The Italian version of the 92-item Prodomal Questionnaire: Concurrent validity with the SIPS and factor analysis in a sample of 258 outpatients aged 11–36 years

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Background: Current early screeners for psychosis-risk states have still to prove ability in identifying at-risk individuals. Among screeners, the 92-item Prodomal Questionnaire (PQ-92) is often used. We aimed to assess the validity of its Italian translation in a large Italian adolescent and young adult help-seeking sample.

Methods: We included all individuals aged 12–36 years seeking help at psychiatric mental health services in a large semirural Roman area (534,600 population) who accepted to participate. Participants completed the Italian version of the PQ-92 and SIPS using Cronbach’s alpha, Cohen’s kappa, and Spearman’s rho, respectively. We tested the validity of adopted cut-offs through Receiver Operating Characteristic (ROC) curves plotted against SIPS diagnoses and the instrument’s factor-structure through Principal Component Analysis.

Results: PQ-92 showed high internal consistency, acceptable diagnostic accuracy and concurrent validity, and excellent convergent validity. ROC analyses pointed to scores of 18 on the Positive subscale and 36 on the total PQ-92 as best cut-offs. The Scree-test identified a four-factor solution as fitting best.

Conclusions: Psychometric properties of Italian PQ-92 were satisfactory. Optimal cut-offs were confirmed at ≥18 on the positive subscale, but at ≥36 on the total scale was able to identify more SIPS-positive cases.

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1. Introduction

Psychotic disorders, especially schizophrenias, are frequently chronic, severely disabling disorders, incurring high direct and indirect costs and psychosocial burden (World Health Organization, 2009). Several studies suggested that early intervention might improve outcome (Marshall et al., 2005; Perkins et al., 2005) and reduce schizophrenia- and psychosis treatment-related costs (Mihalopoulos et al., 2009; Ising et al., 2016). In the past two decades, attempts to clinically characterize pre-psychotic risk states have led to two main clinical high risk approaches (Fusar-Poli et al., 2013; Schultze-Lutter et al., 2014, 2015), i.e., the ultra-high-risk (UHR) approach (Yung et al., 2003) that focuses mainly on attenuated positive symptoms (APS) and is commonly assessed by the Comprehensive Assessment of At-Risk Mental States (CAARMS) (Yung et al., 2002, 2005) or the Structured Interview of Prodromal/Psychosis-Risk Syndromes (SIPS) (McGlashan et al., 2003, 2010), and the basic symptoms approach, assessed mainly by the Schizophrenia Proneness Instrument, Adult (SPI-A) (Schultze-Lutter et al., 2015). The discovery of prodromes has improved the understanding of the disease and its progression and has enabled research to evaluate new methods to prevent or delay the onset of psychosis.

A key method in this regard is the assessment of prodromal symptoms, which are common in the prodromal phase of the illness and can be identified by screening tests. These symptoms can be assessed through questionnaires such as the Prodromal Questionnaire (PQ-92) (Marshall et al., 2005), which is a brief and easy-to-administer tool designed to identify at-risk individuals. The Italian version of the PQ-92 has been validated in a large sample of adolescents and young adults seeking help at psychiatric mental health services in a semirural Roman area (Kotzalidis et al., 2017). The aim of this study was to assess the reliability and validity of the Italian version of the PQ-92 in a sample of 258 outpatients aged 11–36 years seeking help at psychiatric mental health services in a large semirural Roman area (534,600 population) who accepted to participate. Participants completed the Italian version of the PQ-92 and SIPS using Cronbach’s alpha, Cohen’s kappa, and Spearman’s rho, respectively. We tested the validity of adopted cut-offs through Receiver Operating Characteristic (ROC) curves plotted against SIPS diagnoses and the instrument’s factor-structure through Principal Component Analysis.

