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Psychometric Reevaluation of the Columbia–Suicide Severity Rating Scale: Findings From a Prospective, Inpatient Cohort of Severely Mentally Ill Adults

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ABSTRACT

Objective: Accurate prediction of suicide remains elusive due to lack of predictive measures. Given the Columbia–Suicide Severity Rating Scale's (C-SSRS) emerging "gold-standard" status for risk assessment, studies are needed to assess its psychometric properties, particularly predictive validity. The current study adds to the limited literature by assessing the C-SSRS's internal consistency, factor structure, concurrent validity, and predictive validity.

Methods: In this longitudinal study of 1,055 adults with *DSM-IV* diagnoses consecutively admitted to a specialized psychiatric hospital between July 1, 2012, and June 30, 2014, patients completed standardized assessments, including the C-SSRS, at admission and 2, 12, and 24 weeks postdischarge.

Results: The C-SSRS evidenced excellent internal consistency (ordinal $\alpha = .95$). Principal components analysis (PCA) revealed a 2-factor solution, accounting for 65.3% of the variance across items. The severity of ideation and behavioral items loaded onto the first factor, and the intensity of ideation items loaded onto the second factor. The total score, factors, and the most severe ideation single item were moderately correlated with other measures of suicidality ($0.27 \le r \le 0.58$; $P < .0001$). The summary score from the ideation/behavior factor was found to be modestly correlated with any suicide-related behavior within the 6 months following hospitalization. Receiver operator characteristics indicated that the C-SSRS performed adequately in correctly classifying any suicide-related behavior within 6 months of discharge from the hospital (AUC = 0.757, $P < .001$) with the total score and summary score from the ideation/behavior factor providing the best balance between sensitivity (0.694) and specificity (0.652–0.674).

Conclusions: This study is the first to assess the factor structure of the C-SSRS in a large, high-risk sample. The measure has solid psychometric properties and merits use as a suicide risk assessment measure.

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Accurate prediction of suicide-related behaviors continues to remain elusive due to lack of knowledge of the sensitive and specific long-term risk factors, few short-term warning signs, and variability of suicide risk over time.[1,2] The Institute of Medicine[1] and the American Psychiatric Association's *Practice Guideline for the Assessment and Treatment of Suicidal Behaviors*[3] concluded that predicting suicide (especially on the individual level) appears nearly impossible. Longitudinal prediction using relatively distal variables (eg, psychiatric diagnoses) yields high false-positive rates, limiting practical predictive value.[1,4,5] Within this context, the Columbia–Suicide Severity Rating Scale (C-SSRS)[6] has become the preferred suicide risk instrument, and the US Food and Drug Administration now strongly encourages the C-SSRS for use in all antidepressant clinical trials.[7] Given its emerging "gold-standard" status, further psychometric evaluation, particularly of its factor structure and predictive validity, is necessary to supplement 4 existing studies[6,8–10] to date. Interrater reliability is reported as moderately good,[8,10] convergent validity is reasonably established,[6,9,10] and predictive validity of lifetime most severe suicidal ideation was significant in 2 studies.[6,9] Unfortunately, no studies have examined the factor structure of the measure. This gap in knowledge is particularly important given that clinical and research decisions often are based on theoretically proposed (as yet to be empirically validated) summary scores from the C-SSRS. Further, inpatients at high risk for suicide-related behaviors are underrepresented in previous studies. The current study addresses these gaps by assessing the factor structure, concurrent validity (compared to other established measures of suicidal ideation and hopelessness), and predictive validity (6-month suicide-related behaviors and service utilization) of the C-SSRS in a large, adult inpatient population with high prevalence rates of lifetime suicide-related ideation and behavior.

