

SHORT COMMUNICATION

Equipercntile linking of the BPRS and the PANSS



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Abstract

The Positive and Negative Syndrome Scale (PANSS) and the Brief Psychiatric Rating Scale (BPRS) are the most frequently used scales to rate the symptoms of schizophrenia. There are many situations in which it is important to know what a given total score or a percent reduction from baseline score of one scale means in terms of the other scale. We used the equipercntile linking method to identify corresponding scores of simultaneous BPRS and PANSS ratings in 3767 patients from antipsychotic drug trials. Data were collected at baseline and at weeks 1, 2, 4 and 6. BPRS total scores of 18, 30, 40 and 50 roughly corresponded to PANSS total scores of 31, 55, 73 and 90, respectively. An absolute BPRS improvement of 10, 20, 30, 40 points corresponded to a PANSS improvement of 15, 32, 50, and 67. A percentage improvement of the BPRS total score from baseline of 19%, 30%, 40% and 50% roughly corresponded to percentage PANSS improvement of 16%, 25%, 35%, and 44%. Thus a given PANSS percent improvement was always lower than the corresponding BPRS percent improvement, on the average by 4–5%. A reason may be the higher number of items used in the PANSS. These results are important for the comparison of trials that used these rating scales. We present a detailed conversion table in an online supplement.

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1. Introduction

The Positive and Negative Syndrome Scale (PANSS, Kay et al., 1987) and the Brief Psychiatric Rating Scale (BPRS, Overall and Gorham, 1962) are the most frequently used

scales to rate the symptoms of schizophrenia. The BPRS was originally presented in 1962 and has been well evaluated since (Hedlund and Vieweg, 1980). The PANSS was developed in 1987 (Kay et al., 1987) to overcome certain limitations of the BPRS such as insufficient covering of negative symptoms and a lack of clear anchors for the individual items. However, the BPRS is still used today, for example when a detailed assessment of negative symptoms is not necessary or in “pragmatic”, “large and simple” trials for which PANSS ratings can be too time consuming.

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Furthermore, there are many situations in which it is necessary to transform the results of one scale in ratings of the other, e.g. when the results of PANSS studies need to be compared with those of BPRS studies, or when baseline severity as measured by these scales needs to be entered as a covariate in meta-analyses (e.g. Agid et al., 2003). We therefore compared PANSS and BPRS with the equipercen-tile linking, a method that has been successfully applied for comparisons of the PANSS and the BPRS with the Clinical Global Impressions Scale (Leucht et al., 2005a, 2005b; Levine et al., 2008; Rabinowitz et al., 2010).

2. Experimental procedures

We used PANSS and BPRS scores of 4031 participants from six randomised, double-blind trials comparing olanzapine with other antipsychotics (haloperidol, risperidone, ziprasidone) or placebo in schizophrenia, schizoaffective disorder or schizophreniform disorder according to DSM-III-R or DSM-IV (Beasley et al., 1997, 1996; Tollefson et al., 1997; Tran et al., 1997; Breier et al., 2005; Lieberman et al., 2003); for description see [Supplementary Table 1](#). There were 2682 men and 1349 women, mean age 37.0 ± 11.6 years, weight 76.2 ± 17.5 kg, height 171 ± 10 cm and mean PANSS/BPRS at baseline $94 \pm 20/53 \pm 11$. The BPRS was derived from the PANSS, i.e. the 18 BPRS items included in the PANSS were used. The single items were rated on a 7-point scale (1=absent, 2=minimal, 3=mild, 4=moderate, 5=moderate severe, 6=severe, and 7=extreme). The range of possible PANSS total scores is from 30 to 120 and that of the BPRS is from 18 to 126. All calculations were performed for data at baseline, and at weeks 1, 2, 4 and 6. To compare PANSS and BPRS ratings we used equipercen-tile linking, a technique that identifies those scores on the BPRS and the PANSS that have the same percentile ranks. We applied the SAS program EQUIPERCENTILE (Price et al., 2001), which realises the algorithms described by Kolen and Brennan (1995). In brief, the percentile rank functions are calculated for both variables. Using the percentile rank function of one variable and the inverse percentile rank function of the other, one then finds for every score of one variable a score on the other variable that has the same percentile rank (for details see Leucht et al., 2005a, 2005b; Kolen and Brennan, 1995). We linked BPRS and PANSS total scores, absolute improvement of BPRS and PANSS total scores and percentage improvement of BPRS and PANSS total scores. The 30/18 minimum points of the PANSS/BPRS total score were taken into account when calculating percentage PANSS/BPRS reduction (Obermeier et al., 2010; Leucht et al., 2007).

