

# Literature review to identify standardized scales of assessment of suicidal risk in adults seen in primary health care

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## Complementary material

1. Search strategy:  
<https://doi.org/10.6084/m9.figshare.6998534.v1>

2. Excluded studies:  
<https://doi.org/10.6084/m9.figshare.6998585.v1>

## Abstract

According to the World Health Organization, suicide has become a public health problem of global dimensions. Forty-five percent of suicide fatalities had consulted with a primary care doctor in the month preceding the event, but no suicide risk assessment had been conducted. Although suicide is an avoidable event, there is no standardized scale for assessment of suicide risk in the primary health care setting, where mental health care competencies vary and decisions are often guided by clinical judgment. A search and review of the best available evidence was carried out to identify scales for assessment of suicide risk for the nonspecialist doctor (i.e., ideally, brief, predictive, and validated). We searched PubMed/MEDLINE, Cochrane, Epistemonikos, and Scholar Google. We also contacted national and international experts on the subject. We retrieved 3 092 documents, of which 2 097 were screened by abstract, resulting in 70 eligible articles. After screening by full text, 20 articles were selected from which four scales were ultimately extracted and analyzed. Our review concludes that there are no suicide risk assessment scales accurate and predictive enough to justify interventions based on their results. Positive predictive values range from 1 to 19%. Of the patients classified as "high risk," only 5% will die by suicide. Half of the patients who commit suicide come from "low-risk" groups. We also discuss 1) the importance of evaluating a patient with suicidal behavior according to socio-demographic variables, history of mental health problems, and stratification within a scale, and 2) possible initial actions in the challenging context of primary care.

## Key ideas

- There is currently no standardized scale for assessing suicide risk in adult patients in the primary health care setting.
- There are several suicide risk assessment scales but none with enough sensitivity, specificity, and predictive power to justify interventions based solely on their results.
- The suicide risk assessment scales that are currently available should be seen as a means of identifying risk factors and not as predictors of suicidal intent.

## Introduction

Suicide is a complex problem caused by multiple factors. According to the World Health Organization (WHO), each year 800 000–1 000 000 people worldwide commit suicide, making it one of the five leading causes of death<sup>1</sup>. In Chile, there has been a progressive increase in general mortality rates due to suicide, which rose from 9.6 in the year 2000 to 11.8 per 100 000 inhabitants in 2011<sup>2</sup>.

According to research, almost half of those who die from suicide consulted with a primary care physician in the month preceding the event, but medical records for these cases do not show an evaluation of suicide risk<sup>3</sup>. The “gold standard” for this type of evaluation is an interview by a psychiatrist<sup>4</sup>, which is rarely available at the primary care level. Moreover, there is no standardized assessment for suicide risk applicable in the primary care setting (i.e., predictive and brief), where interventions are based on clinical judgment and expert recommendations<sup>5</sup>.

To address the gaps described above, we conducted a search for systematic and nonsystematic reviews and primary research to identify standardized scales for evaluating suicide risk in adults in the primary care setting. We also evaluate the need to stratify patients according to suicide risk.

## Method

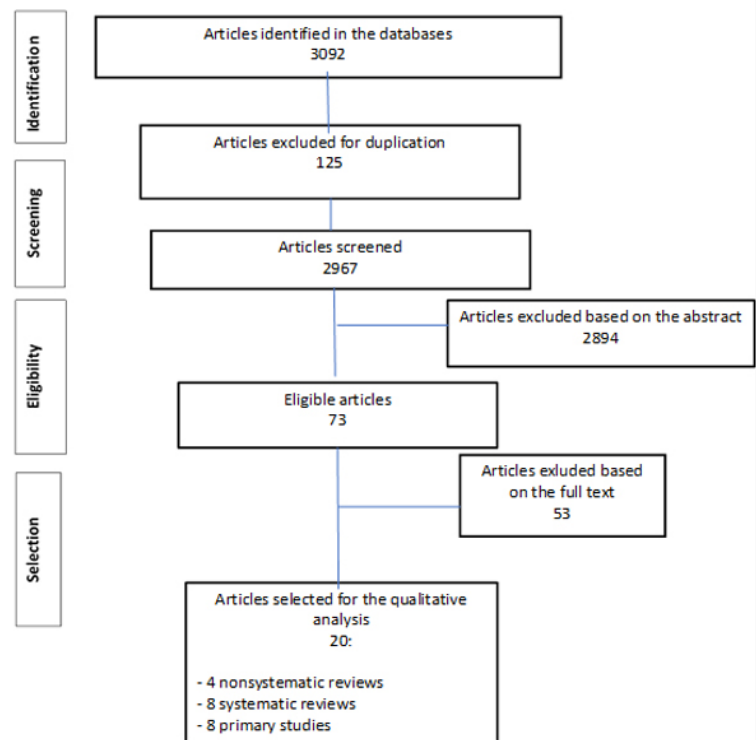
We carried out a bibliographic search in PubMed/MEDLINE, Cochrane, Google Scholar, and Epistemonikos databases, using the keywords *suicide*, *attempted suicide*, *risk assessment*, *psychiatric status rating scales*, *suicide risk scales*, and *suicide risk assessment* to identify the available material, and selecting the research that met the search criteria (search strategy available in Supplementary Material). The inclusion criteria were: systematic or nonsystematic review, or primary research, that examined the validity and predictive capacity of scales for assessing suicide risk in adults in outpatient settings. The exclusion criteria were: research focused on populations with specific mental health diagnoses (e.g., bipolar disorder, schizophrenia); scales used to determine drug efficacy; scales used to evaluate specific populations (e.g., older adults, military, prisoners, pregnant women); scales designed for hospital use only, including emergency services; scales that evaluated suicide risk to predict readmission; letter-type reviews; opinions; clinical case studies; anecdotal material; and studies published more than 20 years ago (i.e., before 1999). International guidelines on suicide<sup>6–8</sup> the Diagnostic and Statistical Manual of Mental Disorders, DSM-5<sup>9</sup>, and Chilean guidelines from the Ministry of Health were also consulted<sup>10</sup>.

