Validation of the Portuguese version of the Psychotic Symptom Rating Scales (PSYRATS)

Diogo Telles-Correia[1,4]
Nuno Barbosa-Rocha[2]
João Gama-Marques[1,3]
Ana L. Moreira[1]
Cátia Alves-Moreira[3]
Sérgio Saraiva[1,3]
Filipa Antunes[1,4]
Carolina Almeida[1,4]
Sérgio Machado[5]
Gillian Haddock[6]

[1] University Clinic of Psychiatry and Medical Psychology, Faculty of Medicine, University of Lisbon, Lisboa, Portugal
[2] Polytechnic Institute of Porto, Health School, Porto, Portugal
[3] Schizophrenia Clinic, Hospital Júlio de Matos, Lisbon Psychiatric Hospital Center, Portugal
[4] Santa Maria Hospital, Department of Psychiatry, Lisboa, Portugal
[5] Institute of Psichiatry, Federal University of Rio de Janeiro, Rio de Janeiro, Brasil
[6] Section for Clinical and Health Psychology, School of Psychological Sciences, University of Manchester, Manchester, United Kingdom

The Psychotic Symptom Rating Scales (PSYRATS) is a clinical assessment tool that focuses on the detailed measurement of delusions and hallucinations in patients with psychosis. The goal of this study was to examine the psychometric properties of the Portuguese version of the PSYRATS. A sample of 92 outpatients suffering from schizophrenia or schizoaffective disorders and presenting persistent psychotic symptoms was assessed using the PSYRATS and the Positive and Negative Syndrome Scale (PANSS). Good inter-rater reliability, test-retest reliability, concurrent validity and internal consistency were found. Factor analysis of the auditory hallucinations scale items disclosed a four-factor solution: emotion characteristics and disruption factor (factor 1), a physical characteristics factor (factor 2), a control characteristics factor (factor 3) and a cognitive attribution factor (factor 4). Regarding the delusions scale items, a two-factor solution was found: cognitive interpretation and disruption factor (factor 1) and an emotional characteristics (factor 2). The Portuguese version of the PSYRATS partially replicates previously published results in other countries.

Keywords: Schizophrenia, Psychosis, Hallucinations, Delusions, Psychometrics

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Validación de la versión en portugués de la Escala de Evaluación de Síntomas Psicóticos (PSYRATS)

La Escala de Valoración de Síntomas Psicóticos (PSYRATS) es una herramienta de evaluación clínica que se centra en la medición detallada de delirios y alucinaciones en pacientes con psicosis. El objetivo de este estudio fue examinar las propiedades psicométricas de la versión en portugués de la PSYRATS. Se evaluó una muestra de 92 pacientes ambulatorios con la PSYRATS y la Escala de Síndromes Positivo y Negativo (PANSS). Los pacientes padecían de esquizofrenia o trastornos esquizoafectivos y presentaban síntomas psicóticos persistentes. Se encontró una buena fiabilidad entre evaluadores, fiabilidad de repetibilidad, validez concurrente y consistencia interna. El análisis factorial de los ítems de la escala de alucinaciones auditivas reveló una solución de cuatro factores: características de la emoción y factor de perturbación (factor 1), un factor de características físicas (factor 2), un factor de características de control (factor 3) y un factor de atribución cognitiva (factor 4). En cuanto a los ítems de la escala de delirios, se encontró una solución de dos factores: un factor de interpretación cognitiva y perturbación (factor 1) y un factor de características emocionales (factor 2). La versión en portugués de la PSYRATS replicó parcialmente resultados publicados anteriormente en otros países.

Palabras clave: Esquizofrenia, Psicosis, Alucinaciones, Delirios, Psicometría

INTRODUCTION

Jaspers first conceptualized the descriptive approach in psychopathology at the beginning of the 20th century. He emphasized the importance of the descriptions of the patients' experiences, which he called "phenomenology"[1]. However, the emergence of modern psychiatric classification systems (with operational diagnostic criteria) led to an emphasis on the nosological diagnosis and, at the end of the century, the quantitative studies became the prime concern[2].

In the last years, we are facing the re-emergence of the Descriptive Psychopathology. Indeed, several authors attempt to include again in their studies a more descriptive component of Psychopathology. Among these, the investigation of the several dimensions of delusions and hallucinations are highlighted[3,4].

