Schizophrenia Research 165 (2015) 116–122

Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

Longitudinal validation of psychosis risk screening tools

Emily Kline [a], Elizabeth Thompson [b], Caroline Demro [b], Kristin Bussell [c], Gloria Reeves [c], Jason Schiffman [b,*]

[a] Massachusetts Mental Health Center, Public Psychiatry Division of Beth Israel Deaconess Medical Center, Harvard Medical School, 75 Fenwood Road, Boston, MA 02115, USA
[b] University of Maryland, Baltimore County, Department of Psychology, 1000 Hilltop Circle, Baltimore, MD 21250, USA
[c] University of Maryland, Baltimore, 701 W. Pratt Street, Baltimore, MD 21201, USA

ARTICLE INFO

Article history:
Received 9 February 2015
Received in revised form 20 April 2015
Accepted 23 April 2015
Available online 11 May 2015

Keywords:
Attenuated psychosis syndrome
Clinical high-risk
Prodrome
Schizophrenia
Screening
Assessment

ABSTRACT

The development of widely used interview tools has helped to standardize the criteria for a "clinical high risk" syndrome, thus enabling advances in efforts to develop interventions for this phase of illness. These assessments, however, are burdensome to administer and not likely to be adopted for widespread use. Scalable early intervention depends on the availability of brief, low-cost assessment tools that can serve to screen populations of interest or triage treatment-seekers toward specialized care. The current study examines the sensitivity, specificity, and predictive strength of three self-report measures (Prime Screen—Revised, Prodromal Questionnaire—Brief, and Youth Psychosis at Risk Questionnaire—Brief) with regard to psychosis onset and symptom persistence over six months of follow-up within an indicated sample of 54 adolescents and young adults ages 12–22. Within this sample, all three measures demonstrated excellent sensitivity to emerging psychosis and strong agreement with clinician evaluations of attenuated psychosis symptoms. Additionally, all screeners obtained negative predictive values of 1.00 with regard to psychosis onset, indicating that an individual scoring below the recommended threshold score would be extremely unlikely to develop psychosis over the following six months. The longitudinal validation of psychosis risk screening tools constitutes an important step toward establishing a standard of care for early identification and monitoring in this vulnerable population.

1. Introduction

Efforts to identify and treat psychosis during the early stages of illness progression have stemmed from research indicating that prompt intervention may maximize treatment effectiveness and quality of life (Fusar-Poli et al., 2013). Research suggesting the relative benefits of a short duration of untreated psychosis (Marshall et al., 2005), as well as findings that many individuals at risk for psychosis can be clinically identified months or years before the onset of schizophrenia or other spectrum disorders (e.g., Cannon et al., 2008), has led to questions regarding the possibility of identifying and treating illness during a pre-psychotic or 'prodromal' phase. Effective treatment prior to the emergence of full-blown illness holds potential to delay or even prevent the onset of acute psychosis (Marshall and Rathbone, 2011).

Although psychosis prevention strategies are still emerging, there have been considerable advances in screening/identification of individuals designated as "clinical high risk" (CHR) for psychotic disorders. Interview and self-report measures have been developed to facilitate screening among high-risk populations. In particular, the extensive adoption of structured clinical assessments such as the Structure Interview for Psychosis-risk Syndromes (SIPS) and the Comprehensive Assessment of At-risk Mental States (CAARMS) in programs of CHR research has been useful in that the common criteria are now widely recognized by researchers embarking on related but unique programs of research (Fusar-Poli et al., 2013). Due to high clinician burden associated with training and administration, however, these measures are not well suited for use in generalist mental health settings. The development of brief instruments that can be 'exported' for clinical use is a crucial step toward establishing and disseminating evidence-based care for individuals most vulnerable to psychosis.

Brief self-report questionnaires have the potential to screen populations of interest, and may ultimately aid in the detection of far more CHR youth than would be possible through referrals to specialized programs. Research within CHR populations suggests that these patients experience considerable distress as well as impairments in social and occupational functioning well before the onset of full-threshold psychotic symptoms (Addington et al., 2008; Ruhrmann et al., 2008; Velthorst et al., 2010; Cornblatt et al., 2011; Thompson et al., 2015). Screening may be particularly useful for identifying CHR patients at an earlier stage of illness by detecting new-onset symptoms after they have become bothersome to patients, but before they have caused notable impairments.

Screeners may also constitute a useful tool for specialty centers looking to recruit CHR samples for both observational and interventional research. Such programs typically administer the SIPS or CAARMS to determine CHR status and thus eligibility for study participation; conducting many such interviews can be a resource-intensive process.

* Corresponding author at: Department of Psychology, UMBC, 1000 Hilltop Circle, Baltimore, MD 21250, USA. Tel.: +1 410 455 1535; fax: +1 410 455 1055.
E-mail address: schiffma@umbc.edu (J. Schiffman).

http://dx.doi.org/10.1016/j.schres.2015.04.026
0920-9964/

Table 1
CHR screening tools.

