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Letter to the Editor

Brief Psychiatric Rating Scale-Expanded (BPRS-E) factor analysis in involuntarily hospitalized psychiatric patients

Dear Editor,

Involuntarily treated psychiatric inpatients pose significant ethical and clinical challenges. Evidence is relatively small on the risk factors for compulsory treatment, and there are no conclusive data on the outcome of involuntary treatment (Zhang et al., 2015). A major limitation of this research area is the absence of a specific standardized assessment of symptom severity (Kallert et al., 2008).

The Brief Psychiatric Rating Scale-Expanded (BPRS-E) (Lukoff et al., 1986) is one of the most widely used tools for assessing type, severity and change over time of psychiatric symptoms. Eight published factor analytic studies of the BPRS-E on inpatients with mixed diagnoses showed contradictory factorial structures (Dazzi et al., 2016). A consistent BPRS-E factor structure in involuntary psychiatric hospitalization could be helpful for developing dimensional subscales that would be suitable for synthetic psychopathological assessment and for defining clinical profiles in acute non-consensual psychiatric settings. To our knowledge, the factor structure of the BPRS-E has never been specifically investigated in samples of involuntarily hospitalized patients. We aimed to provide a principal component analysis of the BPRS-E in involuntarily treated mixed-diagnosis patients in psychiatric intensive care units.

The BPRS-E data used in the present study were retrieved from a sample of a multicentre study (Mandarelli et al., 2018) and from the case sample of a previous case-control single-centre study (Mandarelli et al., 2014).

We carried out an exploratory factor analysis by principal component analysis on the BPRS-E items through Eigenvalue method > 1 in order to extract the factors, and also observe the scree plot. We used varimax rotation and considered only the items with factor loadings greater than 0.5. Cronbach's alpha assessed subscales' internal consistency. The adequacy of factor analysis was assessed by the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity.

N = 161 involuntarily admitted psychiatric patients were included in the analysis. Mean age was 40.1 (SD 12.2), 59.6% were male and 87% of the patients suffered from schizophrenia or bipolar spectrum disorders, while other principal diagnoses included unipolar depressive disorders, obsessive compulsive disorder and substance-related disorders. BPRS-E mean scores revealed high levels of psychiatric symptoms in the study sample.

The Kaiser-Meyer-Olkin measure was 0.76 and Bartlett's test of sphericity was 1453.3 ($p < 0.001$). Principal component analysis disclosed a 5-factor solution explaining 57.3% of the total variance (Table 1).

Table 1
Component structure of the BPRS-E with varimax rotation.

BPRS-E items	Factor 1 Mania / excitement	Factor 2 Depression / suicidality	Factor 3 Hostility	Factor 4 Positive symptoms	Factor 5 Negative symptoms
21. Excitement	0.881				
23. Motor hyperactivity	0.816				
7. Elevated mood	0.786				
22. Distractibility	0.670				
19. Tension	0.525				
4. Suicidality		0.764			
5. Guilt		0.734			
3. Depression		0.732			
2. Anxiety		0.675			
6. Hostility			0.808		
20. Uncooperativeness			0.743		
9. Suspiciousness			0.700		
11. Unusual thought content				0.834	
15. Conceptual disorganization				0.697	
12. Bizarre behavior				0.684	
10. Hallucinations				0.524	
18. Motor retardation					0.735
13. Self-neglect					0.562
14. Disorientation					0.559
16. Blunted affect					0.526
Cumulative variance (%)	16.3	27.3	37.4	47.4	57.3
Chronbach's alpha	0.83	0.72	0,72	0.70	0.58

Note. Only items with factor loading >0.5 are reported.

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The present multi-centre factor analytic study of BPRS-E in involuntarily hospitalized patients suffering from acute mental disorders, disclosed a robust 5-factor structure. This is the first study to assess a mixed sample of acute involuntarily hospitalized psychiatric patients and to provide a specific BPRS-E factorial structure in this critical clinical situation.

Although similar in structure, the factorial structure we are proposing shows some differences from all previous factor analyses in mixed patients. The first factor we found in terms of explained variance was "*mania/excitement*", suggesting a prominent role of excitement and activation in the dimensional psychopathology of involuntary patients. All published mixed sample BPRS-E factor analytic studies included a manic factor, comprising similar items, but only one study on recent-onset voluntary outpatients, mostly suffering from schizophrenia spectrum disorders, reported mania as the first factor in terms of variance explained (Ventura et al., 2000).

The second factor we found was "*depression/suicidality*". A similar factor is consistently reported in BPRS-E factor analysis. The variance explained in our study might indicate the importance of suicidal thoughts and depressive symptomatology in involuntary admitted patients.

The main difference of our factor analysis, as compared to previous ones on mixed samples (Dazzi et al., 2016) is the third factor, "*hostility*", a dimension including uncooperativeness, hostility and suspiciousness, which probably reflects a specific dimension in acute involuntary patients. Only two previous mixed sample BPRS-E factor analytic studies on mixed diagnosis non-forensic acute psychiatric inpatients extracted a similar factor (Burger et al., 1997; Dazzi et al., 2017).

The positive symptoms factor seems to play a less relevant role in acute involuntary patients, in terms of variance explained. The small variance explained by the fifth factor of our analysis probably reflects the limited importance of negative symptoms in acute involuntary admitted patients.

This study has limitations: most patients suffered from schizophrenia spectrum disorder or bipolar disorder. However, our sample reflects reported diagnostic proportions of involuntary treated patients (Kelly et al., 2018).

This study provides empirical support for a specific BPRS-E dimensional structure to be used in future clinical research. This will be needed to address the ethical and clinical challenge posed by involuntarily treated patients and develop further evidence on their dimensional psychopathology and outcomes.

Conflict of interest

None.

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