Correspondence:
Dr. Nuno Rocha
Polytechnic Institute of Porto, Health School, Porto, Portugal
Rua Dr. António Bernardino de Almeida, 400
4200-072 Porto, Portugal
Telf: +351 22 206 10 00
E-mail: nrocha@ess.ipp.pt

Currently, there are several different scales that measure the presence and severity of symptoms of psychosis[5]. The Positive and Negative Syndrome Scale (PANSS)[6] is frequently used to measure the symptom severity with focus on many different experiences and behaviours. Therefore, it restricts the detailed measurement of specific symptoms such as delusions and hallucinations.

The Psychotic Symptom Rating Scales (PSYRATS)[7] was developed in order to improve the measurement of the core dimensions of psychotic symptoms (hallucinations and delusions) and it is typically used in research studies and clinical settings focused on people with psychosis. PSYRATS has also been used in several psychotic conditions, including schizophrenic spectrum disorder[8], first episode[9] and intellectual disability with psychosis[10]. It is validated in several languages, namely in Spanish[11], French[12] and Malay[13] and has been included as an outcome measure of several clinical trials of psychological interventions for psychosis[14-23].

The PSYRATS is a 17-item instrument included in two separate subscales: one for delusions (six items) and other for hallucinations (eleven items), rated from zero to four[7]. In the original study, a *three-factor structure* was found in the factor analysis for the auditory hallucination scale: emotional characteristics, physical characteristics and cognitive interpretation. It was also found a *two-factor structure* for the delusion scale: emotional characteristics and cognitive interpretation.

The Portuguese population only have available a few instruments to assess schizophrenia diagnosis and its severity. Furthermore, no validated self-report measures are yet available to specifically assess hallucination and delusion dimensions.

The aim of this study was to examine the psychometric properties of the Portuguese version of PSYRATS in a sample of patients suffering from schizophrenia-spectrum disorders. The PSYRATS was evaluated both for inter-rater reliability and inter-relationships of the items. Moreover, construct and concurrent validity were examined.

MATERIAL AND METHODS

Recruitment

To be included in the studies, participants had to meet the DSM-5 criteria for schizophrenia or schizoaffective disorders. Participants had no recent change in antipsychotic medication. Participants were recruited among patients admitted to Hospital Júlio de Matos (a psychiatric hospital) and Hospital Santa Maria (a general hospital). The two populations from which the sample was drawn received approval by the local ethics committees and all participants signed an informed consent form.

Participants

Ninety-two participants took part in the study. Eligibility depended on the presence of persistent delusions or auditory hallucinations before consent was obtained. Diagnoses were extracted from current clinical records and confirmed by experienced clinicians. All participants spoke Portuguese fluently.

Instruments

Patients were assessed using the PSYRATS and the PANSS. The PSYRATS is a 17-item, five-point scale (0–4), multidimensional measure of delusions and auditory hallucinations. The items for auditory hallucinations are: frequency, duration, location, loudness, beliefs about origin, negative content, intensity of negative content, amount of distress, intensity of distress, disruption of life and control. The items for delusions are: amount of preoccupation, duration of preoccupation, conviction, amount of distress, intensity of distress and disruption of life. The interview with the PSYRATS usually takes about 30 to 60 minutes to complete. The interview and rating should be completed by psychiatrists, clinical psychologist or other mental health professional with experience on psychiatric symptoms rating scales.

The original English version of the PSYRATS was independently translated by the two first authors (NR and DT) and compared until full agreement was found. Semantic equivalence was inspected with an English language expert. The main author of the original version authorized the translation.

The PANSS is a 30-item, seven point (1–7) rating instrument used for the assessment of symptom phenomena associated with schizophrenia.

For all patients, symptom rating assessments were performed by clinicians trained to reliably administer these measures.

Statistical analysis

All analyses were conducted using the International Business Machines' Statistical Package for the Social Sciences (IBM SPSS) version 20. The factor structure of the scales was evaluated by principal component factor analysis with a single varimax rotation with Kaiser Normalization. Inter-rater reliability was assessed by intraclass correlations (ICCs). Significance test results are quoted as two-tailed probabilities. Associations between PSYRATS and PANSS items were examined using Spearman rank-based correlations.