We also consulted with experts. In the international realm, we contacted members of The Columbia Lighthouse Project, creators of the Columbia scale (C-SSRS), who provided information regarding the use of this scale as a method of assessing suicide risk in the Latin American population. At the national level, we spoke with nurse Irma Rojas Moreno, author of the “National Program for Suicide Prevention of Suicide: Guidelines for its Implementation”<sup>10</sup>, and with child and youth psychiatrist Dr. Vania Martínez N., an academic at the Department of Child and Adolescent Psychiatry at the University of Chile’s School of Medicine.

## Results

We identified 3092 articles and screened 2971. Screening by title and abstract eliminated 2894 articles, resulting in 73 eligible articles for full-text review. Of these, we eliminated 53 more based on the exclusion criteria (including “evaluated different outcomes”) (see Supplementary Material for a list of excluded studies and explanation of the exclusions). A total of 20 articles—four non-systematic reviews<sup>5,11–13</sup> (Table 1); eight systematic reviews<sup>14–21</sup> (Table 2); and eight primary studies<sup>22–29</sup> (Figure 1 flowchart)—were selected for our comparative and summary analysis

**Figure 1.** Flowchart of article selection process.



### Scales for assessing suicide risk

The Suicide Assessment Scale (SUAS) includes 20 items scored from 0 to 4, has an estimated application time of 20 to 30 minutes, and (like the modified, interview version of the SUAS, and the self-report version, SUAS-S) must be administered by trained health personnel<sup>5</sup>. The scale measures 20 areas: sadness / despondency, hostility, energy, hypersensitivity, emotional loss/withdrawal, initiative, loss of perceived control, tension, anxiety, somatic concern, impulsiveness, loss of self-esteem, hopelessness, inability to feel (depersonalization), poor tolerance of frustration, suicidal thoughts, suicide intention, desire to die, lack of reasons to live, suicidal actions. In his study Niméus provides a cutoff of 39 as a predictor of suicide, with a sensitivity of 75%, specificity of 86.3%, and positive predictive value of 19.4%<sup>26</sup>.

The SUAS has the following disadvantages: it must be administered by personnel trained in mental health, it has low sensitivity and low positive predictive value, and it has only been tested in subjects who

have previously attempted suicide. One review describes it as a scale that assesses changes in patients who are suicidal and those who have attempted suicide<sup>13</sup>.

The Beck Depression Inventory (BDI) is a self-report scale that includes 21 items assessing depression severity. Each item is scored from 0 to 3, for a total possible score of 0 to 63, with defined cutoffs for different levels of severity (0 to 9, “symptoms”; 10 to 16, “mild depression”; 17 to 29, “moderate depression”; and 30 to 63, “severe depression”). Studies show the scale has 63 to 77% sensitivity and 64 to 80% specificity, for hospital and outpatient settings respectively, and takes approximately 20 minutes to administer<sup>11,12,14,22</sup>. A 20-year prospective study evaluates the predictive capacity of the scale’s suicide item (“I have no thoughts of suicide” / “sometimes I think of committing suicide, but I would not commit suicide” / “suicide” / “I would commit suicide if I had the chance”) with regard to suicide deaths and suicide attempts and shows that a score of 1 for suicide and 2 for attempted suicide would be predictive within one year of follow-up. The authors emphasize that these values should serve as indicators for more in-depth evaluation, but do not rule out the same course of action for a score of 0, especially if a patient has previously attempted suicide. Despite the results of the prospective study, use of this scale’s suicide item for suicide risk screening has been strongly criticized because stratification is based on self-report for a single scale item<sup>29</sup>.

Another self-report scale is the Adult Suicidal Ideation Questionnaire (ASIQ), in which 25 items scored at 0 to 7 measure cognitions underpinning suicide ideation and frequency of suicide ideation in past month. This scale has generated results that are strongly associated with those from the Beck Hopelessness Scale and the Beck Depression Inventory, but it has only been used in young populations (people  $\leq$  24 years old) and has not been included in any predictive studies. This scale has shown potential for use in population studies<sup>5,16,18</sup>.

The Suicide Intent Scale (SIS) includes 15 items designed to measure the subject’s actual expectation of dying from a suicide attempt. The first eight questions are objective, gathering data about any recent suicide attempt, and the remaining seven questions are subjective. This scale is criticized for the incongruity of these two sets of items, as patients tend to overstate their answers to the subjective questions in seeking social gain or justification for their actions. This scale is not suitable in scenarios where few subjects have previously attempted suicide and/or most suicides occur in the first attempt<sup>5,11,28</sup>.

The five-item Brief Symptom Rating Scale (BSRS-5) is a short screening test for psychiatric morbidity in diverse contexts and is mainly administered in Asia (to hospitalized patients and community subjects). It includes five questions scored on a Likert scale (0 to 4) that measure anxiety, depression, hostility, interpersonal hypersensitivity, and insomnia. Its broader, revised version, the BSRS-5R, has an additional, sixth question (“Do you have any suicide ideation?”) for evaluating suicidal ideation<sup>28</sup>. In a cross-sectional study the BSRS-5R showed sensitivity of 89%, specificity of 85%, a negative predictive value of 99%, and a positive predictive value of 11%, with an optimal cutoff point of tres for detecting suicide ideation in

community subjects<sup>28</sup>. The revised scale had good internal consistency, showing that subjects with a high level of emotional stress have the highest positive response rate to the sixth question. The revised scale is brief and easy to apply but is not designed to predict suicide attempt; it is more suitable as an indicator for more in-depth evaluation of suicidal tendencies, and for detecting severity of psychopathology, reaffirming the idea that people with suicidal ideation tend to have axis I and / or axis II diagnoses. It has not been tested in prospective cohort studies<sup>28</sup>.

The Reasons for Living Inventory is a self-administered instrument that measures factors protective against suicide through 48 items rated on a Likert scale of 0 (“not important”) to 6 (“extremely important”). The six groups of variables measured are: survival and coping beliefs, moral objections to suicide, responsibility to the family, issues related to children, fear of suicide, and fear of social disapproval. It does not have a standardized cutoff point; the higher the score, the greater the reasons to live. A systematic review showed a consistent negative association between the score on this scale and suicidal ideation, suggesting a protective factor for suicide attempt. However, this would not be the case for individuals with a history of previous suicide attempts, especially adolescents, and there would not be any direct association with suicide<sup>13,21</sup>. While not overly relevant for primary care settings, high scores for these six groups of variables (especially survival and coping beliefs, and moral objections to suicide) may moderate suicide risk factors (through a buffering effect), and correlate with resilience.

