



Review Article

Psychometric properties of the concise health risk tracking (CHRT) in adolescents with suicidality



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ABSTRACT

Background: Several self-report rating scales have been developed to assess suicidal ideation, yet few examine other factors related to increased suicidal risk, and even fewer have been validated in both adolescents and adults. We evaluate the 14-item Concise Health Risk Tracking – Self Report (CHRT-SR), a measure previously validated in adults, in a sample of adolescents at risk for suicide.

Method: Data are from a retrospective chart review of adolescents treated in an intensive outpatient program for youth with severe suicidality. Teens completed the CHRT-SR and Quick Inventory of Depressive Symptomatology – Adolescents (QIDS-A) at baseline and discharge. The CHRT-SR was evaluated to determine the factor validity, internal consistency, construct validity, and sensitivity to change.

Results: Adolescents ($n = 271$) completed the CHRT-SR prior to treatment, and 231 completed the CHRT-SR at discharge. Three factors were identified with excellent model fit: Propensity, Impulsivity, and Suicidal Thoughts. Internal consistency reliability coefficients were good-to-excellent for the total score and all three factors at baseline ($\alpha = 0.774$ – 0.915) and exit ($\alpha = 0.849$ – 0.941). The total score and all three factors significantly correlated with overall depression severity and suicidal ideation as rated by teens and parent ($p = .704$ – 0.756 , all $p < .001$). The CHRT-SR was sensitive to change, with moderate to large effect sizes (Cohen's $d = 0.599$ – 1.062).

Limitations: Study limitations include generalizability, lack of a control group, and retrospective data from a sample of opportunity.

Conclusions: The CHRT-SR is a reliable and valid measure for examining severity of suicidal thoughts and associated risk factors, and is sensitive to change following an intervention in adolescents.

1. Introduction

Adolescent suicidal behavior is common. Almost 5000 adolescents die by suicide each year, and 1-million attempt suicide annually in the US (Curtin et al., 2016; Nock et al., 2013), making suicide the second leading cause of death among 15-24-year-olds (American Foundation of Suicide Prevention, 2014). The most salient risk factors associated with suicidal behaviors include mood disorders, prior suicide attempts, and

non-suicidal self-injury. Hopelessness or helplessness, limited social support, and impulsivity have also been associated with suicide attempts (Bridge et al., 2006; Bridge, 2006).

While many rating scales have been developed that assess the severity of suicidal ideation and behaviors, there is presently no accepted standard measure for use in clinical or research settings (Ghasemi et al., 2015). Several scales are clinician-rated measures, which can be an obstacle to use in high volume settings. Of the available self-report

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measures of suicidality, only a few validate in both adults and adolescents. Additionally, most suicidal behavior rating scales focus specifically on suicidal thoughts and past behaviors while neglecting other factors associated with suicidal behaviors, such as mental illness, hopelessness/helplessness, limited social support, impulsivity, etc. (Bridge et al., 2006; Bridge, 2006). A brief rating scale that collects parameters which inform clinicians about the severity of suicidal thoughts and behaviors, assesses other potential risk factors for suicide (within a single measure), is sensitive to change, and is reliable across all ages is an important contribution.

A recently developed self-report measure, the Concise Health Risk Tracking (CHRT), appears to be a promising measure for assessing suicidal severity and risk in adults, and includes assessment of characteristics beyond merely current ideation and behaviors (Ostacher et al., 2015; Reilly-Harrington et al., 2016; Trivedi et al., 2011). The CHRT was designed as a tool to monitor suicidal ideation and related symptoms that could be used repeatedly to detect changes in these “symptoms” over time. To select related symptoms, the developers modeled items based on suicide risk research to date. The items included questions regarding pessimism about the future, helplessness, perception of social support, despair, and actual suicidal thoughts and plans. The original scale included 12 items. It showed strong reliability with Cronbach's coefficient alpha (α) of 0.90, and three factors were identified (current suicidal thoughts and plans, perceived lack of social support, and hopelessness) (Ostacher et al., 2015; Trivedi et al., 2011). An additional two items on impulsivity were added, making the scale 14 items; the 14 items also showed strong reliability with Cronbach's coefficient alpha of 0.88, and significant correlations with depression severity and suicidality based on the Bipolar Inventory of Symptoms Scale suicidality item (Reilly-Harrington et al., 2016). Furthermore, the 14-item CHRT predicted the risk of subsequent suicide-related serious adverse events in adults with bipolar disorder (Reilly-Harrington et al., 2016). Prior reports have also validated a shorter version of the CHRT (7 items) (Ostacher et al., 2015; Reilly-Harrington et al., 2016; Trivedi et al., 2011).