RESULTS

Sample

Data was collected from ninety-two participants (39,5% females). Seventy-six (82.6%) patients were diagnosed with schizophrenia, fourteen (15.2%) with schizoaffective disorder and two (2,2%) with psychosis not otherwise specified. All patients had either auditory verbal hallucinations or delusions. 85 (92,4%) of the patients had delusions and 68 (73.9%) had auditory hallucinations. 61 patients had both delusions and auditory hallucinations (66.3%). The mean age of the participants was 39.43 (SD=12,32). The mean time of illness duration was 11,45 (SD=10,12). All patients were receiving antipsychotic (CPZ equivalents mean = 580.07; SD=332.10).

Inter-rater reliability

Thirty-nine participants (n=25 males) were selected conveniently to independent rating by a second rater. Intraclass correlations for the items of the auditory hallucinations scale of the PSYRATS were excellent, ranging between 0.96 to 1.00. For the delusions scale, the ICCs were also excellent, between 0.95 to 1.00. Average ICC of the auditory hallucination scale was 0.99 and of the delusions scale was 0.98.

Test-retest reliability

Thirty-nine participants were interviewed 2-weeks after the first interview to establish test-retest reliability. Pearson product-moment correlation coefficient between test and retest was 0.57 (p<0,01) for the auditory hallucinations scale and 0.51 (p<0,01) for the delusions scale. The mean score for the auditory hallucinations scale was 27.28 (SD=11.66) at the pre-test and 16.87 (SD=15.61) at the retest and the mean score for the delusions scale was 16.87 (SD=5.89) at the pre-test and 11.77 (SD=9.28), which may represent treatment effects.

Internal consistency

Cronbach's alpha values for the auditory hallucinations scale was 0.96 and for the delusions scale was 0.89, and thus excellent internal consistency. Removing any item would decrease the internal consistency in both scales. The corrected item-total correlation ranged between 0.72 and 0.85 for the auditory hallucination scale and between 0.60 and 0.80 for the delusions scale. The inter-item correlations for the auditory hallucinations items were between 0.43 and 0.95 and for the delusions scale were between 0.33 and 0.93.

Concurrent validity

Pearson product-moment correlations coefficients were calculated between the PSYRATS scales and the positive subscale and items of the PANSS (table 1). The auditory hallucinations scale was significantly correlated with the PANNS hallucinations item, negative scale, general psychopathology and total score. The delusions scale was significantly correlated with PANNS delusions and suspiciousness/persecution items, positive scale, negative scale, general psychopathology and total score.

Factor analysis

The construct validity of the PSYRATS scales was examined using a principal components factor analysis with varimax rotation. Only the participants that reported auditory hallucinations were included in the factor analysis of the PSYRATS hallucinations scale items. Also, only the

Table 1 Correlations of the PSYRATS scales and the PANNS

	PANSS						
PSYRATS	Delusions	Hallucinations	Persecution	Positive Scale	Negative Scale	General	Total Score
Auditory Hallucinations Scale	-0.082	0.602[2]	0.077	0.162	0.217[1]	0.278[2]	0.273[1]
Delusions Scale	0.586[2]	0.224[1]	0.396[2]	0.534[2]	0.228[1]	0.462[2]	0.498[2]

[1]p<0.05, [2]p<0.01

Table 2 Factor loadings for auditory hallucinations scale

	Factors			
	1	2	3	4
Frequency	0.164	0.853	-0.191	0.102
Duration	0.216	0.813	0.214	0.068
Location	0.173	-0.070	0.006	0.833
Loudness	0.076	-0.145	0.861	-0.017
Origin of voice	-0.123	0.383	0.031	0.667
Amount of negative content	0.824	-0.168	0.194	0.042
Degree of negative content	0.823	0.174	0.052	0.118
Amount of distress	0.887	0.233	0.112	-0.085
Intensity of distress	0.848	0.189	0.266	-0.014
Disruption to life	0.552	0.219	-0.212	0.099
Controllability	0.217	0.409	0.625	0.085
Cumulative percentage of variation	30.35	47.85	60.42	71.28

participants who reported delusions were included in the factor analysis of the PSYRATS delusions scale items. Only factors with an eigenvalue of 1 or greater (Kaiser criterion) were retained. Regarding the auditory hallucinations scale items, a four-factor solution with eigenvalues greater than 1 was found and explained 71.28% of the total variance. The distress, disruption to life and negative content items loaded onto one factor; the frequency and duration items loaded on a second; the loudness and controllability items loaded onto a third; and location and origin of voice items loaded onto a fourth (table 2). These four factors could be identified as an emotion characteristics and disruption factor (factor 1), a physical characteristics factor (factor 2), a control characteristics factor (factor 3) and a cognitive attribution factor (factor 4).