The three-part Interpersonal Theory of Suicide (ITS) has recently been promoted for use in predicting suicide risk. This theory explains / evaluates risk for suicide based on three fundamental areas: affection / behavior / cognition. One study used this theory to create the Suicidal Affect-Behavior-Cognition Scale (SABCS), which uses six self-administered questions to classify an individual as “non-suicidal” / “low suicide risk” / “moderate suicide risk” / “high suicide risk,” based on the answers he / she provides (i.e., without standardized scoring). Results from this scale are highly consistent with those from other scales such as the Beck Hopelessness Scale and the Adult Suicidal Ideation Questionnaire (ASIQ). While its theoretical foundations are interesting, it was validated in an online response study and has not been tested in any prospective studies<sup>27</sup>.

Due to their quick application times and relatively consistent results in the 20 studies that were analyzed, four scales were reviewed for their potential use in the primary care setting: the SAD PERSONS scale, the Beck Hopelessness Scale (BHS), the Beck Scale for Suicide Ideation (SSI), and the Columbia–Suicide Severity Rating Scale (C-SSRS).

### 1. SAD PERSONS scale

The name of this scale is an acronym for Sex, Age, Depression, Previous attempt, Excess alcohol or substance use, Rational thinking loss, Social supports lacking, Organized plan for suicide, No spouse, Sickness, which correspond to 10 risk factors for suicide (male sex, age < 20 or > 45 years, active diagnosis of depression, previous suicide attempt, alcohol / drug abuse, lack of rational thinking, inadequate social support, organized suicide plan, no partner, presence of health problems). For each risk factor present, one point is added,

and the total score is used to determine patient management (0 to 2, “discharge and outpatient follow-up”; 3 to 4, “intensive outpatient follow-up; consider hospitalization”; 5 to 6, hospitalization is suggested; 7 to 10, “forced hospitalization”)<sup>14,22</sup>.

The SAD PERSONS scale is used worldwide as a tool for evaluating suicide risk, and in Chile has been included in protocols for managing patients who have attempted suicide in various health centers<sup>30,31</sup>, but research shows it overestimates suicide risk and the need for hospitalization and does not predict suicide risk better than chance (sensitivity for current suicide / suicide attempt = 24 / 41%, future suicide / suicide attempt = 19.6 / 40% respectively). For example, Runeson’s systematic review of good methodological quality reports the scale’s sensitivity as 15%<sup>15</sup>, and the Bolton study shows the scale’s profiles for moderate and severe suicide risk were significantly associated with low suicidal ideation, with half the cases presenting a low score on the scale<sup>11,19,23</sup>.

## 2. Beck’s Hopelessness Scale

The Beck Hopelessness Scale is a self-applied instrument designed to generate dichotomous answers (True / False) to its 20 questions. Administering this scale takes 20 to 30 minutes. A score  $\geq 9$  indicates a considerable degree of hopelessness (negative expectation of the future), which would correlate with suicidal ideation. While hopelessness is linked to severe depression in current mental health practice, its value as a predictor of suicide is not evident in the literature<sup>12,14,17,22</sup>. A meta-analysis shows the scale has low predictive values for suicide, with sensitivity of 29 to 54% and specificity of 60 to 84% (positive likelihood ratio: 1.55, 95% confidence interval: 1.31 to 1.83, and negative positive ratio: 0.45, 95% confidence interval: 0.20 to 1.03)<sup>11</sup>.

A good-quality systematic review shows the scale has 89% sensitivity (95% confidence interval: 78 to 95%) and 42% specificity (95% confidence interval: 40 to 43%), based on moderate-quality evidence<sup>15</sup>. The reviewers rely on the fact that the scale identifies potential high-risk groups rather than potential behavior (in his initial study (in 1990), Beck estimated the group that scored positive for the scale criteria had 11 times higher risk than those that did not). A study that followed patients with depression (unipolar or bipolar) for one year showed that severity of depression measured by Beck’s Depression Inventory predicted suicide attempt, but Beck’s Hopelessness Scale did not<sup>32</sup>. Various websites provide access to this scale<sup>33</sup>.

## 3. Beck’s Scale for Suicide Ideation

The Beck Scale for Suicide Ideation investigates severity of suicidal ideation through 19 questions scored from 0 and 3, for a total score of 0 to 38. Two additional questions (20 and 21) collect descriptive data. Administering this scale takes approximately 10 to 15 minutes and must be done by specialized personnel<sup>5</sup>. It has been used in adolescents, adults, inpatients, and outpatients. In Beck’s initial study, only the hopelessness item (not the total score) correlated predictively to some degree of suicidal ideation. The scale does not have cutoff points for classifying patients as high risk, or as indicators for a specific intervention, but it does show ideation gradients. It has a high internal consistency (Cronbach’s coefficient of 0.89 to 0.96

and an interim reliability of 0.83) and good correlation with the Beck’s Hopelessness Scale and Hamilton’s Rating Scale for Depression. Brown’s 20-year follow-up prospective study shows this scale has a positive predictive value of 3% and a hazard ratio of 6.56 for a cutoff point  $\geq 2$  (i.e., those with scores  $\geq 2$  would have almost seven times greater risk of suicide ideation than those with a score  $< 2$ )<sup>11,12,16,18,22</sup>. Various websites provide tools for applying this scale<sup>34</sup>.

## 4. Columbia Suicide Severity Rating Scale (C-SSRS)

This scale is designed to 1) assess severity of suicidal ideation and behavior in the past month in patients 12 years and older, and 2) link the degree of severity to the level of immediate support the person would need. It evaluates four main items: severity of suicide ideation (passive ideation / active ideation / intention without planning / with planning / with specific method / with the intention of executing it), intensity of the ideation, suicidal behavior, and degree of lethality of the attempt, assigning a specific score for each item. There are multiple versions of the scale, designed for various contexts (initial assessment in emergency services, screening for primary care, military institutions, control in patients with a history of suicide risk, and initial evaluation in schools, among others).