METHODS

Participants

Between July 1, 2012, and June 30, 2014, 1,075 adults were admitted to a specialized psychiatric hospital; 1,055 (98.1%) participated in a larger treatment outcomes study[11] from which these cross-sectional analyses are based. There were no exclusion criteria for study entry; 1.9% of patients declined participation or were discharged before the C-SSRS was administered. Gender distribution was relatively even with 515 women (48.8%) and 540 men (51.2%). The sample was young (35.2 ± 14.7 years), relatively well-educated (88.1% with at least some college), but

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Clinical Points

- Accurate prediction of suicide remains elusive due to lack of predictive measures.
- This first independent psychometric evaluation of the Columbia–Suicide Severity Rating Scale's (C-SSRS) found the measure to be an internally consistent and valid instrument to quantify suicide severity, intensity, and behaviors.
- An empirically derived factor score composed of severity of ideation and suicidal behavioral items from the C-SSRS was modestly correlated with suicide-related behaviors within the 6 months following a psychiatric hospitalization. The C-SSRS provides a clinically useful assessment tool that balances sensitivity and specificity relative to other measures of suicidality.

mostly unemployed (61.3%). The majority of participants were single or never married (57.7%); the remainder were married/partnered (26.8%), divorced (9.6%), separated (4.6%), or widowed (1.3%). Six respondents declined to provide data pertaining to their marital status. In terms of racial background, the majority identified as Caucasian (90.2%); the remainder identified as multiracial (5.7%), African-American (1.8%), Asian (1.3%), American Indian (0.5%), or Native Hawaiian/Other Pacific Islander (0.5%). One participant declined to indicate racial background. Seventy-two patients identified as being of Hispanic or Latino ethnicity (6.8%).

The study sample was severely mentally ill. Patients reported an extensive psychiatric history and having received treatment from multiple previous therapists (4.1 ± 3.8), psychopharmacologists (3.1 ± 3.0), acute psychiatric hospitalizations (1.4 ± 2.4), and extended (> 5 days) psychiatric hospitalizations (1.1 ± 2.1). Admission diagnoses based on Structured Clinical Interview for the *DSM-IV* (SCID-I)[12] indicated that patients met criteria for multiple Axis I disorders (2.9 ± 1.6); 37.1% also met criteria for an Axis II personality disorder diagnosis based on SCID-II[13] assessments. Axis I spectrums included depressive disorders (62.7%), bipolar spectrum disorders (18.9%), anxiety disorders (57.6%), substance use disorders (57.4%), and psychotic disorders (8.3%). The most common personality disorders were borderline personality disorder (17.1%) and avoidant personality disorder (14.2%).

Not all patients provided complete data. Relative to patients who provided only baseline data (n = 737), patients who provided baseline and follow-up data (n = 318, discussed next) had received treatment from more previous therapists (4.5 ± 4.3 vs 3.9 ± 3.6, $P = .013$, $d = 0.162$), psychopharmacologists (3.5 ± 3.9 vs 2.9 ± 2.5, $P = .004$, $d = 0.175$), acute psychiatric hospitalizations (1.7 ± 2.5 vs 1.3 ± 2.3, $P = .025$, $d = 0.148$), and extended (> 5 days) psychiatric hospitalizations (1.4 ± 2.7 vs 1.0 ± 1.8, $P = .003$, $d = 0.182$). Additionally, patients who provided baseline and follow-up data (47.2%) were more likely to receive a formal Axis II diagnosis than patients who provided only baseline data (32.4%), $P < .0001$, $\varphi = 0.143$. There were no other differences across sociodemographic characteristics, Axis I diagnoses, or treatment histories. Of note, the few observed differences between groups were below conventional standards of small effect sizes (ie, < 0.20).

Procedures

Data were collected as part of the hospital's clinical outcomes project to assess treatment response over time[11] with a smaller subsample also participating in a suicide-specific treatment trial.[14] Baseline measures were collected within 72 hours of admission and at 2-week intervals during hospitalization as part of a larger battery of assessments. Data were collected via laptop computers. All assessments were designed and implemented as an element of routine clinical care and integrated into treatment planning and monitoring of progress. As such, obtaining formal informed consent was not necessary. Patients and their treatment teams were provided with profile scores and feedback regarding diagnostic findings. In addition, they were informed that findings were used to evaluate the effectiveness of treatment and for research purposes. Follow-up phone interviews were conducted at scheduled intervals postdischarge at 2, 12, and 24 weeks. Use of all data—including analysis and reporting of findings—was approved by Baylor College of Medicine's institutional review board.

