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The Brief Psychiatric Rating Scale (version 4.0) factorial structure and its sensitivity in the treatment of outpatients with unipolar depression

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Abstract

The 24-item Brief Psychiatric Rating Scale (BPRS, version4.0) enables the rater to measure psychopathology severity. Still, little is known about the BPRS's reliability and validity outside of the psychosis spectrum. The aim of this study was to examine the factorial structure and sensitivity to change of the BPRS in patients with unipolar depression. Two hundred and forty outpatients with unipolar depression were administered the 24-item BPRS. Assessments were conducted at intake and at post-treatment in a Crisis Intervention Centre. An exploratory factor analysis of the 24-item BPRS produced a six-factor solution labelled “Mood disturbance”, “Reality distortion”, “Activation”, “Apathy”, “Disorganization”, and “Somatization”. The reduction of the total BPRS score and dimensional scores, except for “Activation”, indicates that the 24-item BPRS is sensitive to change as shown in patients that appeared to have benefited from crisis treatment. The findings suggest that the 24-item BPRS could be a useful instrument to measure symptom severity and change in symptom status in outpatients presenting with unipolar depression.

Keywords

BPRS; Depression; Crisis Intervention Centre

1. Introduction

In busy psychiatric services, short, simple-to-administer, and informative measures are needed to assess psychopathological symptoms. The Brief Psychiatric Rating Scale (BPRS) is one of the most widely-used instruments enabling the clinician to quickly gather information about the possible presence and severity of various psychiatric symptoms. The

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BPRS exists in various forms, varying in the number and type of symptoms assessed, clarity of anchor point definitions, and administration and rating instructions. The original 16-item BPRS, developed in the early sixties (Overall and Gorham, 1962), was extended to 18 items (Overall et al., 1967). This latter version was used for many years. Then, in order to increase its sensitivity to psychotic and affective disorders as well as to be used with patients living in the community, the BPRS was expanded to 24 items (the 24-item BPRS, version 2; Lukoff et al., 1986a, 1986b). Compared to previous versions of the BPRS, the manual of administration of the 24-item BPRS (version 4.0; Ventura et al., 1993b) offers a more detailed semi-structured interview containing more probe questions for each symptom. The 24-item BPRS also provides supplementary rules for rating (e.g., delusions) and the anchor points are better defined. Additional guidelines for interviews and operational definitions regarding the frequency of symptoms and social functioning alterations are available (Morosini et al., 1995; Morosini and Casacchia, 1995).

With specific regard to the 24-item BPRS, some recent analyses of the underlying construct of the symptom items produced a four-factor solution: Negative Symptoms, Positive Symptoms, Manic-hostility and Anxiety–Depression (Ventura et al., 2000). This structure remains stable across the longitudinal course of schizophrenia (Kopelowicz et al., 2008) and cross-culturally (Ruggeri et al., 2005). The 24-item BPRS is also a sensitive measure of symptom reduction occurring after rehabilitation intervention (Ballerini et al., 2007; Gigantesco et al., 2006; Inch et al., 1997; Pioli et al., 2006). Moreover, less clinically experienced professionals could administer the BPRS 4.0 with high levels of inter-rater reliability (Roncone et al., 1999; Ventura et al., 1993a). However, the use of the 24-item BPRS has, until recently, been mostly limited to severely mentally ill hospitalized patients (e.g., Adams and El-Mallakh, 2009; Anderson et al., 2004; Biancosino et al., 2007; Kopelowicz et al., 2008; Ventura et al., 2000). Shafer (2005) suggested studying the factor structure of BPRS in patients with other psychiatric diagnosis than schizophrenia. Little is known about the 24-item BPRS with regard to mood disorders. As a broad-based instrument, the 24-item BPRS (version 4.0) may contribute to detecting different symptoms (e.g., psychotic features) which are not covered by more specific assessment instruments (e.g., BDI: Beck Depression Inventory, Beck et al., 1988; HDRS: Hamilton Depression Rating Scale, Hamilton, 1980; MADRS: Montgomery and Asberg Depression Rating, Montgomery and Asberg, 1979). This is probably due to the fact that clinicians and researchers prefer to use specific self-administered scales which are in accordance with “a view of mental disorders as independent entities” (Biancosino et al., 2010, p. 329). This may lead clinicians to ignore other symptoms (e.g., somatic concerns, motor retardation) which could also have a deleterious influence on social functioning.

Research has just begun to explore the validity of the 24-item BPRS in assessing symptom severity in other specific psychiatric disorders such as mania in inpatients (Picardi et al., 2008). More recently, the factor structure of the 18-item BPRS was examined in a sample of inpatients with unipolar depression assessed shortly after admission (Biancosino et al., 2010). The authors extracted four factors (“Apathy”, “Dysphoria”, “Depression” and “Psychoticism”) but did not report the sensitivity to change of the instrument and the reliability of the clinical raters. Moreover, the 18-item version of the BPRS suffers from

several weaknesses (e.g., lack of specific anchors points). Thus, the psychometric characteristics of the BPRS remain incomplete.

Furthermore to date, no study has examined the question of whether the 24-item BPRS could also be a useful instrument when administered to outpatients with a mood disorder admitted to a Crisis Intervention Centre (CIC). CICs are community-based psychiatric units which serve as an alternative to voluntary hospitalizations offering intensive, time-limited (6–8 weeks) individual and group therapy, social assistance, as well as, in some cases, the possibility of spending the night in the centre (Bacchetta et al., 2009). For such a treatment context, it becomes essential to have brief, accurate psychopathological instruments which are sensitive to changes during pharmacological treatment (Eiselé et al., 1991) and to document the efficacy of psychological therapies.

