Influence of secondary sources in the Brief Negative Symptom Scale

1. Introduction

Negative symptoms are core symptoms of schizophrenia associated with poorer clinical outcome (Strauss et al., 2010). They can be clinically subdivided into primary and secondary features, representing different phenomenology and pathophysiological mechanisms (Miller et al., 1994). Secondary negative symptoms phenotypically present as primary symptoms, but are attributed to external causes. Positive symptom severity, depression and antipsychotic side-effects are known sources of secondary negative symptoms (Carpenter et al., 1985). Discriminating whether a negative symptom is primary or secondary is clinically relevant as it might require specific, and often opposite interventions (Miller et al., 1994). Despite the development of new symptom severity rating scales, none have considered this distinction.

The novel Brief Negative Symptom Scale (BNSS) is widely used following the NIHM Consensus Development Conference on Negative Symptoms recommendations. It established five symptom domains (anhedonia, avolition, asociality, alogia and blunted affect) and distinguishes between anticipatory and consummatory anhedonia and between internal experience and observed behaviour for asociality and avolition (Kirkpatrick et al., 2006).

Several studies have evaluated the influence of secondary sources on BNSS scores. Null to weak correlations have been found between the total BNSS score and depressive and positive symptoms and also between the anhedonia subscale and depressive symptoms (Mucci et al., 2015; Strauss et al., 2012). This could imply that the BNSS mainly rates primary negative features. However, the influence of medication side-effect as a secondary source for negative symptoms remains to be clarified.

We studied the influence of secondary negative symptoms on the BNSS in a sample of clinically stable patients with schizophrenia. Three main potential sources of negative symptoms were considered: positive, depressive and antipsychotic-induced symptoms. We also analysed all subscales separately, as they have shown to be independent factors in the negative symptoms construct (Ahmed et al., 2018; Strauss et al., 2018).

2. Material and methods

2.1. Subjects

This study was a multi-center cross-sectional design. Four centers participated, which included one in UK (University of Cambridge) and three in Spain: (Universidad de Oviedo, Hospital del Mar and Hospital Clinic). All four local research ethic committees approved the study.

Inclusion criteria were age between 18 and 65 years; meeting ICD-10 diagnostic criteria for schizophrenia or schizophreniform disorder; and clinical stability measured as no changes in antipsychotic or antidepressant treatment during the last 8 weeks. Exclusion criteria were IQ below 80, neurological disorders and substance dependence except for nicotine and cannabis. All participants provided written consent.

2.2. Assessments

Negative symptoms were assessed with the BNSS. Positive symptoms were assessed with the Positive subscale of the PANSS. Depressive symptoms were assessed using the CDSS. Extrapyramidal symptoms were assessed with the Simpson-Angus Scale (SAS). The total score on the SAS was divided into a score for akinesia (items reflecting akinesia and rigidity) and a score for non-akinesia (glabella tap, salivation, tremor), because these components may have a different influence on negative symptoms (Peralta et al., 2000).

2.3. Statistical analysis

First we performed bivariate correlations using the Spearman rank coefficients between the total BNSS and its subscales scores and the PANSS positive, total CDSS, and SAS akinesia and non-akinesia scores. Seven stepwise linear regressions were then carried out to explore the contribution of each presumed source of secondary negative symptoms (PANSS positive, total CDSS, and SAS akinesia and non-akinesia) in explaining the BNSS total score and each of its subscales. The coefficient of determination (R^2) at each step was used to determine the proportion of variance in the BNSS total and subscales score that was explained by each of these scales (Peralta et al., 2000).

3. Results

Eighty subjects were included. 80.0% ($n = 64$) were male, with a mean age of 40.07 years (s.d. $= 10.95$). All were on atypical antipsychotics. Sample characteristics are presented in Table 1 supplementary 1 (s1).

Bivariate correlations are presented in Table 2 s2 and stepwise regressions in Table 1.

The only significant predictor of the BNSS total score was the SAS akinesia score, which explained 25% of its variability. Regarding the anhedonia and avolition subscales, the total CDSS and SAS akinesia scores were the only significant predictors, explaining respectively 16 and 6%,

and 4 and 16% of their variability. For the other subscales the SAS akinesia subscale was the only significant predictor explaining 15, 12, 9, and 17% of their variability respectively.

4. Discussion

Our study shows that the total BNSS score in stable schizophrenia patients is mildly influenced by secondary sources of negative symptoms.

The results broadly replicate and expand previous work showing marginal association between the total BNSS score and positive and depressive symptoms (Mucci et al., 2015; Strauss et al., 2012).

Expanding their work, our study confirmed the results with a multivariate linear regression, which showed the lack of statistical prediction of the CDSS and PANSS-P on the total BNSS.

This would indicate that negative symptoms measured with the BNSS are not significantly affected by the presence of depressive or positive symptoms in stable schizophrenia patients, as previously shown (Mucci et al., 2015; Strauss et al., 2012). We speculate that the distinction between observed behaviour and internal experience might have added high discriminative value of the scale with regard to secondary sources of negative symptoms.

We found a significant prediction of the SAS-akinesia on BNSS variance. Noteworthy, it is still unclear whether there is a complete independence between extrapyramidal symptoms and negative symptoms (Carpenter et al., 1988).

Similar to others, we found a marginal influence of anhedonia and avolition on the CDSS (Mucci et al., 2015; Strauss et al., 2012) and suggest that the anhedonia subscale could be useful for clinicians aiming to rate primary negative symptoms of anhedonia.

The main limitation was the cross-sectional study, as it does not allow us to determine whether the enduring negative symptoms explain the BNSS total score in the long term.

Overall, the results indicate that the assessment of negative symptoms with the BNSS scale is weakly affected by sources of secondary negative symptoms in stable schizophrenia patients and therefore it would support its use in clinical and research settings, although more research is warranted.

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Contributors

Author AM, MB, JB, MGP, CGR, EFE conducted the literature review, designed the study and wrote the protocol. Author DT, GS, AT, LGA collected the data and commented on drafts. Author EFE, DT and AM undertook the statistical analysis, and author DT wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

Table 1

Multiple regression analysis of significant determinants of BNSS total and subscale scores.

	B (IC)	S.E.	t	Sig.	Adjusted R^2
BNSS total					
SAS akinesia	2.80 (1.72–3.88)	0.54	5.17	<0.001	0.25
BNSS anhedonia					
CDSS total	0.39 (0.10–0.68)	0.15	2.68	0.009	0.16
SAS akinesia	0.44 (0.09–0.79)	0.28	2.51	0.014	0.06
BNSS distress					
SAS akinesia	0.21 (0.10–0.32)	0.05	3.88	<0.001	0.15
BNSS asociality					
SAS akinesia	0.35 (0.15–0.56)	0.10	3.50	0.001	0.12
BNSS avolition					
CDSS total	0.22 (0.03–0.41)	0.10	2.26	0.027	0.04
SAS akinesia	0.33 (0.09–0.56)	0.12	2.81	0.006	0.16
BNSS blunted affect					
SAS akinesia	0.53 (0.17–0.89)	0.18	2.91	0.005	0.09
BNSS alogia					
SAS akinesia	0.56 (0.29–0.86)	0.13	4.15	<0.001	0.17

BNSS: Brief Negative Symptoms Scale; CDSS: Calgary Depression Scale for Schizophrenia; SAS: Simpson-Angus Scale.

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