The creators of the scale, the Columbia Lighthouse Project team, provide different versions of the C-SSRS on their website, available for free download, by context (general use, health care, military, and schools); target population (adults & adolescents, very young children, and individuals with cognitive impairments); and language (English or Spanish)<sup>35</sup>.

The Columbia scale is recognized for clinical use by the US Food and Drug Administration (FDA) because it is easy to use, can be applied in all settings, and effective<sup>36</sup>. It was validated in a study that included three specific population groups: adolescents that had attempted suicide (N = 124), depressed adolescents under treatment (N = 312) and adults who presented to an emergency service for psychiatric reasons (N = 237). The study, which had good methodological quality, showed good convergent validity with respect to other scales and divergent validity in the areas of suicidal ideation and behavior in adults and adolescents. In group 1, it showed significant predictive capacity for suicide attempt during treatment (i.e., a repeat attempt) (odds ratio: 1.45, 95% confidence interval: 1.07 to 1.98,  $p = 0.02$ ) and at week 24 of the study (odds ratio: 1.34, 95% confidence interval: 1.05 to 1.70,  $p = 0.02$ ), increasing the baseline risk by 45% and 34% respectively<sup>25</sup>. In addition to the complete version, a short (screening) version is available for use in primary care. Both versions are available both for patients who have never had suicidal ideation and for those who have a history of it<sup>[37,38]</sup>. In addition to primary care use, the screening version has been applied extensively in health service networks where it has shown positive screening results ranging from 6.3% (in emergency services) to 2.1% (in outpatient clinics, and in hospitalization units)<sup>39</sup>.

The C-SSRS has been linguistically validated in 45 languages, including Spanish, and has been psychometrically validated in the Spanish-speaking population<sup>40,41,42</sup>. It has a sensitivity of 94%, specificity of 97.9%, a positive predictive value 75.3% and a negative



predictive value 94.7% for prediction of suicide attempt in adolescents and young Spanish-speaking adults<sup>42</sup>. The Greist study examined the ability of the scale to prospectively predict suicidal ideation and behavior in psychiatric and nonpsychiatric patients in 33 countries, using the baseline electronic C-SSRS (eC-SSRS). A meta-analysis of 54 406 eC-SSRS evaluations (8 837 baseline and 45 619 prospective) was conducted between 2009 and 2012.

This analysis shows that in psychiatric patients a positive eC-SSRS evaluation for only ideation predicts four times more risk of suicidal behavior than a negative result for both suicidal ideation and suicidal behavior (odds ratio: 4.66, 95% confidence interval: 2.6 to 8.3). In the same patients, those with a positive result for both ideation and suicidal behavior in their baseline eC-SSRS evaluation had nine times more risk of maintaining this behavior prospectively (odds ratio: 9.33, confidence interval 95%: 7.1 to 12.3). The scale is also predictive in nonpsychiatric patients, with those who have a positive baseline eC-SSRS result for suicidal behavior showing a 12-fold higher risk of maintaining it at the end of the follow-up period (odds ratio: 12.55, 95% confidence interval: 2.5 to 62.1). In those who present both suicidal ideation and behavior in their baseline assessment, the risk rises to 17 times higher (odds ratio: 17.11, 95% confidence interval: 3.4 to 85.5)<sup>24</sup>.

Given these data, critics of the scale have asserted that it does not address the full spectrum of suicidal ideation or behavior, and has conceptual and psychometric errors<sup>43</sup>. Another disadvantage that has been cited is that its predictive capacity has only been tested 1) in adolescents, 2) for a brief period (9 months), and 3) electronically (online). No prospective studies have been conducted to validate it.

No version of the scale has been validated for Chile to date, but a revised version is being validated by Dr. Vania Martínez Nahuel, whom we contacted for this study<sup>44</sup>.

The short version of the C-SSRS, which is used as a screening tool for primary health care, is limited to only one item—severity of suicidal ideation—through six direct questions classifying patients with suicidal ideation into three color-coded risk categories: red (high risk / requires immediate prevention measures); orange (moderate risk / requires evaluation by the mental health team as soon as possible for selection of precautionary measures); and yellow (slight risk / deferred referral of patients to mental health team) (Table 3). Although it is a simple tool—easy to apply and with logical theoretical thinking—the short version has not been validated prospectively, and the accuracy of the patient categorization and adequacy of the corresponding interventions are not clear. Although no prospective studies have validated this scale it is seen as a promising tool.

## Discussion

WHO estimates that 800 000 people die worldwide each year from suicide—the second leading cause of death in those 15 to 29 years old. The impact of this number is magnified by the fact that for each person who commits suicide 10 to 20 others try to<sup>6</sup>. The impact of a suicide is profound—it is both a transgenerational family tragedy and proof that public policies have failed in the face of a preventable event.

Why try to identify individuals at risk of suicide? In its systematic review for 2004, the US Preventive Services Task Force (USPSTF) concludes that screening tools could help identify individuals at risk, and psychotherapy can reduce suicide attempts in those with high risk<sup>20</sup>. Thus, identifying individuals at risk is the first major step in preventing suicide. Positive feedback has also been shown to have a positive effect, with the exercise of identifying people at risk improving systematic use of mental health services, developing trust in doctor / patient relationships, and encouraging the clinician to use evidence-based interventions to reduce the risk<sup>45</sup>.

But, how do we identify who is really at risk? We know that suicide is a complex problem involving multiple factors—experiential, psychosocial, and even cultural factors—as well as mental health status (e.g., history of a psychiatric illness such as major depressive disorder, bipolar depressive disorder, and/or substance use dependence, among others)<sup>9</sup>.

A comprehensive patient evaluation that collects information on medical history, socio-demographic / biographical factors, psychiatric history, presence of suicidal ideation, family context, and support networks is essential. In the 20 studies we reviewed, some of the scales that were analyzed evaluated the same variables (previous suicidal behavior, thoughts and current plans of suicide, hopelessness, impulsiveness, self-control, and protective factors). However, this review found that studies that evaluate instruments used to assess suicide risk have limited methodological quality. For example, many of them measure composite outcomes (suicide and self-harm) and show low discrimination capacity for suicide, with sensitivities that do not surpass 90%, and specificity between 40 and 50%.

