Schizophrenia Research 158 (2014) 7–10

Contents lists available at ScienceDirect

Schizophrenia Research

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

Predicting psychosis and psychiatric hospital care among adolescent psychiatric patients with the Prodromal Questionnaire

Sebastian Therman [a,*], Maija Lindgren [a], Marko Manninen [a], Rachel L. Loewy [b], Matti O. Huttunen [a], Tyrone D. Cannon [c], Jaana Suvisaari [a]

[a] National Institute for Health and Welfare, Department of Mental Health and Substance Abuse Services, P.O. Box 30, FI-00271 Helsinki, Finland
[b] University of California, San Francisco, Department of Psychiatry, Box 0984 PAR, 401 Parnassus Ave., LangPorter, San Francisco, CA 94143, United States
[c] Yale University, Department of Psychology, Box 208205, 2 Hillhouse Ave., New Haven, CT 06520-8205, United States

ARTICLE INFO

Article history:
Received 27 February 2014
Received in revised form 18 June 2014
Accepted 24 June 2014
Available online 22 July 2014

Keywords:
Adolescent
Psychosis prodrome
Follow-up
Self-report instrument
Screening

ABSTRACT

The Prodromal Questionnaire (PQ) identifies psychiatric help-seekers in need of clinical interviews to diagnose psychosis risk. However, some providers use the PQ alone to identify risk. Therefore, we tested its predictive utility among 731 adolescent psychiatric help-seekers, with a 3–9-year register-based follow-up. Nine latent factors corresponded well with postulated subscales. Depersonalization predicted later hospitalization with a psychosis diagnosis (HR 1.6 per SD increase), and Role Functioning predicted any psychiatric hospitalization (HR 1.3). Published cut-off scores were poor predictors of psychosis; endorsement rates were very high for most symptoms. Therefore, we do not recommend using the PQ without second-stage clinical interviews.

1. Introduction

Psychotic disorders often develop gradually, and most patients have a health care contact due to psychiatric symptoms before the onset of psychosis (Anderson et al., 2013). Initial psychiatric care should thus be an excellent opportunity for detecting such a disease course. Though structured interviews focused on the early detection of psychoses can be employed, they are time consuming and require special training. Consequently, several specific questionnaires have been constructed for the screening of psychotic symptoms (e.g. Heinimaa et al., 2003; Ord et al., 2004; Liu et al., 2013). These questionnaires can select patients for targeted interviews. Some of the new instruments have been validated against gold-standard interview methods for detecting incipient psychosis (Loewy et al., 2005), but research on prospective predictive value is still scant. Despite this, some providers use the screeners without referring for clinical interview. Therefore, we sought to test the accuracy of the Prodromal Questionnaire (PQ) in predicting psychosis on its own.

The first visit to a non-specific psychiatric outpatient clinic is an optimal situation for testing the utility of such inventories, balancing base risk and volume in a situation acceptable to the patients. Accordingly, we prospectively tested the predictive validity of a putative psychosis screening questionnaire in a general adolescent psychiatric setting, with a long-term high-coverage hospitalization register follow-up.

2. Participants and questionnaire

The Helsinki Prodromal Study (HPS) is a prospective study of psychosis risk among adolescent psychiatric patients in Helsinki, Finland (Lindgren et al., 2010). The questionnaire validation cohort included all consecutive new patients aged 15–18 years who presented to any public adolescent psychiatric clinic in Helsinki during the years 2003 to 2008 (some clinics did not maintain screening during 2005–2006). The only exclusion criterion was psychiatric treatment within the previous 24 months. At their first or second clinic visit, the adolescents were asked to fill in the Finnish version of the Prodromal Questionnaire (PQ, Loewy et al., 2005, reproduced in Appendix 1), a validated 92-item self-report measure for screening putatively prodromal symptoms, and 819 questionnaires were returned, representing 75% of eligible patients. A random subsample was later interviewed as part of the same study and asked for informed consent; the use of register data was refused by 61 individuals. Of the remaining patients, 27 had a previous psychosis diagnosis or received one during the same hospital stay as they filled in the PQ; the sample size for the analyses presented here was thus 731. The participants' average (SD) age was 16.4 (0.9) years, 67.9% were female, and 4.0% were inpatients at baseline.

* Corresponding author. Tel.: +358 44 5405559.
E-mail addresses: Sebastian.Therman@thl.fi (S. Therman), Maija.Lindgren@thl.fi (M. Lindgren), Marko.Manninen@thl.fi (M. Manninen), RachelL@lppi.ucsf.edu (R.L. Loewy), Matti.Huttunen@konsmoh.inet.fi (M.O. Huttunen), Tyrone.Cannon@yale.edu (T.D. Cannon), Jaana.Suvisaari@thl.fi (J. Suvisaari).

http://dx.doi.org/10.1016/j.schres.2014.06.031
0920-9964/

The PQ has 92 items in a "yes/no" format, and extensively covers a large spectrum of problems commonly observed in the prodromal period, grouped into positive, negative, disorganized, and general symptoms, with the latter including anxiety, depression, and sleep difficulties (Loewy et al, 2005).

3. Outcome measures

Lifetime psychiatric admission and discharge diagnoses (ICD-10) from any hospital were obtained up to the end of 2011 from the Finnish hospital discharge register (Care Register for Health Care; a.k.a. HILMO), resulting in a 3–9-year (mean 5.9) follow-up period. The register includes all public and private hospitals, and has an excellent accuracy in detecting psychosis cases (Perälä et al. 2007).