Thus, the aim of this study was to investigate the factor structure of the French version of the 24-item BPRS and to examine its sensitivity to change in a sample of outpatients with unipolar depression treated in a CIC.

2. Methods

2.1. Patients

Two hundred and forty outpatients (62.5% women) with unipolar depression were included. The patients' average age was 40.85 years (S.D. = 10.89; range, 19–70). They were recruited from consecutive admissions in one of the CICs of the University Hospital of Geneva, Switzerland. At admission, patients were carefully interviewed by a psychiatrist. During this unstructured interview were examined psychiatric symptoms, social conditions, trigger events as well as present and past history including substance and alcohol abuse and dependence, mood swings or mood disorders induced by medical conditions. Patients' records were also examined. This was done in order to exclude medical conditions associated with psychiatric symptoms and to identify possible bipolar disorders (type I or type II) or other comorbidities (e.g. substance and alcohol dependence). In case of doubt, patients were referred to a specialized bipolar unit or other specialized units (substance or alcohol) for diagnosis ascertainment and treatment. According to the ICD-10, 136 (56.66%) were diagnosed with depressive mood disorder (F32) and 104 (43.34%) with recurrent depressive disorder (F33). Clinical diagnoses were ascertained by two independent psychiatrists. In the depressive mood disorder group, 6 (4.41%) presented a mild depressive episode (F32.0), 61 (44.85%) a moderate depressive episode (F32.1) and 69 (50.73%) a severe depressive episode without psychotic symptoms (F32.2). In the recurrent depressive disorder group, 6 (5.76%) had a mild depressive episode (F33.0), 53 (50.96%) a moderate depressive episode (F33.1), 36 (34.61%) a severe depressive episode without psychotic symptoms (F33.2), 2 (1.92%) a severe depressive episode with psychotic symptoms (F33.3), 1(0.96%) was then in remission (F33.4) and 6 (5.76%) presented an unspecified episode. Most of the patients (92.91%) received psychotropic medication and 77.50% took more than one medication. One hundred and fifty (62.50%) were either employed or students. The most common symptoms motivating treatment at the CIC were suicidal ideation or suicidal attempt (43.75%), depressed mood (33.75%) and anxiety (10.83%). The prevalent trigger events were couple difficulties (42.50%), conflicts at work (22.90%), family situation

(16.66%), miscellaneous (12.08%) and unclear (4.10%). Patients received a 6–8 weeks crisis treatment combining pharmacological treatment and intensive individual and group therapy (for full descriptions see Bacchetta et al. (2009)).

2.2. Measures

The 24-item BPRS (version 4.0) assesses 24 psychiatric symptoms (Ventura et al., 1993b). The presence and severity of psychiatric symptoms were rated on a Likert scale ranging from 1 (not present) to 7 (extremely severe). Thus, possible scores vary from 24 to 168 with lower scores indicating less severe psychopathology. The 24-item BPRS interviews and ratings were assessed following the 24-item BPRS administration manual, including Morosini et al.'s (1995) and Morosini and Casacchia's (1995) adjunctions, which we translated and adapted into French (Zanello et al., 2004, unpublished manuscript).

As an independent measure of clinical change we used the Symptom Checklist – Revised (SCL-90 R) (Derogatis, 1977). The SCL-90 R is a self-rating scale composed of 90 items rated from 0 (not at all) to 4 (extremely). The SCL-90 R enables to calculate the Global Severity Index (GSI).

2.3. BPRS training

Research assistants (five psychologists) received BPRS training before assessing patients. The training consisted of (a) 3 h of formal teaching introducing BPRS rationale, interview characteristics', description and scoring of items, (b) a video-training consisting in eight video-taped BPRS interviews with “gold standard” consensus ratings obtained from four senior psychologists previously trained by one of us (J.V.) with good intra-class reliability (ICC > 0.87), and (c) clinical practice in real situations was given to each research assistant as he participated in four in vivo BPRS interviews (two conducted by A.Z. and two conducted by the trainee under A.Z.'s supervision). The quality assurance was provided over time study, and each BPRS interview was discussed with the first author.

2.4. Procedure

The 24-item BPRS was included in the protocol of a study approved by the local ethical committee. Participants gave written informed consent before being administered a battery of questionnaires including the 24-item BPRS and the SCL-90 R. Assessments were made by a research assistant at intake within one week of admission and at discharge after 8 weeks ± 1 week. Ratings considered the last two-week period of psychiatric symptoms.

2.5. Statistical analyses

First, the suitability of the data for factor analysis was verified. The distribution of the BPRS item scores was inspected with the Kolmogorov–Smirnov test. As the results showed the violation of normality for all variables ($P < 0.001$), the latent structure of the 24-item BPRS was examined following Costello and Osborne's (2005) recommendations. Thus, we carried out an Exploratory Factor Analysis (EFA) and extracted factors using the principal axis factors method. The number of factors retained for rotation was determined with Horn's parallel analysis using the Monte Carlo method for parallel analysis software (Watkins, 2000). Oblique rotation (the direct oblimin method) was preferred as factor independence

was not assumed. To enable a clear interpretation of the factor analysis, only loadings of 0.30 or higher were considered (Tabachnick and Fidell, 2007). Items were forced in repeated EFA analysis to obtain the most parsimonious and interpretable factor solution. The latter had to fulfil the following criteria: (1) produce items with a factor loading of 0.30 or higher, (2) produce factors comprising at least three items and (3) have as few cross-loading items as possible.