Results: PQ-92 showed high internal consistency, acceptable diagnostic accuracy and concurrent validity, and excellent convergent validity. ROC analyses pointed to scores of 18 on the Positive subscale and 36 on the total PQ-92 as best cut-offs. The Scree-test identified a four-factor solution as fitting best.

Conclusions: Psychometric properties of Italian PQ-92 were satisfactory. Optimal cut-offs were confirmed at ≥18 on the positive subscale, but at ≥36 on the total scale was able to identify more SIPS-positive cases.

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al., 2007) or Child and Youth version (SPI-CY) (Schultze-Lutter et al., 2012). While independent of each other, the two approaches were associated with pooled 1- and 2-year conversion rates to frank psychosis of 15–25% and 20–28% (Schultze-Lutter et al., 2015); combining both approaches, further increased conversion probability (Ruhmann et al., 2010; Schultze-Lutter et al., 2014).

Despite being useful in detecting UHR states (Fusar-Poli et al., 2015), assessment interviews are lengthy and require intensive training and supervision. Thus, it would be ethically and economically desirable to spare patients’ time and limit them to those who are at higher risk for transition to psychosis. To this aim, several screeners have been developed, in particular within the framework of the UHR approach (Kline and Schiffman, 2014; Addington et al., 2015), meeting only rarely full psychometric validity and reliability requirements across all settings and populations (Michel et al., 2014, 2016). One frequently applied screener is the Prodromal Questionnaire (PQ-92), a 92-item self-report instrument containing 4 subscales modeled on the SIPS, i.e., positive, negative, disorganized, and general symptoms (Loewy et al., 2005). PQ-92 showed acceptable predictive validity for making UHR diagnosis when used conjointly with the SIPS (Loewy et al., 2005, 2007, 2012). Furthermore, using a cut-off score of 18 positive symptoms, PQ-92 corresponded to SIPS-UHR criteria with 82% sensitivity and 49% specificity (Loewy et al., 2012). Similar results to those of the PQ-92 were obtained by the PQ’s brief version (PQ-B; Loewy et al., 2011) and the 16-item version of the PQ (PQ-16; Ising et al., 2012), which proved also to be cost-saving (Ising et al., 2016). The two questionnaires have collectively gathered most of the evidence for their use as screeners, compared to less tested measures. Recently, Kline et al. (2015) reported good 6-month predictive accuracy for PQ-B. As for PQ-16, de Jong et al. (2016) tested it in a population of adolescents referred to Child and Adolescent Mental Health Services and found an acceptable internal consistency (Cronbach’s \( \alpha = 0.79 \)).

1.1. Aims of the study

As part of the “Liberiamo il Futuro” (LF, “release the future”) project (Brandizzi et al., 2014), we translated PQ-92 into Italian and examined its psychometric properties, i.e., reliability and validity, and dimensional structure, in a large outpatient sample.

2. Methods

2.1. Setting

As detailed in Brandizzi et al. (2014), the LF project is a collaboration between Sapienza University, Rome, and 12 adult and child/adolescent mental health outpatient departments of the semirural Roma 6 area. This catchment area consists of approximately 534,600 residents, of whom 98,100 are <18-year-old. The LF project aims to identify people at high clinical risk according to UHR (Miller et al., 2002, 2003) and/or basic symptom criteria (Schultze-Lutter, 2009) among help-seeking adolescents (12–17 years) and young adults (18–36 years) through a 2-step procedure. The first screening step included the PQ-92 and functioning and sensitivity measures; the second step included SIPS and SPI-A/SCI-CY interviews. Screening was performed by service staff, whereas 2-step assessments were carried-out by trained, project clinicians.

Complying with the declaration of Helsinki, the study was approved by the local ethical committee.

2.2. Participants

During 01/2012–07/2013, all consecutive help-seekers/referrals to the 12 pediatric and adult outpatient mental health departments were invited to voluntarily participate in the study. Inclusion criteria were age 12–17 years and 18–36 years, respectively. Exclusion criteria included known organic cause, intellectual disability (defined as IQ < 70), known history of psychosis, and insufficient Italian language skills.