Our primary outcome was "hospitalization with a psychosis diagnosis", including both non-affective psychotic disorders and affective disorders with psychotic features (F20, F22–F29, F30.2, F31.2, F31.5, F32.3, and F33.3). In addition, psychiatric hospitalization in itself – as an indicator of general illness severity and functioning – was considered relevant to this study; the "any psychiatric hospitalization" outcome was defined as a stay at a psychiatric hospital, or any hospital stay with a primary or secondary psychiatric diagnosis (F00–F99, X60–X85, or Y87.0). The 77 participants with a baseline or previous psychiatric hospitalization were excluded from follow-ups with the latter outcome (n = 654).

As register discharge diagnoses are assigned by hospital stay, the starting date of each stay was used for calculating time intervals from PQ assessment.

4. Analyses

No PQ item had more than 0.6% missing responses, and the overall missingness rate was 0.2%. The means (SDs) for the PQ Positive subscale sum score and PQ Total sum score were 10.6 (7.8) and 31.3 (18.7), respectively.

A confirmatory factor analysis of the PQ indicated that the a priori four-dimensional model showed only a moderately good fit (RMSEA = 0.04, CFI < .90). Therefore, to determine the empiric factorial structure of the PQ, exploratory factor analysis of the 731 response sets was conducted with the WLSMV algorithm, Oblimin rotation, and default parameters in Mplus version 7.11 (Muthén and Muthén, 2012). In this model, a response threshold parameter is calculated for each item, and one factor loading parameter for each item-factor combination is estimated from the tetrachoric item correlations. The model was computed with an increasing number of dimensions, until there was no improvement in RMSEA.

Symptom factor scores and the a priori PQ Total and Positive Symptom subscale sum scores were the hypothesized predictors in Cox proportional hazards models of a) any psychiatric hospitalization (n = 120) and b) hospitalization with a psychosis diagnosis (n = 41) during the individual's full follow-up time. Predictors were first used singly, and those that were significant at the p = .01 level individually were included in a forward-stepping Cox model with the same p = .01 criterion for entry. For comparability of coefficient estimates, all factor scores and PQ sum scores were normalized before survival analyses. Age was used as a covariate in all analyses. Due to a larger baseline psychosis and hospitalization risk among boys in our sample, all survival analyses were conducted with gender as a stratum.

In addition, for facilitating comparison with previously published results, we assessed the one-year predictive values for psychosis of the previously proposed (Loewy et al, 2007) cut-offs for the Total and Positive Symptom subscale sum scores.

5. Results

The multidimensional WLSMV latent factor models of the PQ provided improving fit using RMSEA, CFI, WRMR indices with up to 10 dimensions. As models of up to nine Oblimin-rotated factors were readily interpretable, this number of factors was retained (RMSEA 0.014, CFI .99). Factor loadings, thresholds, and factor correlations are shown in Supplementary Table 1.

Kaplan–Meier curves of hospitalization with a psychosis diagnosis and any psychiatric hospitalization are depicted in Fig. 1, by gender. After three years, which was the shortest follow-up time, 3.6% of females and 7.2% of the males had been hospitalized for psychosis. Cox regression results are reported in Table 1. Four predictors of hospitalization with a psychosis diagnosis were statistically significant individually (in order of effect size): Depersonalization, PQ Total sum score, Role Functioning, and Dysphoria. When the strongest predictor Depersonalization (HR 1.6, 95% CI 1.2–2.2, p = 0.005) was accounted for, none of the other variables offered significant improvements to the model (p = .94, .14 and .35, respectively). Five predictors of any psychiatric hospitalization were statistically significant individually:

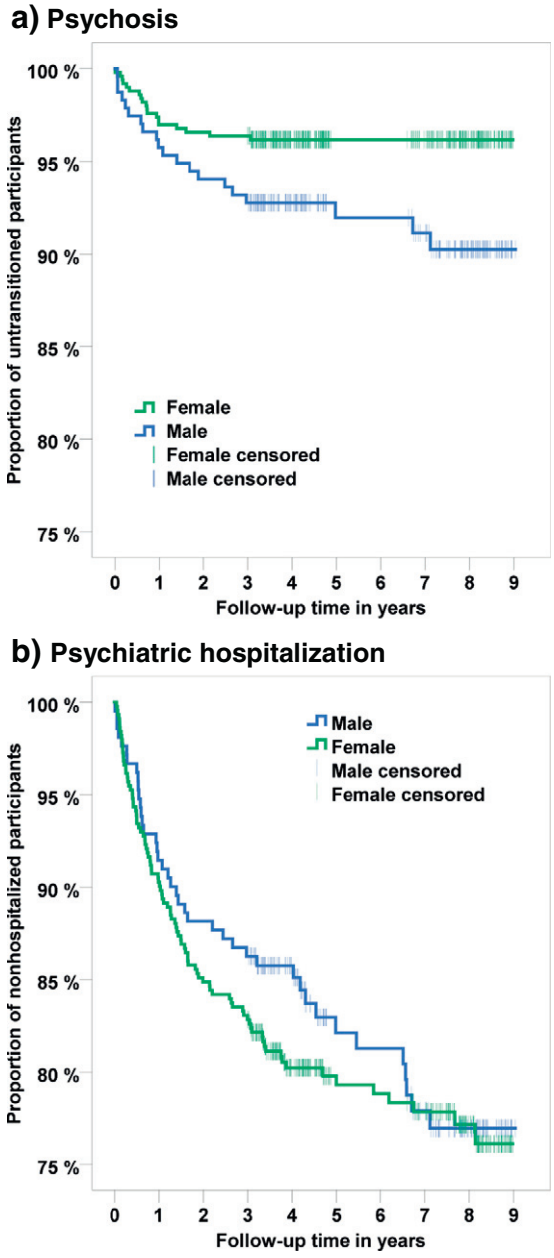

Fig. 1. Survival curves for psychosis and psychiatric hospitalization outcomes in register follow-up, by gender. a) Psychosis and b) psychiatric hospitalization.