Factorial scores were obtained by adding the items loading on a specific factor and dividing this sum by the number of items belonging to the factor. This simple and most frequently used method produces stable factor scores across samples and keeps the same metric scale as the items (DiStefano et al., 2009). Sensitivity to change was verified through the comparison of (a) pre–post BPRS scores, (b) the factors previously obtained in a sample of patients with schizophrenia and mania (Ventura et al., 2000) and (c) the outcome groups derived from SCL-90 R GSI. As pre–post BPRS comparisons did not provide complete information about its sensitivity (e.g. are patients' after treatment scores normative?) and because significant changes may also be due to its possible unreliability, there was a need to include an independent measure of clinical change. Therefore, we have used the SCL-90 R GSI to that end. Then, in order to identify patients' outcomes we have applied the Reliable Change Index (RCI) and Clinical Significance (CS) criteria of Jacobson and Truax (1991).

Non-parametric statistics were used to compare group factorial scores. Thus, gender, diagnosis and outcome groups' differences were examined with the Mann– Whitney *U*-test or the Kruskal–Wallis one way analysis of variance for independent samples. Distributions were examined with Pearson's Chi-Squared (χ^2) test. Associations between variables were analyzed with Spearman correlation coefficient. Sensitivity to change over time was analyzed with the Wilcoxon signed-rank test for dependent samples. The Effect sizes (ES) were computed with the ClinTools Software, Version 4.1 (Devilly, 2007) and their magnitude of ES was interpreted as small (r = 0.10–0.29), medium (r = 0.30–0.49) or large ($r \geq 0.50$) according to Cohen (1988). The analyses were computed with PASW 18 Statistics (SPSS Inc., Chicago, IL, USA). The RCI and CS were computed with the ClinTools Software, Version 4.1 (Devilly, 2007) considering the non-patient normal group SCL-90 R GSI mean (S.D.) of 0.31 (0.31) (Derogatis, 1977). The criteria chosen were the RCI *z*-score≤or ≥1.96 and the CS cut-off between the non-patient normal group and our samples' mean with at least 95% confidence.

3. Results

3.1. Item descriptive statistics

Table 1 presents descriptive statistics for the BPRS items. The mean of fifteen (62.5%) items is the score two. The range of 17 (70.8%) items is comprised between absent (score 1) to severe/ extremely severe (score≥6). For 2 items (“distractibility”, “mannerisms and posturing”) the range is weak. The presence of a symptom was defined as a score superior to the score 1. According to this definition, “anxiety” or “depression” were present in almost all patients (> 95%) while 4 items (“grandiosity”, “conceptual disorganization”, “distractibility”, “mannerisms and posturing”) were seldom present (≤10%). The distribution of the items was examined according to Bulmer's (1979) criteria. Thus, “anxiety” and

"depression" items were negatively highly skewed (< −1) while the distribution of nearly two-thirds of items (n = 14, 58.3%) was highly positively skewed (> + 1), indicating respectively high and low ratings. Seven items (29.2%) are moderately skewed (between −1 and −0.05 or 0.05 and 1). Only, the distribution of the item "suicidality" is approximately symmetric (skewness between −0.05 and 0.05).

3.2. Data screening

At intake, the sample size was higher than the minimal recommended sample size for EFA analysis (n > 150) (Tabachnick and Fidell, 2007). The ratio of 10 patients per variable corresponded to the suggested ratio of 10 to 1 (Nunnaly, 1978). The Kaiser–Meyer–Oklin value of 0.69 exceeded the advised value of 0.60 (Tabachnick and Fidell, 2007). The inspection of the correlation matrix revealed many coefficients greater than 0.3. Bartlett's test of Sphericity was significant (χ^2 (276) = 1048.42, P < 0.001). All these indicators suggested that the data could be considered suitable for EFA. All items were included in the EFA.

3.3. Exploratory Factorial Analysis (EFA)

The EFA without rotation revealed eight factors with eigenvalues superior to 1.0, explaining 58% of the variance. Two factors were dropped because they failed to exceed the criterion value obtained by the Parallel Analysis after 100 runs. Thus, EFA was rerun forcing the items into four-, five- and six-factor solutions. The four- and five-factor solutions were not retained because they each had four items loading on several factors and because one factor had only two items. The six factor solution was the most acceptable which explained 49% of the variance. After rotation, the six-factor solution fulfilled the above mentioned criteria to interpret the factors (see point 2.5). Twenty-two items out of the 24-item BPRS loaded on it. The items "elevated mood" and "grandiosity" did not belong to any factor. Table 2 reports the six retained factors and the item loadings grouped by size.

Factor I was saturated by "unusual thought content" and "suspiciousness" and to a lesser degree by "hallucination". It was interpreted as "Reality distortion". Factor II was mainly loaded by two items "motor activity" and "excitation"; "distractibility" and "tension" loaded to a lower extent. It was defined as "Activation". Factor III consisted of "blunted affect", "emotional withdrawal", "motor retardation" and "uncooperativeness" and it is interpretable as "Apathy". Factor IV comprised items relating to "Mood disturbance", that is "depression", "anxiety", "suicidality" and "guilt" items. This factor also includes the "suspiciousness" item, which is a psychotic feature, but at a much lower loading than for "Reality distortion". Factor V is principally composed of "conceptual disorganization" while "disorientation" and "bizarre behaviour" had low communalities. Hence, we interpreted this factor as "Disorganization". Factor VI grouped "somatic concern", "hostility" and "mannerisms and posturing". It is interpreted as "Somatization". These factors explained correspondingly, 13.04%, 10.98%, 7.06%, 6.73%, 5.63% and 5.40% of the variance. It is to be noted that the item "suspiciousness" showed cross-loadings on the "Reality distortion" and "Mood disturbance" factors. As the "tension" item loaded very similarly with the "Mood disturbance" and "Activation" factors it was excluded from the analysis. As shown in Table 3, the six dimensions are weakly correlated.