Measure	Description
Prime Screen—Revised (Miller et al., 2004)	Developed by the SIPS author group, the Prime Screen contains 12 Likert-type items describing attenuated symptoms and asks respondents to choose from 7 response choices ranging from "definitely disagree" to "definitely agree." In a validation sample of 36 participants, the screening instrument showed a sensitivity of 0.90 and perfect specificity with regard to SIPS-obtained diagnoses. The authors recommend using a threshold of two or more 'somewhat agree' item endorsements to categorize positive vs. negative responders. Items scored as five (somewhat agree) or six (definitely agree) were counted as a "yes," and the screener total was obtained by counting how many items the respondent endorsed by circling five or six. Average administration time: 1:40 Flesch–Kincaid reading grade level estimate: 6.8
Prodromal Questionnaire, Brief Version (PQ-B) (Loewy et al., 2011)	The PQ-B is a 21-item self-report questionnaire. Items are answered true/false and also contain 'distress scores' in which respondents rate their level of concern with regard to each item on a scale of 1 ('strongly disagree' or no distress) to 5 ('strongly agree' or substantial distress). Total weighted distress scores are calculated by summing the distress scores for items that are marked 'true.' Respondents are asked to consider only experiences occurring *not* under the influence of drugs or alcohol. Within a sample of 141 adolescents and young adults referred for assessment to prodromal research centers, the instrument achieved specificity of 0.68 and sensitivity of 0.88 with regard to SIPS diagnoses using a cutoff distress score threshold of six or greater on the weighted distress measure. Average administration time: 2:30 Flesch–Kincaid reading grade level estimate: 8.6
Youth Psychosis at Risk Questionnaire (YPARQ-B) (Ord et al., 2004)	The abbreviated YPARQ (YPARQ-B) is a 28-item self-report measure developed from the Comprehensive Assessment of At-risk Mental States. Responses are 'yes' (scored as one) and 'no/unsure' (scored as zero). The YPARQ-B authors recommend a cut-off score of eleven endorsements to categorize positive vs. negative responders, which yielded sensitivity of 0.82 and specificity of 0.99 in a validation sample of 648 Palauan high school students. Average administration time: 3:55 Flesch–Kincaid reading grade level estimate: 7.6

Screening efforts might produce an enriched sample with respect to psychosis risk, thus optimizing assessors' time spent evaluating potentially CHR individuals and limiting time spent on individuals not likely at risk.

A handful of brief self-report measures have been developed with the aim of assessing symptoms putatively indicating a 'psychosis risk state' (Addington et al., 2014; Kline and Schiffman, 2014). Given the prospective focus of the CHR concept, longitudinal validation represents a vital step toward understanding how such tools might be appropriately incorporated in clinical and research settings. Although the concurrent agreement of CHR screening tools with clinician assessments has been established, few studies to date have investigated longitudinal outcomes following CHR self-report assessments (Kobayashi et al., 2008; Loewy et al., 2012; Rietdijk et al., 2012). The goal of the current study is to evaluate the predictive validity of three brief CHR self-report questionnaires with regard to symptom progression and psychosis onset over approximately six months within a sample of adolescents and young adults seeking mental health treatment.

2. Methods

2.1. Procedures

Procedures were reviewed and approved by the Institutional Review Boards at the University of Maryland (UM) School of Medicine and University of Maryland, Baltimore County (UMBC). After providing informed consent, participants completed the three self-report tools. Those under age 18 gave assent and were required to have a parent or other legal guardian present to provide consent. Screeners were presented in a Latin Square design to enable detection of order effects. Participants were encouraged to complete the measures on their own, but study staff assisted teens with attention and/or literacy issues by reading items aloud. Participants were then administered the SIPS by study staff. Staff administering the SIPS either completed a two-day training with the SIPS authors or were subsequently trained through a process of reviewing vignettes provided by the SIPS authors (McGlashan et al., 2010), practice ratings of taped interviews, observation of at least two interviews, and leading at least two interviews whose ratings were compared with those of an experienced interviewer. Cases were reviewed weekly in team meetings. As an additional check on reliability, ten audio-recorded interviews were randomly selected for re-review by the assessment team. Inter-rater agreement for these ten interviews was high, with intraclass correlations of 0.82 for positive symptom ratings, 0.84 for all symptom ratings, and kappa of 1.00 for diagnosis.

After six months, the participants were invited to complete a follow-up visit at which the SIPS was re-administered.

2.2. Participants

Participation was open to any teen or young adult ages 12–22 receiving mental health services. Participants meeting the SIPS criteria for psychosis at intake were not included in the current sample. The majority (~75%) of participants were referred by mental health clinicians both within and outside of the UM system; others (~25%) self-referred after seeing a flier posted at the UMBC campus or UM outpatient psychiatry clinic. Some, but not all, clinician referrals to the study were intended as psychosis consults, thus providing a sample with potentially heightened CHR prevalence.

The analysis sample includes 54 participants who completed baseline (T1) and follow-up (T2) assessments. The 54 participants included

Table 2
Psychosis risk diagnoses at baseline and follow-up.

T1 SIPS diagnosis	T2 SIPS diagnoses
Low-risk ($n = 33$)	• 28 (stable) LR (85%) • 5 (new-onset) CHR (15%)
Clinical high risk ($n = 21$)	• 4 (remitted) LR (19%) • 13 (persistent) CHR (62%) • 4 (transitioned) psychosis (19%)

Table 3
Descriptive statistics for primary variables.

Measure	*N*	Range	Mean (*SD*)	Skew	Kurtosis	Cronbach's α
PS-R (T1)	54	0–8	2.02 (2.42)	1.10	0.17	0.92
PQ-B (T1)	52	0–80	25.31 (23.47)	0.77	−0.54	0.95
YPARQ-B (T1)	54	0–20	7.78 (6.20)	0.41	−1.08	0.89
P-SOPS (T1)	54	0–20	8.33 (5.63)	0.30	−1.04	0.78
P-SOPS (T2)	54	0–22	7.22 (6.26)	0.82	−0.37	0.84