For the Beck Hopelessness Scale, Beck Depression Inventory, and Beck Scale for Suicide Ideation, positive predictive values (the proportion of individuals who will actually die by suicide among those with a positive screening result) have been as low as 1, 2, and 3% respectively. In the Suicide Intent Scale, a positive predictive value of 17% has been seen, but only in those who have previously attempted suicide. For the Suicide Assessment Scale (SUAS) and the Columbia–Suicide Severity Rating Scale, the positive predictive values were 19% and 14% respectively (with the latter measure corresponding to 9-week follow-up)<sup>46</sup>. There is also consistent evidence that some scales are not useful in predicting suicide risk (e.g., the SAD PERSONS scale does not predict suicide risk better than chance).

How good are the scales to predict suicide risk then? Not very good. Therefore, we do not consider or recommend the use of a suicide risk assessment scale as a single tool, in accordance with the recommendations of the World Health Organization<sup>6</sup>, the National Institute for Health and Care Excellence (NICE)<sup>7</sup>, and the US Preventive Services Task Force (US-PSTF)<sup>8</sup>.

Another disadvantage of using scales as predictors of suicide risk is that the cognitive, affective, and behavioral factors that they measure do not interact with the modifiable or demographic risk factors of the patient (e.g., age, sex, axis I diagnoses). For example, Chile's national suicide prevention program bases its evaluation of suicide risk on multiple, classic risk factors that contribute to patient risk<sup>10</sup>. If

we integrate these risk factors with the assessment scales for screening, does detection improve? A meta-analysis of cohort studies found that of patients categorized as "high suicide risk" (based on a combination of demographic factors, and assessment scales,) only 5% (overall positive predictive value) died from this cause, and half of those who died from suicide were classified as "low suicide risk" using the same method. Hence, some authors completely reject the idea of stratifying the suicidal patient by risk<sup>47</sup>.

Some interesting alternatives for assessment of suicide risk have been suggested, including one from Roos, who proposes a unique instrument—a neuropsychological evaluation that generates a suicide risk profile. Administering this assessment would undoubtedly require specialized personnel, and there is thus far insufficient research to validate it<sup>11</sup>. In his review Carter rejects the idea of stratifying patients based on the results of assessment scales and proposes exhaustive clinical evaluation (especially of modifiable risk factors) and aggressive treatment for specific subpopulations (such as people with borderline personality disorder) instead<sup>14</sup>. We believe this method is plausible in hospitals and outpatient centers with specialized health personnel but unrealistic for primary care practice.

The limitations of primary care are an ongoing issue for suicide risk assessment in this setting, where most people seeking care enter the health system—many with a high burden of psychiatric morbidity that is often associated with specific psychosocial contexts and traumatic, adverse life histories. One study shows a prevalence of 2 to 3% for suicidal ideation in people seeking care in primary settings in the past month<sup>8</sup>. These patients are evaluated by health personnel with diverse mental health competencies and abilities, a situation that raises the question of how effectively suicidal ideation in the primary care setting is being managed.

How do we address the gaps in this scenario? By considering suicide risk scales as 1) a means of identifying suicide risk factors and not as predictors of attempted suicide, 2) tools for developing therapeutic alliances, and communicating with patients who may have intense psychic pain that impedes their ability to express themselves clearly, 3) support for calibrating interventions, and in epidemiological research. The focus should be on identifying and treating modifiable factors that allow patients with suicidal behavior to negotiate a plan based on their own needs (for example, treating addictions, managing mood disorders with antidepressants, increasing the perception of family support, and strengthening protective factors that could moderate risk factors), as well as restricting access to lethal elements, increasing patient supervision, and referring the patient for support services when existing supervision is not sufficient<sup>47</sup>. There is a lack of studies showing how to evaluate individuals for suicide risk, beyond intuition, especially in the primary care setting, where for the most part this type of assessment has been limited. The question remains whether or not the wrong factors are being measured—and if the relevant factors are interacting with any discernable pattern.

Given these gaps, the focus and efforts in this area could be directed toward aspects of suicide prevention, such as the development of public, community, and social policies that could, collectively, improve mental health and quality of life.

## Conclusion

Evidence indicates currently available suicide risk assessment scales have limited value and low effectiveness in predicting suicide or suicidal intent. Therefore, these tools are most useful for descriptive evaluations, such as those that focus on developing communication or improving relationships with the patient. We envision the increased use of new methods to fill current gaps, such as integrated risk factor modeling, cognition testing, and interventions in specific mental health populations, as a reliable, predictive, brief, standardized tool for assessing risk for this cause of death in the primary care setting remains to be found.

## Notes

### Author contributions

CA: Conceptualization, Investigación, Metodología, Project administration, Supervisión, Visualización, Writing (original draft preparation), Writing (review and editing). CG: Conceptualization, Investigación, Metodología, Supervisión, Writing (original draft preparation). CC: Conceptualization, Investigación, Metodología, Supervisión, Writing (original draft preparation). BE: Conceptualization, Investigación, Metodología, Supervisión, Writing (original draft preparation).

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### Conflicts of Interest

The authors have completed the ICMJE Conflict of Interest declaration form, and declare that they have not received funding for the report; have no financial relationships with organizations that might have an interest in the published article in the last three years; and have no other relationships or activities that could influence the published article. Forms can be requested by contacting the author responsible or the editorial management of the *Journal*.

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**Table 1.** Summary of results reported by the non-systematic reviews.