The “Mood disturbance ” factor scores were normally distributed (Kolmogorov–Smirnov test $P > 0.05$) indicating that most patients present mild to moderate depressive symptoms, whereas the distribution of the other factor scores was not normal (Kolmogorov–Smirnov test $P < 0.001$) and was strongly skewed indicating that a small proportion of patients presented high severity on these dimensions.

3.4. Group differences and factor associations

Table 4 presents the results of group comparison and factor association. Age was not correlated to the 24-item BPRS factor scores. However, we found some gender differences. Women displayed significantly less “Apathy” and more “Somatization” features than men. Nevertheless, these differences did not survive the Bonferroni correction for multiple comparisons.

There were no significant differences between the depressive mood disorder (F32) and the recurrent depressive disorder (F33) patient groups, between medication groups (drug free versus monotherapy versus polytherapy) and between employed and non-employed patient groups with regard to the 24-item BPRS scores.

3.5. Sensitivity to change

All participants were asked to complete the 24-item BPRS and the SCL-90 R after 8 weeks (± 1 week). A group of 99 patients agreed, 59 of whom were women (59.99%), with a mean age of 41.90 (S.D. = 11.61; range, 19–63) years. Eighty four patients completed both instruments. At intake, no difference in the 24-item BPRS variables and socio-demographic characteristics was found between this group and the group that did not participate in the follow-up (all $P > 0.10$).

3.5.1. Pre–post factors comparisons—To assess the change in symptoms over time, both the total 24-item BPRS score and the average composite scores of each factor were considered. As shown in Table 5, the sensitivity of the BPRS dimensions obtained herein is very similar to the one using the dimensions obtained by Ventura et al. (2000). This appears especially clear for the “Mood Disturbance”, “Activation” and “Apathy” dimensions compared to “Depression–Anxiety”, “Manic-hostility” and “Negative Symptoms”. In addition to Ventura et al. (2000), we also found “Disorganization”, “Reality distortion” and “Somatization” dimensions, these two latter being sensitive to change. According to Cohen's (1988) rule of thumb, the effect sizes were small for “Reality distortion”, “Apathy” and “Disorganization”, moderate for the 24-item BPRS total and “Somatization” and large for “Mood disturbance”. No change was observed on the “Activation” factor score.

3.5.2. Groups' outcomes comparisons—The RCI and CS computed for the SCL-90 R GSI score changes allow us to classify patients after intervention according to Wise (2004) as Recovered ($n = 31$) if both RCI and CS were met (reliable change criteria and scores shift on the normative range), Improved ($n = 21$) if only RCI criteria was met (reliable change criteria and scores remain in the pathological range), Unchanged ($n = 10$) if none of the two criteria was met (scores remain in the pathological range) or Deteriorated ($n = 7$) if RCI criteria was met in the negative direction (scores worsen). In addition, we considered also a

No distress group (n = 15) (SCL-90 R GSI scores are normative at admission and discharge). The scores of each dimension and total of the 24-items BPRS of these five outcome groups were compared both at admission and at discharge. Table 6 shows the mean (S.D.) and the results of the comparisons. P values were adjusted for each time (P = 0.05/7 variables = 0.007) and for the number of group comparisons (P = 0.05/10 comparisons = 0.005). Only the results reaching statistical significance after adjustment for multiple comparisons are considered. At admission, only “Reality distortion” was statistically significant. Post hoc analyses indicate that the No Distress group has lower “Reality distortion” scores than the Recovered (Mann–Whitney U-test, z = −3.24, P = 0.001), Improved (Mann–Whitney U-test, z = −3.71, P < 0.001) and Unchanged (Mann–Whitney U-test, z = −2.94, P = 0.005) groups. No other differences were found. At discharge, “Reality distortion”, “Mood disturbance” and BPRS total score were significant. Post hoc analyses show significant differences for the following comparisons. For “Reality distortion”, the No distress Group scored lower than the Deteriorated (Mann–Whitney U-test, z = −3.01, P = 0.003) group. For “Mood disturbance” the No distress Group scored lower than Improved (Mann–Whitney U-test, z = −3.55, P = 0.001), Unchanged (Mann–Whitney U-test, z = −3.39, P < 0.001) and Deteriorated (Mann–Whitney U-test, z = −2.71, P = 0.005) groups and the Recovered group scored lower than the Improved (Mann– Whitney U-test, z = −4.65, P < 0.001), the Unchanged (Mann– Whitney U-test, z = −4.02, P < 0.001) and the Deteriorated (Mann–Whitney U-test, z = −3.41, P < 0.001) groups. Finally, for BPRS total score the Deteriorated group scored higher than the No distress (Mann–Whitney U-test, z = −2.83, P = 0.003) group. The Recovered group scored lower than the Improved (Mann–Whitney U-test, z = −4.38, P < 0.001), the Unchanged (Mann–Whitney U-test, z = −3.76, P < 0.001) and the Deteriorated (Mann–Whitney U-test, z = −3.67, P < 0.001) groups. No other differences reached statistical significance.

4. Discussion

The current study, to the best of our knowledge, is the first to investigate the symptom dimensions and the sensitivity to change of the 24-item BPRS in a sample of outpatients with unipolar depression. Therefore we could not directly compare our findings to those of previous studies. In fact, previous research using the BPRS 24 was done in different clinical settings and with psychotic patients or used the18-item BPRS or other instruments with patients suffering from depression.