Regarding the delusions scale items, a two-factor solution with eigenvalues greater than 1 was found and explained 75.92% of the total variance. The amount of preoccupation, duration of preoccupation, conviction and disruption to life items loaded onto one factor and the distress items loaded onto another (table 3). These two factors could be identified as a cognitive interpretation and disruption factor (factor 1) and one emotional characteristic (factor 2).

Table 3 Factor loading for delusions scale

	Factors	
	1	2
Amount of preoccupation	0.808	0.176
Duration of preoccupation	0.754	0.400
Conviction	0.786	-0.036
Amount of distress	0.189	0.942
Intensity of distress	0.152	0.962
Disruption to life	0.667	0.455
Cumulative percentage of variation	39.04	75.92

DISCUSSION

The current study presents the factor structure and the relationship between the PSYRATS and PANSS in a population of Portuguese speaking patients having persistent psychotic symptoms.

The factor structure of the delusions scale of the PSYRATS is the same as in the original study[7], German[8], and French[12]. The factor structure of the hallucinations scale shows a four-factor structure. The original study has disclosed a three-factor structure[7]. The factors we found were: Emotion characteristics and disruption factor (factor 1), Physical characteristics factor (factor 2), a control characteristics factor (factor 3) and a cognitive attribution factor (factor 4). These are very similar to those found in the French and German validations[8,12].

As in previous validation studies, an emotional factor appears clearly, as well as a cognitive attribution factor and a physical characteristics factor[7,8,12]. A fourth factor appears in other validations but not in the original study of Psyrats[8,12]. In the French version the fourth factor is disruption and volume[12], but in the German version the fourth factor is a control characteristics factor[8], as it is in our study.

It is our understanding that control is a fundamental dimension for the comprehension of hallucinations in psychotic disorders. There is consistent evidence demonstrating that the hallucinatory experience is not exclusively dependent of perceptual processes, but a phenomenon that highly relies on top-down cognitive control processes[24]. This is the reason why interventions based on cognitive control have a positive impact in these symptoms[25].

In most validation studies, location and beliefs re-origin items usually loaded on a cognitive attribution factor; negative content and distress items usually loaded on an emotion characteristics factor; and frequency and duration items usually loaded on a physical characteristics factor[7,8,12]. The differences across validations appear mostly in disruption, volume and control items that appear in different factors, depending on the study.

The factor analysis of our study encountered the same difficulties as previous studies did when replicating the factorial structure of the original version of PSYRATS hallucinations' scale. Steel[5] also found a four-factor structure in his study and pointed out these differences between the original structure and the replication studies might reflect the lack of a clear understanding of the dimensions of hallucinatory experience. He also refers that further research is needed to clarify the best use of potential subscales.

Favrod et al.[12] also gives an explanation for these differences between the factor structure of the replication studies and the original validation study of PSYRATS. According to the authors, different evaluations of PSYRATS have been carried out with dissimilar participant populations with psychotic symptoms and with a differential response to psychiatric treatment, which can be confounding factors.

Regarding concurrent validity, we also found several associations with the PANSS. While the delusions scale was associated with the full positive symptoms scale and with selected items of delusions and suspiciousness/persecution, auditory hallucinations was selectively associated only with the hallucinations item of the PANSS, but not with the positive symptoms scale. This results shows that the PSYRATS scale appear to selectively and accurately address these psychotics symptoms, but add additional relevant information.

Regarding the limitations of the study, we selected participants mainly with persistent psychotic symptoms, which may prevent that results and conclusions can be applied to other conditions associated to psychosis. In what concerns external validity, the smaller number of participants with schizoaffective disorder compared to participants with schizophrenia might also have been an important limitation.

CONCLUSIONS

In conclusion, the Portuguese version of the PSYRATS partially replicates the original validation study and previous evaluations of the scale in other languages. The results show that the Portuguese version of the PSYRATS seems to adequately measure relevant dimensions of the psychotic symptoms. Further research is needed to clarify the different dimensions (factors) of the PSYRATS Hallucinations scale.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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The Portuguese version of the PSYRATS should be obtain from Dr. Nuno Rocha (nrocha@ess.ipp.pt).

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