Reference	Variables measured	Comments
Rangel-Gar-zón et al[5]	Beck Scale for Suicide Ideation (SSI) Beck Scale for Suicide Ideation, Self-Report (SSI-SR) Modified Scale for Suicide Ideation (MSSI) Plutchik suicide risk scale SAD PERSONS scale Suicide Assessment Scale (SUAS) Modified Suicide Assessment Scale (SUAS) and Suicide Assessment Scale, Self-Report (SUAS-S) Suicide Intent Scale (SIS) Adult Suicidal Ideation Questionnaire (ASIQ)	The MSSI and the Plutchik Suicide Risk Scale could be useful in emergency services
Roos et al[11]	Beck Hopelessness Scale Beck Depression Inventory Beck Scale for Suicide Ideation (SSI) Suicide Intent Scale (SIS) SAD PERSONS scale Mini-International Neuropsychiatric Interview (MINI) suicide subscale Suicide Assessment Scale (SUAS) Schedule for Nonadaptive and Adaptive Personality–Self-Harm subscale (SNAP-SH) Karolinska Interpersonal Violence Scale (KIVS) Death/Suicide Implicit Association Task (AIT) Suicide Stroop task	Analysis limited to scales that underwent predictive studies (suicide / attempted suicide) The prediction of future suicidal behavior based on these scales has inconsistent results Neurocognitive assessment tests (Suicide Stroop task, Death / Suicide Implicit Association Task (IAT)) would be more predictive than clinical evaluation
Lotito et al[12]	Beck Depression Inventory Beck Hopelessness Scale Beck Scale for Suicide Ideation (SSI) Motto’s Risk Estimator for Suicide Linehan’s Reasons for Living Inventory USuicide Severity Scale (C-SSRS) <i>Chronological Assessment of Suicide – CASE approach</i> Minnesota Multiphasic Personality Inventory-2 (MMPI-2) Rorschach inkblot test Firestone Assessment of Self-Destructive Thoughts (FAST).	Scales analyzed from the perspective of the American Psychiatric Association (APA) Only included articles in English Does not review the predictive validity of the scales None of the scales predict suicide, but they are a useful tool, along with the clinical interview
Hourani[13]	Beck Scale for Suicide Ideation Reasons for Living Inventory (RFL) SAD PERSONS scale Suicide Risk Assessment (SRA) Potential Suicide Personality Inventory (PSPI) Suicide questionnaire	Published in 1999 Most scales have poor to moderate predictive capacity. Detects common limitations of the scales: they are based on predictions and not on evaluation models, they can not be applied to different groups of individuals or settings, they do not incorporate the risk factors in their variables, and they do not consider the effects of interaction between the risk factors. Beck suicide scale prevails as recommended.

**Table 2.** Summary of results reported by the systematic reviews.

Reference	No. of studies	Participants	Measured variables	Main results	Comments
<b>Suicide attempt or suicide</b>					
Carter et al[14]	70	Most studies included adults only; others included adolescents and adults, or only adolescents Patients with recent self-harm or active suicidal ideation, or psychiatric populations (patients with mood disorders, psychotic outbreaks, personality disorders, post-traumatic stress disorders).	52/70 studies: psychological instruments: Buglass & Horton scale SAD PERSONS scale Beck Hopelessness Scale Beck Depression Inventory Manchester Self-Harm Rule (MSHR) Edinburgh Risk of Repetition Scale (ERRS) Actions and Feelings Questionnaire (AFQ) Death/Suicide Implicit Association Task (AIT) Mini-International Neuropsychiatric Interview (MINI) suicide subscale Suicide Assessment Scale (SUAS) Suicide Intent Scale (SIS) Schedule for Nonadaptive and Adaptive Personality–Self-Harm subscale (SNAP-SH) ReACT Self-Harm Rule 17/70 studies: biological measures: 5-Hydroxyindoleacetic acid in cerebrospinal fluid (CSF 5-HIAA) Dexamethasone suppression test (DST) Homovanillic acid (HVA) Skin Conductance Habituation test (SCHS) Genotype tryptophan hydroxylase 1 (TPH1) (TPH1) 1/70 study: psychological instruments and biological measures	Overall positive predictive value for suicidal behavior for all scales plus biological measures: 16% Positive predictive value for suicide: 5.5% Positive predictive value for self-harm: 26.3% Positive predictive value for self harm or suicidal behavior: 35.9% Only psychological instruments: Positive predictive value for suicide / suicide attempt: 3.7% Positive predictive value for self-harm: 27.5% Positive predictive value for suicide or suicide attempt: 38.9% Beck Hopelessness Scale positive likelihood ratio: +2.1 Buglass & Horton scale positive likelihood ratio: +2.1	Evaluates accuracy of scales that classify patients as "high suicide risk" Setting was not excluded but they were analyzed only in a hospital context.  Only selected articles in English.  Actual measured outcome was "suicidal behavior" (compound outcome: suicide / suicide attempt and self-harm).
Runeson et al[15]	21 studies	Adult and adolescent patients of psychiatric services; only one evaluates primary care patients	15 instruments: Beck Depression Inventory (BDI) Beck Hopelessness Scale (BHS) Columbia–Suicide Severity Rating Scale (C-SSRS) Mini-International Neuropsychiatric Interview (MINI) SAD PERSONS scale Modified SAD PERSONS scale Suicide Intent Scale (SIS) Suicide Assessment Scale (SUAS) ReACT Self-Harm Rule Manchester Self-harm Rule (MSHR) Södersjukhuset Self-harm Rule (SoS-4) Beck Scale for Suicide Ideation (SSI) Death/Suicide Implicit Association Task (AIT) Edinburg Risk of Repetition Scale (ERRS) Patient Health Questionnaire (PHQ-9)	SAD PERSONS scale: Sensitivity of 15% (95% confidence interval: 8 to 24) Specificity of 97% (95% confidence interval: 96 to 98). Manchester Self-Harm Rule (MSHR): Sensitivity of 97% (95% confidence interval: 97 to 97) Specificity of 20% (95% confidence interval: 20 to 21) ReACT, which is a modification of MSHR, had similar low specificity. Beck Hopelessness Scale: Sensitivity of 89% (95% confidence interval: 78 to 95) Specificity of 42% (95% confidence interval: 40 to 43) PHQ-9: Sensitivity: 78% Specificity: 70%	Evaluates diagnostic accuracy of scales for evaluation of suicide risk Meta-analysis of 5 scales None would meet the criteria for diagnostic precision stipulated by the authors (sensitivity > 80% and specificity > 50%)  Studies published up to 2014