Regarding symptom dimensions, a six-factor solution was the most parsimonious, interpretable and clinically relevant. As expected, we found a “Mood disturbance” component including symptoms typically related to depression and anxiety. A “Depression” factor was also found in unipolar depressive patients using the 18-item BPRS (Biancosino et al., 2010). A very similar “Depression–Anxiety” dimension emerged also in factorial studies of the 24-item BPRS in patients with schizophrenia (Burger et al., 1997; Dingemans et al., 1995; Kopelowicz et al., 2008; Picardi et al., 2008; Thomas et al., 2004; Van der Does et al., 1993; Ventura et al., 2000). However, this factor did not emerge in patients with Bipolar Affective Disorders (Picardi et al., 2008). This latter result suggests that the 24-item BPRS factor structure may vary according to patient sample studied.

The “Reality distortion” dimension, characterized by items assessing psychosis, is very similar to the “Psychoticism” factor reported by Biancosino et al. (2010). At first glance, this could appear somewhat surprising as in our sample only two patients had a diagnosis of depressive disorder with psychotic features. However, psychotic-like symptoms are very common in patients with depression (Perlis et al., 2011). Our findings also confirm reports using other assessment instruments isolating a “Psychosis” component in patients with unipolar depression (Cassano et al., 2009; Harvey et al., 2009; Serretti et al., 1998). This is also in line with cognitive theory of depression claiming that this disorder is characterized by several irrational beliefs (Beck et al., 1979; McDermut et al., 1997; White et al., 1992), and with the hypothesis that depression can lead to an exacerbation of positive psychotic symptoms (Yung et al., 2007). Studies of patients with schizophrenia or with bipolar affective disorder also identified this BPRS factor which was variously labelled “Positive symptoms”, “Thinking Disorder” or “Thought Disturbance” (Burger et al., 1997; Dingemans et al., 1995; Kopelowicz et al., 2008; Picardi et al., 2008; Thomas et al., 2004; Van der Does et al., 1993; Ventura et al., 2000). However, it should be reminded that the presence of psychotic features in depression does not mean that all patients have psychosis.

The “Activation” factor is comprised of the “motor hyperactivity”, “excitement” and “distractibility” items also found in bipolar disorder and schizophrenia (e.g., Kopelowicz et al., 2008; Picardi et al., 2008; Thomas et al., 2004; Ventura et al., 2000). This is a strength of the 24-item BPRS compared to the 18-item BPRS which failed to produce an activation dimension in unipolar depression (Biancosino et al., 2010). Our findings also add support for clinical relevance of the “Activation” dimension observed in unipolar depressed patients (Akiskal and Benazzi, 2006; Biondi et al., 2005).

The “Apathy” dimension found here measures the emotional impoverishment aspect of the Apathy model (Starkstein et al., 2001). Our findings represent additional support for the distinction between depression and apathy (Biancosino et al., 2010; Klaassen et al., 2011; Starkstein et al., 2001). However, the “Apathy” dimension was not correlated with age in unipolar depressed patients as reported in other studies (e.g., Biancosino et al., 2010). It is also worthwhile to mention that the “Apathy” dimension overlapped part of the labelled “Negative symptoms” dimension observed in patients with schizophrenia (e.g., Burger et al., 1997; Dingemans et al., 1995; Kopelowicz et al., 2008; Thomas et al., 2004; Van der Does et al., 1993; Ventura et al., 2000). This suggests that BPRS dimensions comprising similar symptoms may be differently labelled and should be interpreted according to the diagnosis.

The “Disorganization” factor consists of cognitive (“conceptual disorganization” and “disorientation” items) and behavioural (“bizarre behaviour”) features. Factor analyses of the 18 and 24-item BPRS have also reported a “Disorganization” factor in patients with schizophrenia (Van der Does et al., 1993). Disorganization is the core item of this factor and is often included in the psychotic dimension in patients with schizophrenia (e.g., Burger et al., 1997; Dingemans et al., 1995; Kopelowicz et al., 2008; Thomas et al., 2004; Van der Does et al., 1993; Ventura et al., 2000) while for patients with mood disorders (manic and depressive) the “disorganization” item is related to “Apathy” items (Biancosino et al., 2010; Picardi et al., 2008). In our patient sample, the “Disorganization” dimension may represent the negative impact of actual emotional crisis on everyday life functioning.

The sixth factor is more difficult to interpret because it includes the “somatic concern”, “hostility”, and “mannerisms and posturing” items which are conceptually not related. Looking at their definition and scoring in the BPRS manual, it is likely that the lower scores could be considered as various manifestations of physical sensations. Thus, we named this factor “Somatization”. All these items are part of the “Dysphoria” dimension found by Biancosino et al. (2010). It is important to point out that the prevalence of somatic symptoms and irritability is commonly reported in major depression (Kapfhammer, 2006; Perlis et al., 2011; Trivedi, 2004; Tylee and Gandhi, 2005). Somatic symptoms and irritability were observed in approximately two-thirds of our patients (see Table 1). The presence of the “mannerisms and posturing” item in this factor, a feature more often observed in patients with schizophrenia, may be explained by the fact that in some patients with depression, irritability may mimic mannerism and posturing (Féline, 1991). In our sample women reported higher “Somatization” scores than men. This finding replicates those of several previous studies (Marcus et al., 2005; Silverstein, 1999; Silverstein and Patel, 2011).

Although we used an oblique rotation, only weak correlations were found among factors. The highest association was observed between “Reality distortion” and “Disorganization”. This confirms previous findings suggesting that these two psychotic features may represent two distinct but related dimensions (Ventura et al., 2013).

Overall, the factorial structure of the 24-item BPRS found here suggests that in unipolar depression it is important to assess additional symptoms other than those traditionally measured by specific scales developed to only evaluate depressive symptoms. Indeed, the identification of various symptom dimensions is in accordance with the dimensional approach to depression psychopathology as a complement to categorical depression approach (Van Praag et al., 1990; Van Praag, 1995; Goldberg, 2000; Biondi et al., 2005).