Written informed consent was provided by all participants and, in case of minors, by their parents or legal guardians prior to assessments.

2.3. Instruments

For the 1st-step assessment of potential UHR status, we used the PQ-92, a self-report screening questionnaire consisting of 92 true/false statements in 4 dimensions: (1) 45 positive symptoms (e.g., unusual thinking and perceptual abnormalities); (2) 19 negative symptoms (e.g., flat affect and social withdrawal); (3) 13 disorganized symptoms (e.g., odd behavior), and (4) 15 general symptoms (e.g., depression and diminished role functioning). PQ-92 statements were mainly modeled on probe questions of the SIPS (Miller et al., 2002) and items of Raine’s (1991) Schizotypal Personality Questionnaire. A score of ≥18 on the positive PQ subscale is considered predictive of a UHR-positive rating on the SIPS (Loewy et al., 2012; Ising et al., 2012).

We translated the 92-item PQ from English into Italian (VS and AS) and had it back-translated by a project member unfamiliar with the English PQ-92 (GDK). The back-translation was then inspected and approved by the original author (RL).

For the 2nd-step assessment of UHR criteria, we used the Italian SIPS version (Comparelli and Conti, 2011; Comparelli et al., 2011), a semi-structured clinical interview. The SIPS enables identification of three UHR groups, i.e., attenuated psychotic symptoms (APS; scores of 3–5 on any positive item), brief intermittent psychotic symptoms (BIPS; score of 6 on any positive item, but not of sufficient duration to qualify for full-blown psychosis), and genetic risk and functional deterioration (GRFD; schizotypal personality disorder in the patient or a psychotic disorder in a first-degree relative and an at least 30% decrease from the highest level of functioning in the preceding year). More details on the SIPS are found in the Supplementary material.

Further, axis I DSM-IV-TR (American Psychiatric Association, 2000) diagnoses were assessed with the Structured Clinical Interview for DSM-IV (SCID-I) (First et al., 1995) in adults and with Kiddie-SADS-Present and Lifetime Version (K-SADS-PL) (Kaufman et al., 1997) in children/adolescents. Patients were interviewed by clinicians (AS, MC, JFL, AM, and MB) previously trained in the use of the SIPS, SPI-A, and SPI-CY by authorized trainers (FS-L and EG) and showing excellent interrater reliability on individual symptoms (Fleiss’ kappa = 0.821), UHR syndromes (Fleiss’ kappa = 0.823), and GAF scores (Fleiss’ kappa = 0.839).

2.4. Statistical analyses

The rank-scaled and categorical variables were analyzed using non-parametric statistics. The coefficient of stability (Heise, 1969) was calculated to measure test-retest reliability of the PQ-92 over 2 weeks on a subsample of 15 participants who had scored ≥18 on the PQ positive subscale at first assessment. This rather short time interval was chosen to limit the possible impact of both symptomatic changes and memory effects (Michel et al., 2014). Test-retest-reliability coefficients >0.80 are considered good to excellent (Heise, 1969). As an additional measure of reliability, we examined the internal consistency of PQ total scale and subscales using Cronbach’s \( \alpha \) within the total sample.

Further, different aspects of validity of the PQ-92 were examined in the total sample (Michel et al., 2014). Concurrent validity, i.e., the correspondence of positive results on the PQ-92 (i.e., a positive subscale score ≥18) and on the SIPS (i.e., a score ≥3 on at least one positive item), was examined by Cohen’s \( kappa \). Further, we calculated diagnostic accuracy measures, i.e., sensitivity, specificity, positive and negative predictive values (PPV and NPV) and positive and negative likelihood ratios (PLR and NLR), that balance sensitivity against specificity. According to Jaeschke et al. (1994), likelihood ratios (LRs) of 1–2 and 0.5–1 alter pretest probability to a small (and rarely important) degree; LRs
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