Batterham et al[16]	19	Adults, adolescents, children, in all settings	<p>19 scales:</p> <p>ASIQ (Adult Suicidal Ideation Questionnaire)</p> <p>Beck Scale for Suicide Ideation (SSI)</p> <p>Concise Health Risk Tracking Self-Report (CHRT-SR) scale</p> <p>Firestone Assessment of Self-destructive Thoughts (FAST)</p> <p>Harkavy-Asnis suicide scal (HASS)</p> <p>Expanded Version of the Inventory of Depression and Anxiety Symptoms (IDAS-II)</p> <p>Positive and Negative Suicide Ideation (PANSI) inventory</p> <p>Suicide Intent Scale (SIS)</p> <p>Plutchik suicide risk scale</p> <p>Sheehan-Suicidality Tracking Sca (S-STSS)</p> <p>Suicide Probability Scale (SPS)</p> <p>Yale Evaluation of Suicidality (YES) scale</p> <p>Depressive Symptom Inventory Suicidality Subscale (DSI-SS)</p> <p>General Health Questionnaire suicide subscale (GHQ-28)</p> <p>P4 Suicidality Screener ("P4 screener")</p> <p>Psychiatric Symptom Frequency (PSF)</p> <p>Suicidal Behaviors Questionnaire-Revised (SBQ-R)</p> <p>Suicidal Ideation Attributes Scale (SIDAS)</p> <p>Self-Monitoring Suicide Ideation Scale (SMSI)</p>	<p>None meets criteria for recommendation</p> <p>Of the short questionnaires, the Depressive Symptom Inventory Suicidality Subscale (DSI-SS), Suicidal Behaviors Questionnaire-Revised (SBQ-R), and Suicidal Ideation Attributes Scale (SIDAS) would be potentially useful for population screening</p> <p>The ASIQ and SSI have potential use at the population level, although both have high costs.</p>	<p>Measurement of suicide risk with scales applicable for population use</p> <p>Self-report only</p> <p>No meta-analysis</p> <p>Only includes studies in English</p> <p>DSI-SS only tested in adolescents</p> <p>DSI-SS and SIDAS lack evaluation of test-pretest reliability and sensitivity to change</p> <p>SBQ-R lacks evaluation of sensitivity to change, in addition to testing with small samples</p> <p>Scales assumptions need more psychometric study</p>
McMillan et al[17]	10 studies: 4 with suicide outcome 6 with self-harm outcome	Adults and adolescents hospitalized with suicidal ideation. Adults with a history of self-harm Adult outpatients	Beck Hopelessness Scale only	<p>Suicide outcome: Suicide sensitivity of 0.80 (95% confidence interval: 0.68 to 0.90)</p> <p>Suicide specificity of 0.42 (confidence interval: 95% 0.41 to 0.44)</p> <p>Self-harm outcome: Self-harm sensitivity of 0.78 (95% onfidence interval: 0.74 to 0.82)</p> <p>Self-harm specificity of 0.42 (95% confidence interval: 0.38 to 0.45)</p> <p>Suicide outcome: Positive likelihood ratio: 1.55 (95% confidence interval: 1.31 to 1.83)</p> <p>Negative likelihood ratio: 0.45 (95% confidence interval: 0.20 to 1.03)</p> <p>Self-harm outcome: Positive likehood ratio: 1.29 (95% confidence interval: 1.09 to 1.52)</p> <p>Negative likelihood ratio or: 0.58 (confidence interval: 0.47 to 0.71)</p>	<p>For reporting "potential" risk of suicide more than actual / possible behavior</p> <p>9 points or more in the scale, shows low sensitivity, specificity, and predictive power of suicide</p>
Ghasemi et al[18]	153	General population	14 scales evaluating suicidal attitude: Suicide Opinion Questionnaire (SOQ)	No gold standard for evaluation of attitude / suicidal ideation	Review of scales that evaluate attitude and / or suicidal ideation Blend of two distinct concepts.

			<p>Suicide Attitude Vignette Experience (SAVE) scale  Suicide-Attitude Questionnaire (SUIATT)  Multi-Attitude Suicide Tendency Scale (MAST)  General Social Survey (GSS-4)  Semantic Differential Scale Attitudes towards Suicidal Behavior (SEDAS)  Suicide Attitudes and Attribution Scale, Sorjonen (SAAS)  Renberg y Jacobsson 's Attitudes Toward Suicide Scale (ATTS)  Eskin's Attitudes Toward Suicide Scale (ATSS)  Attitudinal Beliefs Questionnaire about Suicidal Behavior (CCCS-18)  Suicide Behavior Attitude Questionnaire (SBAQ)  Attitudes Towards Attempted Suicide-Questionnaire (ATAS-Q)  Scale of Public Attitudes about Suicide (SPAS) (SPAS)  Hong Kong version of the Chinese Attitude toward Suicide Questionnaire (CASQ-HK)</p> <p>15 scales evaluating suicidal ideation:  Paykel's Questionnaire  Modified Scale for Suicide Ideation (MSSI)  Suicide Ideation Questionnaire (SIQ)  Suicide Intent Scale (SIS)  Adult Suicidal Ideation Questionnaire (ASIQ)  Beck Scale for Suicide Ideation (SSI)  Suicidal Ideation Screening Questionnaire (SIS-Q)  Suicidal Probability Scale (SPS)  Suicide Behaviors Questionnaire (SBQ)  Positive and Negative Suicide Ideation (PANSI) inventory  Suicide Behaviors Questionnaire-Revised (SBQ-R)  International Suicide Prevention Trial (InterSePT) Scale for Suicidal Thinking (ISST)  Geriatric Suicidal Ideation Scale (GSIS)  Columbia-Suicide Severity Rating Scale (C-SSRS)  Five-item Brief Symptom Rating Scale (BSRS-5)</p>		Mainly descriptive review of the scales; no predictive analysis
Warden et al[19]	9 studies. Only 3/9 evaluated suicide outcome.	Patients in emergency services and outpatient centers 98 individuals, with 9 (9%) cases of suicide	SAD PERSONS scale	Insufficient evidence to justify its use as a predictor of suicide risk	Primary studies limited in quantity and quality