Concerning the sensitivity to change of the “Mood Disturbance”, “Activation” and “Apathy” dimensions, they are very similar to the one of the “Depression–Anxiety”, “Manic-hostility” and “Negative Symptoms” dimensions reported in patients with schizophrenia and mania (e.g. Ventura et al., 2000). This is not surprising as these dimensions regroup very similar items. The “Disorganization” dimension is less sensitive to change than the “Reality distortion” and “Somatization” dimensions. The “Activation” dimension failed to reach statistical significance. This latter result may be explained by a floor effect and could be partially attributed to sample composition. In fact, none of the patients had psychosis (e.g., schizophrenia) or an acute manic disorder which would likely have higher “Activation” scores than unipolar depression.

These findings lead to some suggestions for the use of 24-item BPRS with patients presenting unipolar depression. If the clinician considers only the general level of psychiatric symptom severity, he will ignore important information, thus it also becomes essential to take into account the profile of factor scores. Monitoring the symptoms regularly with a single instrument such as the 24-item BPRS could also be central to adapting pharmacological and therapeutic treatments (e.g., in a Crisis Centre); this could also be useful to document hospitalizations or the situation at discharge.

However, some limitations may impede the generalization of our findings. First, the 24-item BPRS was not administered to all patients referred to the CIC but only to a selected sample that agreed to participate in the study. Second, the validity of the clinical diagnosis may be criticized because it was not ascertained with standardized instruments (e.g., SCID, Structured Clinical Interview for DSM-IV, First et al., 1996). Third, the comorbidities (e.g., medical conditions, substance abuse) were not considered, which may have confounding effects. Fourth, the factorability of data may also be questionable because several items were unrelated to others and some symptom items failed to contribute to the factor structure. Moreover, given the exploratory nature of the study, we chose a simple method to calculate factor scores. Future research should consider using more sophisticated statistical procedures (see DiStefano et al. (2009)). Fifth, the convergent validity of the 24-item BPRS remained unknown because of the absence of other symptom measures. Sixth, patients with psychiatric diagnoses other than unipolar depression were not included; thus the discriminant validity of the 24-item BPRS could not be verified. Future research has to consider these limitations. Studies should not only confirm the factor solution found herein but also verify the convergent validity of the 24-item BPRS with other well-known and more frequently used instruments for assessing unipolar depression. The effects of socio-demographic variables, such as marital and socio-economic status, crisis type (e.g., family relations, work-related problems) and psychiatric background of patients (e.g., previous hospitalization) should also be examined in larger samples. Finally, the fact that Crisis Centres are not part of all health care systems prevents the generalization of our findings to inpatients with unipolar depression. Thus, future research should verify the stability of the factor structure of the 24-item BPRS in patients admitted to acute hospital wards. Further differences between patient groups should be considered (e.g. inpatients admitted for a long stay versus for a short stay versus outpatients admitted in a Crisis Centre versus outpatients of ambulatory psychiatric units).

In summary, the current study should be considered as a first step towards the examination of the 24-BPRS psychometric properties in patients with unipolar depression. Despite its limitations, the findings showed that the 24-item BPRS could be a promising, valid, broad clinical instrument to routinely monitor psychopathology in outpatients with unipolar depression and to evaluate the effect of treatments.

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Table 1

BPRS items and total scores.

	Mean	(S.D.)	Range	Skewness	Presence (%)
1. Somatic concern	2.23	(1.26)	1–6	0.82	59.6
2. Anxiety	5.27	(1.22)	1–7	−1.21	97.5
3. Depression	5.20	(1.26)	1–7	−1.23	97.9
4. Suicidality	3.38	(1.67)	1–7	0.13	81.3
5. Guilt	3.19	(1.44)	1–7	−0.58	81.7
6. Hostility	2.75	(1.56)	1–7	0.49	69.6
7. Elevated mood	1.30	(0.73)	1–5	2.74	18.3
8. Grandiosity	1.19	(0.70)	1–6	4.46	10.0
9. Suspiciousness	2.33	(1.25)	1–6	0.72	68.8
10. Hallucinations	1.36	(0.85)	1–6	2.67	18.8
11. Unusual thoughts content	1.36	(0.88)	1–5	1.01	37.5
12. Bizarre behaviour	1.27	(0.74)	1–6	3.26	15.0
13. Self-neglect	2.45	(1.46)	1–7	0.65	60.7
14. Disorientation	1.22	(0.54)	1–4	2.62	16.7
15. Conceptual disorganization	1.13	(0.46)	1–4	3.94	9.2
16. Blunted affect	2.13	(1.20)	1–6	0.94	60.0
17. Emotional withdrawal	1.57	(0.88)	1–6	1.80	37.1
18. Motor retardation	1.64	(0.96)	1–6	1.50	37.9
19. Tension	1.86	(1.13)	1–7	1.46	49.2
20. Uncooperativeness	1.20	(0.65)	1–7	5.02	14.2
21. Excitement	1.47	(0.90)	1–6	2.27	29.2
22. Distractibility	1.07	(0.30)	1–3	4.84	5.4
23. Motor hyperactivity	1.17	(0.52)	1–5	3.96	12.1
24. Mannerisms and posturing	1.03	(0.17)	1–2	5.63	2.9
Total	49.10	(8.35)	27–72		

Table 2

Factor loadings after rotation, using Exploratory Factor Analysis (EFA).

