specificity of the Calgary depression scale for schizophrenics. Schizophr Res 1994, 11:239–244.
37. Miller DD: Atypical antipsychotics: sleep, sedation, and efficacy. Practical Assess Res Eval 2004, 6(Suppl 2):3–7.
38. Teff KL, Kim SF: Atypical antipsychotics and the neural regulation of food intake and peripheral metabolism. Physiol Behav 2011, 104(4):590–598.
39. Radiolo LS: The CES-D scale: a self-report depression scale for research in the general population. Applied Psychol Measurement 1977, 1:385–401.
40. Mauritz M, Van Meijel B: Loss and grief in patients with schizophrenia: on living in another world. Arch Psychiatr Nurs 2009, 23(3):251–260.
41. Simonsen C, Sundet K, Vaskinn A, Ueland T, Romm KL, Helliø T, Melle I, Friis S, Andreassen OA: Psychosocial function in schizophrenia and bipolar disorder: relationship to neurocognition and clinical symptoms. J Int Neuropsychol Soc 2010, 16(5):771–783.
42. Kulhara P, Avasthi A, Chadda R, Chandiramani K, Mattoo SK, Kota SK, Joseph S: Negative and depressive symptoms in schizophrenia. Br J Psychiatry 1989, 154:207–211.
43. Koning JP, Vehof J, Burger H, Wilffert B, Al Hadithy A, Alizadeh B, Van Harten PN, Snieder H: Genetic Risk and Outcome in Psychosis (GROUP) investigators: Association of two DRD2 gene polymorphisms with acute and tardive antipsychotic-induced movement disorders in young Caucasian patients. Psychopharmacol 2012, 219(3):727–736.

Cite this article as: Lako et al.: Psychometric properties of the self-report version of the Quick Inventory of Depressive Symptoms (QIDS-SR16) questionnaire in patients with schizophrenia. BMC Psychiatry 2014 14:247.