This study evaluated the 14-item CHRT-SR in a sample of adolescents treated in a suicide-prevention intensive outpatient program to determine whether the psychometric features found in adults are comparable in adolescents. Specifically, we examined the following questions: 1) Does the factor structure found in adults replicate in adolescents? 2) Does the scale demonstrate similar internal consistency reliability in adolescents as found in adults? 3) Is the scale sensitive to change following an intervention? 4) Is there evidence of construct validity for the overall total score and factors?

2. Method

Data are from a retrospective chart review of youth treated in a clinical intensive outpatient program (IOP) for adolescents with severe suicidality between January 1, 2014, and December 31, 2015, in a large not-for-profit children's hospital. The study protocol was approved by the Institutional Review Board at the University of Texas Southwestern Medical Center at Dallas. All identifying data were removed from the clinical database prior to conducting analyses. Because this study is a retrospective chart review, no consents were obtained from participants or their parents.

2.1. Participants

To be eligible for the IOP program, teens (ages 12–18 years) had to have a recent suicide attempt or severe worsening of suicidal ideation warranting emergency services. Patients could be referred from within the hospital or from community providers and were typically evaluated for IOP within a few days after the suicidal event (attempt or worsening of ideation) or within a few days of discharge if they were hospitalized following the event. The history of suicidal behaviors was assessed by

the clinician at the initial evaluation using the Columbia Suicide Severity Rating Scale (C-SSRS) (Posner et al., 2011). Teens requiring other levels of care (inpatient hospitalization, day treatment, or outpatient care) were provided referrals for treatment. All youth evaluated for the IOP and who completed the CHRT-SR (see supplementary appendix) during the evaluation from January 1, 2014, through December 31, 2015, were included in the analyses.

2.2. Treatment program

The IOP program included 3 hours of group therapy twice weekly, and utilized cognitive behavior therapy (CBT) and dialectical behavior therapy (DBT) components focusing on skills to reduce risk factors associated with suicidal behaviors (Brent et al., 2009; Bridge, 2006). Teens also received individual and/or family therapy and referral to a psychiatrist for medication management as needed (NOTE: most patients were receiving psychological and psychopharmacological interventions in addition to IOP). In addition, parents attended a 1-hour weekly skills-based parent group. The timing of discharge from IOP was based on individual patient need and was determined by the clinician based on the teen's readiness for standard outpatient care. Length of treatment was typically 4–6 weeks of IOP, although discharge was based on the individual patient.

2.3. Measures

In addition to clinical interview by a licensed provider, teens completed the 14-item Concise Health Risk Tracking Self-Report at the initial assessment for the program and upon discharge. CHRT-SR responses range from 0 (strongly disagree) to 4 (strongly agree), with a total score ranging from 0 to 56. Both teens and parents completed the Quick Inventory of Depressive Symptomatology – Adolescents (QIDS-A) (Haley, 2009; Rush et al., 2003) at the initial assessment for the program and upon discharge. The QIDS-A-SR is a 17-item self-report that assesses depressive symptom severity based on the DSM-IV and V criterion symptoms that define a major depressive episode. For adolescents, the highest rating on either sadness or irritability rates to define depressed mood domain. Each item is rated from 0–3, with 0 being asymptomatic and 3 noting a severe symptom. The 17 symptoms are categorized into the nine criterion domains each rated 0–3. The highest rated item in the specific domain defines the domain score (Range 0–3) (QIDS-A total range: 0 to 27) (Rush et al., 2003). Item 13 on the QIDS-A assesses suicidal behavior. In the IOP, adolescents completed the self-report measure about themselves (QIDS-A-SR), and parents completed the parent rating about their teen (QIDS-A-P).

2.4. Statistical analyses

Factor validity of the CHRT-SR was assessed through confirmatory factor analysis (CFA) using the 7- and 14-item models which have been previously tested in samples of adults with bipolar disorder (Ostacher et al., 2015; Reilly-Harrington et al., 2016) and major depressive disorder (Trivedi et al., 2011). CFA was conducted with maximum likelihood estimation within Mplus 7.4 (Muthen and Muthen, 2012). Model fit was assessed through several indices: model chi-square value and significance value (X^2) (Kline, 2011), model chi-square statistic per degrees of freedom (X^2/df) (Bollen, 1989), the root mean square error of approximation (RMSEA) (Kline, 2011) with a 90% confidence interval (90%CI), both the Comparative Fit Index (CFI) and Tucker-Lewis index (TLI) (Hu and Bentler, 1999; Kline, 2011), and the standardized root-mean-square residual (SRMR) (Brown, 2006). Generally, model fit is supported when X^2 is not statistically significant, $X^2/df < 3.0$, CFI and TLI > 0.95 , RMSEA < 0.08 , and SRMR < 0.08 . The internal consistency reliability of each factor, as well as domains within the Propensity factor, and CHRT-SR total score were assessed through Cronbach a coefficient.

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