	Factors						
	Reality distortion	**Activation**	**Apathy**	**Mood disturbance**	**Disorganization**	**Somatization**	h^2
BPRS items							
11. Unusual thoughts content	**0.79**	0.09	0.07	0.21	0.23	0.26	0.67
9. Suspiciousness	**0.78**	0.05	0.19	**0.34**	0.13	0.17	0.69
10. Hallucinations	**0.34**	−0.00	0.02	0.12	0.06	−0.01	0.15
7. Elevated mood	0.19	0.07	−0.14	−0.14	0.11	0.03	0.09
23. Motor hyperactivity	0.01	**0.71**	−0.14	−0.08	0.05	0.24	0.53
21. Excitement	0.04	**0.71**	−0.20	−0.06	0.17	0.24	0.56
22. Distractibility	0.07	**0.48**	−0.02	−0.10	−0.06	−0.13	0.29
8. Grandiosity	0.26	0.26	−0.09	0.05	0.24	−0.15	0.22
16. Blunted affect	0.06	−0.21	**0.81**	0.27	0.06	−0.15	0.70
17. Emotional withdrawal	0.12	−0.06	**0.74**	0.20	0.03	−0.04	0.57
18. Motor retardation	0.02	−0.22	**0.57**	0.14	0.20	−0.12	0.39
20. Uncooperativeness	0.01	0.09	**0.35**	0.03	−0.04	0.17	0.18
3. Depression	0.15	−0.13	0.20	**0.62**	0.21	−0.01	0.45
2. Anxiety	0.07	−0.12	0.11	**0.48**	0.02	0.02	0.25
4. Suicidality	0.11	0.04	0.13	**0.38**	0.13	0.11	0.17
13. Self-neglect	0.20	−0.10	0.11	**0.37**	0.05	−05	0.16
5. Guilt	0.18	0.07	0.00	**0.36**	−0.03	0.10	0.15
19. Tension	−0.03	**0.32**	0.04	**0.35**	−0.20	0.15	0.28
15. Conceptual disorganization	0.15	0.04	0.07	0.07	**0.67**	0.00	0.46
14. Disorientation	0.23	−0.12	0.11	−0.03	**0.35**	−0.08	0.19
12. Bizarre behaviour	0.05	0.26	−0.04	0.12	**0.30**	0.15	0.19
1. Somatic concern	0.13	−0.05	−0.05	0.16	0.13	**0.43**	0.23
6. Hostility	0.17	0.21	−0.19	0.26	0.16	**0.42**	0.30
24. Mannerisms and posturing	0.04	0.10	0.04	−0.01	−0.08	**0.39**	0.17
Eigenvalues	3.13	2.64	1.69	1.61	1.35	1.30	
Cumulative variance	13.04	24.03	31.08	37.81	43.45	48.84	

h^2 indicates communalities.

Factor loadings ≥0.30 are highlighted in bold.

Brackets indicate items loading ≥0.30 but which load higher on another factor.

Table 3

Correlations among factors.

Factors	F1	F2	F3	F4	F5	F6
F1 Reality distortion	1.00					
F2 Activation	0.047	1.00				
F3 Apathy	0.023	−0.129	1.00			
F4 Mood disturbance	0.165	−0.023	0.171	1.00		
F5 Disorganization	0.243	0.013	0.001	0.052	1.00	
F6 Somatization	0.071	0.158	−0.048	0.125	0.009	1.00

Table 4

Group comparisons and factor associations.

	Reality distortion	Activation	Apathy	Mood disturbance	Disorganization	Somatization	Total
Age (*n* = 240)							
Spearman Rho	−0.12	0.012	0.08	−0.07	0.04	0.02	−0.05
P	0.06	0.86	0.22	0.26	0.56	0.80	0.46
Gender							
Female (*n* = 150)	1.83 (0.88)	1.24 (0.45)	1.57 (0.62)	3.56 (0.80)	1.20 (0.38)	2.09 (0.78)	46.26 (8.04)
Male (*n* = 90)	1.77 (0.74)	1.27 (0.49)	1.76 (0.77)	3.56 (0.71)	1.23 (0.40)	1.85 (0.68)	46.17 (8.05)
Mann–Whitney: *z* value	−0.08	−0.57	−1.99	−0.02	−0.79	−2.27	−0.30
P	0.94	0.57	0.05	0.98	0.43	0.02	0.76
Occupational status							
Employed (*n* = 150)	1.80 (0.84)	1.26 (0.51)	1.59 (0.63)	3.57 (0.74)	1.19 (0.36)	1.95 (0.73)	46.02 (7.90)
Non-employed (*n* = 90)	1.82 (0.83)	1.20 (0.37)	1.73 (0.76)	3.54 (0.80)	1.24 (0.42)	2.09 (0.78)	46.46 (8.27)
Mann–Whitney: *z* value	−0.22	−0.12	−1.35	−0.69	−0.92	−1.27	−0.68
P	0.83	0.91	0.18	0.49	0.36	0.21	0.50
Diagnoses							
Depressive mood disorder (F32) (*n* = 136)	1.86 (0.87)	1.21 (0.45)	1.65 (0.67)	3.62 (0.83)	1.19 (0.33)	1.95 (0.74)	46.42 (8.20)
Recurrent depressive disorder (F33) (*n* = 104)	1.74 (0.79)	1.26 (0.48)	1.62 (0.72)	3.47 (0.66)	1.24 (0.45)	2.07 (0.77)	45.97 (7.88)
Mann–Whitney: *z* value	−0.73	−1.00	−0.58	−1.67	−0.31	−1.21	−0.40
P	0.46	0.32	0.56	0.10	0.76	0.22	0.69
Medication							
None (*n* = 17)	1.59 (0.63)	1.26 (0.45)	1.38 (0.44)	3.66 (0.71)	1.20 (0.50)	2.22 (0.75)	45.88 (7.18)
Monotherapy (*n* = 37)	1.66 (0.75)	1.21 (0.42)	1.50 (0.50)	3.60 (0.75)	1.15 (0.27)	1.96 (0.71)	45 14 (7.56)
Polytherapy (*n* = 186)	1.86 (0.86)	1.24 (0.48)	1.69 (0.73)	3.54 (0.77)	1.22 (0.39)	1.99 (0.76)	46.70 (8.21)
Kruskal–Wallis: χ^2(d.f.)	3.38 (2)	0.27 (2)	3.70 (2)	0.87 (2)	1.15 (2)	1.75 (2)	0.83 (2)
P	0.18	0.87	0.16	0.65	0.56	0.42	0.66