Measures

Demographic variables as well as history of psychiatric hospitalization and psychiatric service usage were assessed using a standardized patient information survey.[11]

The C-SSRS is a semistructured interview that assesses severity of suicidal ideation, intensity of ideation, suicidal behavior, and lethality of suicide attempts.[6] The Severity of Ideation subscale uses a 5-point scale comprising (1) a passive wish to be dead, (2) nonspecific active thoughts of suicide, (3) active suicidal ideation including methods, (4) suicidal intent without a specific plan, and (5) active suicidal ideation with intent and a plan to act. The Intensity of Ideation subscale is composed of 5 items (frequency, duration, controllability, deterrents, and reasons for ideation), each rated on a 5-point scale with increasing values indicating increasing intensity. The Suicidal Behavior subscale assesses actual attempts, nonsuicidal self-injurious behavior, interrupted attempts, and aborted attempts using a nominal scale. The lethality subscale uses an ordinal scale to assess the lethality of actual attempts or the potential for lethality if the lethality was none or minimal.[6]

The Patient Health Questionnaire (PHQ-9)[15] is a 9-item self-report measure assessing core depression symptomatology over the prior 2 weeks using a 4-point Likert scale. Only item 9, which pertains to suicidal ideation (ie, "Thoughts that you would be better off dead or thoughts of hurting yourself in some way"), was retained for inclusion in these analyses.

The Beck Scale for Suicidal Ideation (BSS)[16] is a self-report instrument consisting of 21 sets of statements containing content such as wish to live, wish to die, frequency of ideation, perceived capability to carry out an attempt, and

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extent of actual preparation.[15] Scores range from 0 to 38. The BSS is widely used in suicide research.[17]

The Beck Hopelessness Scale (BHS)[18] is a 20-item self-report instrument intended to measure negative future thinking. Items are rated as true or false. Hopelessness has been shown to be a key mediator between depression and suicidal ideation, and the BHS has demonstrated sensitivity (0.91) for deaths by suicide.[17]

The Suicide Cognitions Scale (SCS)[19] is a self-report instrument consisting of 18 items rated on a 5-point scale. Items were constructed to be consistent with schemas of unbearability and unlovability with scores ranging from 18 to 90. The SCS has excellent psychometric properties.[19,20]

Data Analysis

Given the large number of analyses and potential for α inflation, statistical significance was set at $P < .01$. All analyses were conducted using SAS/STAT software, version 9.3 of the SAS System for Microsoft Windows, Cary, North Carolina.

Reliability

The scale of measurement for the 20 items across 3 subscales of the C-SSRS includes items that have potential responses that are (1) dichotomous (yes vs no; eg, "actual attempt"), (2) ordinal (rank-ordered; eg, frequency of thoughts from low to high), (3) categorical (multiple, non-ordered classes; eg, "reasons for ideation"), and (4) continuous (at-least interval scale; eg, "total number of attempts"). Given this variability in scale of measurement, standard approaches to evaluating internal consistency are not possible. In fact, Posner and colleagues commented accordingly in 2011: "The severity and behavior subscales use an ordinal scale and are therefore not subject to internal consistency analysis."[6(p1269)] However, subsequent advances (ie, in 2012)[21] in psychometric theory, research, and practice have revealed ordinal α to be an appropriate measure of internal consistency for instruments that have items with variable scales of measurement. Interpretation of results obtained from ordinal α analyses are the same as with traditional approaches, such that higher α values are better.[22] Consequently, in the current analyses, ordinal α was calculated separately for the 3 subscales of the C-SSRS (severity of ideation, intensity of ideation, and behaviors) as well as for the full measure.