3. Results

3.1. Correlations

Both scales were highly correlated with Spearman correlation coefficients between 0.93 and 0.96 for the comparison of the total scores at weeks 0-6, between 0.94 and 0.96 for the percentage reduction scores at weeks 1-6 and 0.94-0.96 for the absolute reduction scores at weeks 1-6 (all $p < 0.0001$).

3.2. Linking of the BPRS total score with PANSS total score

The analysis showed that a BPRS total score of 18 on the average corresponded to a PANSS total score of 31, a BPRS

of 30 to a PANSS of 55, of 40 to 73, of 50 to 90, of 60 to 108, of 70 to 125, of 80 to 142, of 90 to 157 and of 100 to 174 (see [Figure 1](#) and [Supplementary Table 2](#)).

3.3. Linking of BPRS percent improvement with PANSS percent improvement

A percent improvement of 19% on the BPRS corresponded with a percent improvement of 16% on the PANSS, 30% BPRS improvement with 25% PANSS improvement, 40% with 35%, 50% with 44%, 60% with 54%, 70% with 65% and 80% with 75% PANSS improvement. The percent improvement of the PANSS was approximately 5% lower than the respective BPRS improvement (see [Figure 2](#) and [Supplementary Table 3](#)).

3.4. Linking of BPRS total improvement to PANSS total improvement

An improvement of 10 points on the BPRS total score corresponded with an improvement of 15 points on the PANSS, 20 points with 32 points, 30 with 50, 40 with 67 and 50 with 86 points (see [Figure 3](#) and [Supplementary Table 4](#)).

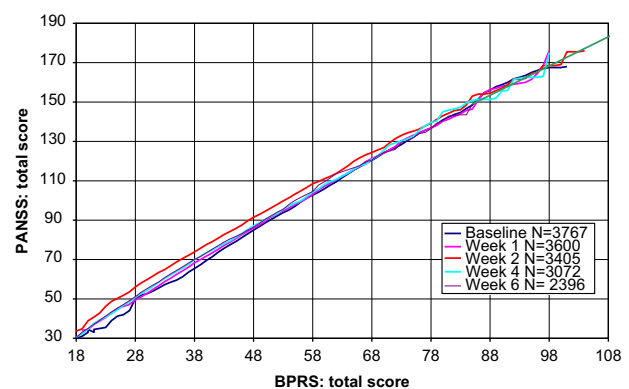


Figure 1 Linking of PANSS total score with BPRS total score. PANSS=Positive and Negative Syndrome Scale. BPRS=Brief Psychiatric Rating Scale.

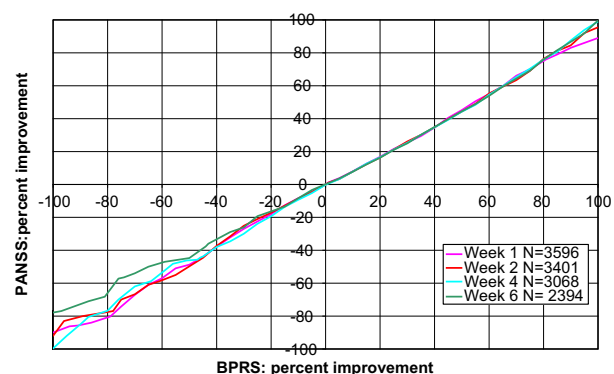


Figure 2 Linking of PANSS percent improvement with BPRS percent improvement. PANSS=Positive and Negative Syndrome Scale. BPRS=Brief Psychiatric Rating Scale.

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