Table 5

Sensitivity of the 24-item BPRS factors to change as a function of time.

	Admission (*n* = 99)	**Discharge (*n* = 99)**	***z***	***P***	**ES**
BPRS scores current study	*M* (S.D.)	*M* (S.D.)			
Total	46.22 (8.02)	40.18 (9.63)	−6.45	< 0.001*	0.68
Reality distortion	1.81 (0.83)	1.58 (0.81)	−3.82	< 0.001*	0.28
Activation	1.23 (0.46)	1.21 (0.46)	−0.6	0.55	0.05
Apathy	1.63 (0.69)	1.40 (0.48)	−2.71	0.007*	0.39
Mood disturbance	3.56 (0.76)	2.57 (0.87)	−7.51	< 0.001*	1.21
Disorganization	1.20 (0.38)	1.10 (0.25)	−2.36	0.018	0.31
Somatization	2.00 (0.75)	1.65 (0.64)	−5.06	< 0.001*	0.50
BPRS scores (Ventura et al., 2000)					
Depression–anxiety	4.26 (0.88)	2.93 (1.17)	−7.36	< 0.001**	1.23
Manic-excitement	1.24 (0.38)	1.22 (0.38)	−1.62	0.09	0.05
Negative symptoms	1.94 (0.77)	1.61 (0.59)	−3.22	0.001**	0.48
Positive symptoms	1.58 (0.55)	1.38 (0.52)	−4.31	< 0.001**	0.37

BPRS: Brief Psychiatric Rating Scale; ES indicates Effect size.

*Significant after Bonferroni correction, $P = 0.05/7 = 0.007$.

**Significant after Bonferroni correction, $P = 0.05/4 = 0.125$.

Table 6

BPRS factors and total scores by categorial outcome groups according to SCL-90R GSI (n = 84).

	Groups[a] and total scores, *M* (S.D.)						Group differences			Post-hoc analysis**
	Time[b]	R (n = 31)	I (n = 21)	U (n = 10)	D (n = 7)	ND (n = 15)	χ^2	d.f.	*P*	
Reality distortion	T0	1.86 (0.69)	2.25 (0.83)	2.30 (1.02)	2.10 (1.41)	1.24 (0.48)	17.48	4	0.002*	ND< R = I = U
	T1	1.32 (0.43)	1.76 (0.64)	2.17 (1.27)	2.38 (1.37)	1.22 (0.34)	16.54	4	0.002*	ND = R< I = D
Activation	T0	1.20 (0.31)	1.24 (0.34)	1.67 (0.28)	1.29 (0.49)	1.36 (0.61)	2.36	4	0.67	
	T1	1.20 (0.32)	1.12 (0.22)	1.13 (0.28)	1.33 (0.74)	1.33 (0.66)	0.98	4	0.91	
Apathy	T0	1.61 (0.54)	1.54 (0.57)	1.52 (0.74)	1.50 (0.32)	1.38 (0.41)	2.25	4	0.69	
	T1	1.28 (0.38)	1.52 (0.65)	1.55 (0.57)	1.57 (0.34)	1.48 (0.49)	5.12	4	0.28	
Mood disturbance	T0	3.81 (0.70)	4.00 (0.66)	4.44 (0.74)	3.46 (0.63)	3.44 (1.04)	10.40	4	0.04	
	T1	2.10 (0.73)	3.30 (0.74)	4.06 (0.98)	3.40 (0.66)	2.44 (0.44)	39.81	4	< 0.001*	ND = R< I = U = D
Disorganization	T0	1.14 (0.40)	1.14 (0.27)	1.47 (0.54)	1.29 (0.49)	1.07 (0.14)	8.73	4	0.07	
	T1	1.06 (0.16)	1.05 (0.12)	1.13 (0.23)	1.19 (0.26)	1.04 (0.12)	4.57	4	0.33	
Somatization	T0	2.26 (0.78)	2.36 (0.91)	2.23 (0.54)	2.05 (0.56)	1.71 (0.82)	6.47	4	0.17	
	T1	1.48 (0.58)	1.86 (0.73)	2.03 (0.51)	1.86 (0.53)	1.48 (0.56)	11.04	4	0.02	
BPRS Total	T0	48.79 (6.34)	51.86 (8.10)	53.91 (9.78)	48.88 (7.34)	43.50 (7.54)	13.27	4	0.01	
	T1	34.50 (5.94)	44.10 (7.56)	50.60 (10.99)	48.57 (7.72)	38.27 (5.55)	35.42	4	< 0.001*	ND = R< I = U = D

[a] R = Recovered, I = Improved, U = Unchanged, D = Deteriorated, ND = No distress.

[b] T0 = admission, T1 = discharge.

* Significant after Bonferroni correction at $P = 0.05/7$ variables per time of assessment = 0.007.

** Differences reaching significance after Bonferroni correction at $P = 0.05/10$ group comparisons = 0.005.