Construct Validity

Although the C-SSRS is divided into 3 theoretical subscales, there are no published data on the factor structure of the C-SSRS. Consequently, an exploratory factor analysis was undertaken to assess the latent structure of the scale. Again, because of the variable scales of measurement of the 20 items of the C-SSRS, traditional factor analytic approaches are inappropriate given that they assume an underlying correlation matrix (eg, Pearson's) among continuously scaled items.[22] When there are deviations from the aforementioned assumption, a polychoric correlation matrix among items must first be calculated and then factor analytic approaches applied.[22] Consequently, principal components analysis (PCA) of the underlying polychoric correlation matrix of nonredundant items from the C-SSRS was used to establish the construct validity of the measure. Component extraction was based on Horn's parallel analysis[23] as it is among the least subjective, most accurate, and sensitive methods of factor extraction.[24] The more commonly used Kaiser criterion (ie, eigenvalues ≥ 1), on the other hand, is among the least accurate methods and tends to overestimate number of factors to retain.[24] The factor structure was rotated using a varimax rotation for ease of interpretation. Note that the PCA was run on all items of the C-SSRS except for "most severe ideation"; this item is redundant in that it represents a rank ordering of the previous 5 items that constitute the suicidal ideation subscale. Summing scores from the items that loaded on each of the factors derived from the PCA allowed for the calculation of clinically useful summary scores.

Concurrent Validity

The total summed score of nonredundant items from the C-SSRS, the summary scores from the PCA, and the single item most severe ideation were correlated with total scores of commonly used measures of suicidal ideation: item 9 from the PHQ-9, the BSS, BHS, and SCS. In addition to the C-SSRS, all patients completed the PHQ-9. However, only a subsample (n = 318) completed the BSS, BHS, and SCS as part of their participation in a concurrent suicide-specific treatment trial.

Predictive Validity

Suicide-related behaviors. The total summed score of nonredundant items from the C-SSRS, the summary scores from the PCA, and the single item most severe ideation were correlated separately with each of the following self-reported suicide-related behaviors: actual attempts, aborted attempts, interrupted attempts, and preparatory acts obtained from the Suicide Behaviors subscale from the C-SSRS during any 1 of 3 scheduled follow-up contacts (2, 12, and 24 weeks) after discharge from the hospital. A dichotomous (yes vs no) variable that captured any of the aforementioned suicide-related behaviors was calculated and also correlated with the total score, the factor scores from the PCA, and the single item most severe ideation.

Of note, receiver operating characteristic (ROC) analyses were calculated to provide clinically meaningful cut-scores for the 4 scores from the C-SSRS (total score, factor 1 from the PCA, factor 2 from the PCA, and single item most severe ideation) as well as other commonly used measures of suicidality in correctly classifying any suicide-related behaviors within 6 months of discharge from the hospital. Results are presented in terms of area under the curve, sensitivity, and specificity (see Table 3).

Service utilization. The total summed score of nonredundant items from the C-SSRS, the summary scores from the PCA, and the single item most severe ideation

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Table 1. Factor Loadings From the Principal Components Analysis

Component	Factor 1	Factor 2
Nonspecific, active, suicidal thoughts (Y/N)	0.95191	
Active suicidal ideation with some intent to act without specific plan (Y/N)	0.90643	
Aborted attempt (Y/N)	0.87633	
Suicidal behavior (Y/N)	0.86435	
Active suicidal ideation with any method (not plan) without intent to act (Y/N)	0.86249	
Wish to be dead (Y/N)	0.86192	
Total number of aborted attempts	0.8595	
Preparatory acts or behavior (Y/N)	0.81671	
Actual attempt (Y/N)	0.79835	
Total number of interrupted attempts	0.79421	
Interrupted attempt (Y/N)	0.79081	
Total number of attempts	0.7695	
Active suicidal ideation with specific plan and intent (Y/N)	0.75467	
Has subject engaged in nonsuicidal self-injurious behavior (Y/N)	0.62621	
Controllability		0.65779
Frequency		0.59954
Duration		0.59443
Reasons for ideation		0.53836
Deterrents		0.51096

were correlated with the emergency department visit(s) and psychiatric hospitalization(s) during any 1 of 3 scheduled follow-up contacts (2, 12, and 24 weeks) after discharge from the hospital.