					Few retrospective studies in emergency services with low suicide rate
O'Connor[20]	159 1: Determine if screening improves any relevant outcome. 4: Determine if screening identifies individuals at risk.	Adolescents, adults, and older adults.	Evaluation of clinical risk  Suicide item from the Hamilton Depression Rating scale or structured clinical interview for the diagnosis and treatment of mental disorders  Interview structure, administered by a nurse  K-SADS-PL: Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version	Question 1: The benefit of short-term screening is not clear.  Question 2: Overall sensitivity from 83 to 100% and specificity from 81 to 98% to classify an individual as suicidal.  Positive predictive value of 6 to 30%.  In the adolescent group sensitivity was from 52 to 87%, with specificity from 60 to 85%.  Screening could help detect individuals at risk, but not in adolescents.  Did not generate sufficient evidence to recommend for suicide risk screening in primary care.  Psychotherapy could be effective in preventing suicide in high-risk populations.	They base screening on "clinical interviews" with a system that is difficult to standardize.  Does not clarify whether screening increases or decreases the likelihood of suicide attempts, especially in high-risk populations, especially.
Bakhiyi[21]	39 studies.	General population, adults and adolescents.	Reasons for Living Inventory (RFL)	High values could protect against suicide ideation and attempt (adjusted for depression and hopelessness). The way in which it protects against ideation is uncertain (how is it a moderator?). Could also be negatively related to the lethality of the attempt.	Not suitable in scenario where subjects have made previous suicide attempts.  Would not be directly associated with suicide.

**Table 3.** Screening version of the Columbia–Suicide Severity Rating Scale (C-SSRS).

Table 3: Columbia-Suicide Severity Rating Scale Screen with Triage Points for Primary Care (C-SSRS)		Past month	
Ask questions that are in bold and <u>underlined</u> .		Yes	NO
Ask questions 1 and 2			
<p>Wish to be dead:</p> <p>Subject endorses thoughts about a wish to be dead or not alive anymore or wish to fall asleep and not wake up.</p> <p><b><u>Have you wished you were dead or wished you could go to sleep and not wake up?</u></b></p>			
<p>Non-specific active suicidal thoughts:</p> <p>General non-specific thoughts of wanting to end one’s life/die by suicide (e.g., “I’ve thought about killing myself”) without thoughts of ways to kill oneself/associated methods, intent, or plan during the assessment period</p> <p><b><u>Have you had any actual thoughts of killing yourself?</u></b></p>			
If YES to 2, ask questions 3, 4, 5, and 6. If NO to 2, go directly to question 6			
<p>Active suicidal ideation with any methods (Not Plan) without intent to act:</p> <p>Subject endorses thoughts of suicide and has thought of at least one method during the assessment period. This is different than a specific plan with time, place or method details worked out (e.g., thought of method to kill self but not a specific plan). Includes person who would say, “I thought about taking an overdose but I never made a specific plan as to when, where or how I would actually do it... and I would never go through with it.”</p> <p><b><u>Have you been thinking about how you might do this?</u></b></p>			
<p>Active suicidal ideation with some intent to act, without specific plan:</p> <p>Active suicidal thoughts of killing oneself and subject reports having some intent to act on such thoughts, as opposed to “I have the thoughts but I definitely will not do anything about them.”</p> <p><b><u>Have you had these thoughts and had some intention of acting on them?</u></b></p>			
<p>Active suicidal ideation with specific plan and intent:</p> <p>Thoughts of killing oneself with details of plan fully or partially worked out and subject has some intent to carry it out.</p> <p><b><u>Have you started to work out or worked out the details of how to kill yourself? Do you intend to carry out this plan?</u></b></p>			
		Past 3 months	
<p>Suicidal behavior:</p> <p>Have you ever done anything, started to do anything, or prepared to do anything to end your life?</p> <p>Examples: Collected pills, obtained a gun, gave away valuables, wrote a will or suicide note, took out pills but didn’t swallow any, held a gun but changed your mind or it was grabbed from your hand, went to the roof but didn’t jump; or actually took pills, tried to shoot yourself, cut yourself, tried to hang yourself, etc.</p>			
	Mild suicide risk		
	Moderate suicide risk		
	Severe suicide risk		
<p>Source: Posner K., Brent D., Lucas C., Gould M., Stanley B., Brown G., et al. Columbia-suicide severity rating scale (C-SSRS). Screener with triage for primary health settings. The Research Foundation for Mental Hygiene, Inc. 2008. Available from: <a href="http://cssrs.columbia.edu/the-columbia-scale-c-srs/cssrs-for-communities-and-healthcare/#filter=.general-use.english">http://cssrs.columbia.edu/the-columbia-scale-c-srs/cssrs-for-communities-and-healthcare/#filter=.general-use.english</a> Free PDF download.</p>			

**Table 4.** Suicide risk assessment scales that may be suitable for primary care settings: advantages and disadvantages

Scale	Advantages	Disadvantages
1.SAD PERSONS scale[11][13][14][18][19][23]	Brief Does not require training Free Easy to remember Includes recommended interventions based on score.	Does not predict suicide attempt or suicide. Considers environmental/contextual risk factors that are not necessarily associated with suicidal intent. Overestimates suicide risk and the need for hospitalization.
2. Beck's Hopelessness Scale[11][12][13][14][16][19]	Multiple websites provide tools for rapid calculation of the score and estimation of suicide risk. Quick to administer.	Must be administered by trained personnel. Variable sensitivity and specificity. Poor predictive power. Hopelessness is a risk factor only (not an indicator of suicide ideation or attempt).
3.Beck's Scale for Suicide Ideation[11][12][15][17][19][34]	Comes close to measuring suicide ideation. Quick to administer.	Must be administered by trained personnel.. Measurement is more characterological than categorical. Poor predictive power. No cutoff points to allow for classification of risk and/or recommendations of specific interventions). Tends to overestimate risk.
4.Columbia–Suicide Severity Rating Scale (C-SSRS)[11][12][17][25][22][35][37][38]	Considered by some as the “gold standard” for evaluating suicide risk. Predictive in both adolescents and adults. Has short (screening) version designed for use in primary care. Validated for the Latin American population. Easy to access. Can be administered by non-specialist staff. Includes suggested interventions based on score. Validada en población adolescente y adulto joven hispano hablante (Argentina).	Controversial because it does not measure the full spectrum of suicide (e.g., ideation and behavior). Still being validated in Chile.

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