RESULTS

Reliability

When analyzed in aggregate, the 20 items comprising the C-SSRS evidenced excellent internal consistency (ordinal α = .95). Subscale analyses revealed variable findings. The 5-item Severity of Ideation subscale (ordinal α = .98) and the Suicidal Behavior subscale (ordinal α = .95) evidenced excellent internal consistency as well. The 5 items comprising the Intensity of Ideation subscale revealed poor/unacceptable levels of internal consistency (ordinal α = .59).

Validity

Horn's parallel analyses indicated forcing a 2-factor solution to the PCA. All 19 items loaded onto the orthogonally rotated solution with factor loadings above 0.51 and in a solution that accounts for 65.3% of the variance across items. The severity of ideation and behavioral items rotated onto the first factor, and the intensity of ideation items loaded onto the second factor. This PCA provides support to the construct validity of the C-SSRS. See Table 1 for details.

Table 2 provides details of the multiple additional validity analyses. The total summed score of nonredundant items from the C-SSRS, the summary scores from the PCA, and the single item most severe ideation were found to be significantly correlated (r = 0.27 to 0.58) with frequently used measures of suicidality, demonstrating adequate concurrent validity. The total score from the C-SSRS and the summary score from factor 1 were found to be moderately correlated with individual suicide-related behaviors and more strongly

Table 2. Concurrent and Predictive Validity of the C-SSRS

	Baseline (rating at admission)			
	Total Score	PCA Factor 1	PCA Factor 2	MSI
Concurrent validity—Suicide-related measures				
Patient Health Questionnaire-9				
r	0.582	0.539	0.397	0.326
P value	<.0001	<.0001	<.0001	<.0001
n	1,054	1,054	763	763
Beck Hopelessness Scale				
r	0.365	0.300	0.313	0.328
P value	<.0001	<.0001	<.0001	<.0001
n	316	316	308	308
Beck Scale of Suicide Ideation				
r	0.477	0.430	0.333	0.388
P value	<.0001	<.0001	<.0001	<.0001
n	318	318	310	310
Suicide Cognitions Scale				
r	0.449	0.398	0.336	0.271
P value	<.0001	<.0001	<.0001	<.0001
n	318	318	310	310
Predictive validity—Suicide-related behavior within 6 months of discharge from the hospital				
Actual attempt				
r	0.143	0.168	0.053	0.077
P value	.011	.003	.381	.201
n	318	318	275	275
Interrupt attempt				
r	0.239	0.214	0.184	0.192
P value	<.0001	.0001	.002	.001
n	318	318	275	275
Aborted attempt				
r	0.265	0.248	0.152	0.146
P value	<.0001	<.0001	.011	.012
n	318	318	275	275
Preparatory acts/behavior				
r	0.247	0.251	0.128	0.156
P value	<.0001	<.0001	.034	.009
n	318	318	275	275
Any suicide-related behavior				
r	0.289	0.282	0.161	0.165
P value	<.0001	<.0001	.008	.006
n	318	318	275	275
Predictive validity—Service utilization within 6 months of discharge from the hospital				
Hospitalizations				
r	0.124	0.095	0.138	0.125
P value	.023	.090	.022	.039
n	318	318	275	275
Emergency department visits				
r	0.138	0.097	0.141	0.110
P value	.014	.083	.019	.069
n	318	318	275	275

Abbreviations: C-SSRS = Columbia Suicide Severity Rating Scale; MSI = most severe ideation (single item); PCA = principal components analysis.

correlated with any suicide-related behavior within the 6-month period following hospitalization compared to the intensity score and the single item most severe ideation from the C-SSRS. Of the 4 scores from the C-SSRS, the total summed score and intensity summary score were found to be correlated with emergency department visits and psychiatric hospitalizations within 6 months following discharge from the hospital; the single item was correlated with emergency department visits only. Notably, the severity of ideation/behavior factor was not correlated with service utilization.

Table 3 provides details of the ROC analyses. All 4 scores from the C-SSRS as well as the 4 other commonly

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Table 3. Diagnostic Efficiency Statistics for Baseline Psychometric Measures in Predicting any Suicide-Related Behaviors Within 6 Months of Discharge From the Hospital

Psychometric Measure (cut score)	AUC	SN	SP
C-SSRS Total Score (≥ 23)	0.757	0.694	0.652
C-SSRS PCA Factor 1 Total Score (≥ 9)	0.751	0.694	0.674
C-SSRS PCA Factor 2 Total Score (≥ 14)	0.632	0.611	0.527
C-SSRS MSI (≥ 2)	0.647	0.861	0.406
PHQ-9, item 9 (≥ 3)	0.624	0.861	0.331
BHS total score (≥ 13)	0.624	0.633	0.561
BSS total score (≥ 14)	0.651	0.581	0.650
SCS total score (≥ 55)	0.666	0.581	0.678

Abbreviations: AUC = area under the curve from receiver operating characteristic analysis, BHS = Beck Hopelessness Scale, BSS = Beck Scale of Suicide Ideation, C-SSRS = Columbia Suicide Severity Rating Scale, MSI = most severe ideation (single item), PCA = principal components analysis, PHQ-9 = Patient Health Questionnaire-9, SCS = Suicide Cognitions Scale, SN = sensitivity, SP = specificity.

used measures of suicidality performed better than chance in correctly classifying any suicide-related behavior within 6 months after discharge from the hospital ($P < .001$). The C-SSRS total score and factor 1 from the PCA provided the best balance between sensitivity and specificity, performing almost identically. Although the single item most severe ideation and the single suicide-related item from the PHQ-9 were found to be highly sensitive to any suicide-related behaviors (0.861), both evidenced poor specificity (< 0.41).

DISCUSSION

An emerging consensus in the suicide research literature contends that suicide risk is best conceptualized as a complex diathesis-stress phenomenon involving genetic vulnerability triggered by early adverse events, resulting in impaired development and function of neurobiological systems regulating behavior, affect, and cognitive function.[25–29] Stress-response systems may become overwhelmed in response to episodic negative life events, increasing the likelihood of triggering a suicidal crisis. Studies generally support diathesis-stress models for predicting suicide risk, finding that interactions between early adverse events and current impulsivity,[29] recent stressful life events,[30,31] and level of psychopathology and recent stressful life events in alcoholics[32] confer increased risk of suicide-related behaviors. In the context of diathesis-stress models, any single measure, regardless of the robustness of its psychometric properties, will exhibit limited validity in predicting outcome. Therefore, despite the relatively small magnitude of the correlations and marginally acceptable sensitivity and specificity in correctly classifying suicide-related behaviors, the results of the current study provide support for the predictive validity and clinical utility of the C-SSRS.

The results of reliability analysis revealed that, overall, the C-SSRS functions well as an internally coherent construct; however, the Intensity of Ideation subscale (frequency, duration, controllability, deterrents, and reasons for suicidal ideation) had poor internal consistency. One potential reason for this result is the confounding use of a zero point that can indicate either greater intensity of ideation or no problem with ideation. Future research should assess the internal consistency of the Intensity of Ideation subscale with the zero-point anchor eliminated in order to clarify its psychometric properties. In the interim, clinicians, researchers, and policy-makers should judiciously use this subscale as an independent measure of the intensity of suicidal ideation.

The results from the factor analysis revealed new information regarding the C-SSRS. Contrary to the developers' assumptions of multiple domains, the results support a 2-factor solution, with severity of suicidal ideation and all suicide-related behavior items loading onto the first factor, and the intensity of ideation items loading on a second factor. The 2 sets of items comprising the first factor are conceptually related insofar as the severity of ideation encompasses behavioral methods/plans (ie, rehearsal) and line up with actual behaviors. These items differ from items that load on the second factor, where the "intensity" items pertain more to the extent of preoccupation than the specific contents. While it may be expedient for clinicians to draw conclusions based on single items such as total number of suicide attempts, aborted attempts, and interrupted attempts, the PCA results point to the potential benefit of computing factor scores that can then be regressed with other outcomes.

Overall, the C-SSRS demonstrated reasonable concurrent validity with self-report measures of suicidal ideation; however, the wide range of small-to-medium effect sizes indicates that the interview measure assesses similar yet distinct constructs compared to measures of suicidal ideation, hopelessness, or suicide cognitions. This finding should not come as a surprise in part because the C-SSRS assesses suicide-related behaviors and ideation. Furthermore, the C-SSRS is an interview-based measure whereas the BSS and BHS are self-report measures, and this difference thereby introduces hetero-method measurement error variance.

The C-SSRS total score, summary scores from the PCA, and the single item most severe ideation demonstrated differential predictive validity. The total score and factor 1 demonstrated significant association with postdischarge preparatory, interrupted, aborted, and actual suicide attempts, as well as all suicide-related behaviors (small-to-medium correlations). Factor 2 was predictive of postdischarge interrupted attempts, all suicide-related behaviors, and service utilization, whereas most severe ideation was predictive of preparatory and interrupted attempts. Compared to other studies indicating most severe ideation[6,9] and past suicide attempt as most predictive of future suicide attempts, the current study indicated that total score ($r = 0.289$) and factor 1 ($r = 0.282$) were more robust predictors of suicide-related behaviors than most severe ideation ($r = 0.165$). Even though all 4 scores from the C-SSRS performed better than chance in correctly classifying any suicide-related behaviors within 6 months of discharge from the hospital, the total score and summary score from factor 1 provided the best (but still only marginally acceptable) balance between sensitivity and specificity.

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This study has a number of limitations. First, the sample is largely Caucasian, which limits generalizability to individuals from other racial/ethnic backgrounds. The inpatient sample may not generalize to all clinical populations; however, the importance of studying patients with high burden of illness and high risk for suicide is a necessary step in improving diagnostic and treatment approaches to suicide risk. Second, as is evident from the significant difference between the number of patients completing the C-SSRS at admission (N = 1,055) and the relatively fewer individuals providing data during the 6-month period following the hospitalization (n = 318), patients lost to follow-up may bias the findings. This potential for bias, however, is somewhat tempered. There were few differences between patients who provided follow-up data and those who did not. Although differences between treatment histories and likelihood of meeting criteria for formal Axis II disorder were statistically significant, all observed differences between groups were below conventional standards of even small effect sizes (ie, < 0.20). Nonetheless, future research should strategize efforts to improve longitudinal participation as well as efforts to obtain external measures of suicide lethality.

This study has a number of important strengths, including a large sample of adult inpatients with high base rates of suicide-related behaviors, as well as advanced analytic approaches appropriate to the measurement challenges of the C-SSRS. Despite losing a large percentage of the original study sample during the follow-up period, 6-month, cross-sectional data from a large cohort of high-risk patients sets this study apart from much of the existing suicide literature. Finally, this is the first report on the latent factor structure of the measure and the first independent study to examine the psychometric properties of the C-SSRS outside of the measure's original developers. These notable strengths and essentially confirmatory findings from this study should help to allay concerns (eg, Health Policy Advisory Committee on Technology, State of Queensland, Australia[33]) regarding the widespread diffusion of this measure into clinical and research practice despite few psychometric evaluations. The C-SSRS's solid psychometric properties merit its use as a suicidal risk assessment instrument.

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