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Twelve Month Prevalence of and Risk Factors for Suicide Attempts in the WHO World Mental Health Surveys

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Abstract

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Objective—Although suicide is a leading cause of death worldwide, clinicians and researchers lack a data-driven method to assess the risk of suicide attempts. This study reports the results of an analysis of a large cross-national epidemiological survey database that estimates the 12-month prevalence of suicidal behaviors, identifies risk factors for suicide attempts, and combines these factors to create a risk index for 12-month suicide attempts separately for developed and developing countries.

Method—Data come from the WHO World Mental Health (WMH) Surveys (conducted 2001–2007) in which 108,705 adults from 21 countries were interviewed using the WHO Composite International Diagnostic Interview (CIDI). The survey assessed suicidal behaviors and potential risk factors across multiple domains including: socio-demographics, parent psychopathology, childhood adversities, DSM-IV disorders, and history of suicidal behavior.

Results—Twelve-month prevalence estimates of suicide ideation, plans and attempts are 2.0%, 0.6% and 0.3% respectively for developed countries and 2.1%, 0.7% and 0.4% for developing countries. Risk factors for suicidal behaviors in both developed and developing countries include: female sex, younger age, lower education and income, unmarried status, unemployment, parent psychopathology, childhood adversities, and presence of diverse 12-month DSM-IV mental disorders. Combining risk factors from multiple domains produced risk indices that accurately predicted 12-month suicide attempts in both developed and developing countries (AUC=.74–.80).

Conclusion—Suicidal behaviors occur at similar rates in both developed and developing countries. Risk indices assessing multiple domains can predict suicide attempts with fairly good accuracy and may be useful in aiding clinicians in the prediction of these behaviors.

Keywords

suicide; risk factors; prediction; assessment; World Mental Health Survey

INTRODUCTION

Approximately 9% of people report having serious thoughts of suicide at some point in their lives and 3% actually make a suicide attempt.^{1, 2} Although most suicide attempts do not result in death, each attempt carries a chance of serious long-term physical injury, is associated with significant psychological suffering, and increases the likelihood of subsequent suicide attempts and death.^{3–5} As a result, the accurate prediction of suicide attempts is of critical importance to clinicians.

Unfortunately, although many studies have identified risk factors for suicidal behaviors,^{1, 6–10} this information has not led to a reduction in the rate of suicide or suicidal behaviors.^{2, 11} Several obstacles have prevented the translation of these findings for use in clinical settings—a high priority for clinical science.^{12, 13} First, most prior studies have used relatively small and selective samples (e.g., college students, psychiatric inpatients) and have focused on long-term prediction (5–20 years) rather than short-term risk—raising questions about the generality and clinical utility of the identified risk factors. Second, most studies have identified risk factors for suicidal thoughts or attempts, but not what factors predict which suicide ideators will make a suicide attempt. This is an important concern for clinicians who often must predict not who in the general population will make a suicide attempt, but which of their clients with suicidal thoughts will make a suicide attempt in the coming days, weeks, or months. Third, many risk factors identified in prior studies cannot be feasibly assessed in clinical settings, such as diagnoses obtained from semi-structured interviews or the results of extensive self-report questionnaires.^{6, 8, 10} Fourth, prior studies have identified individual risk factors but have not yielded a method of combining risk factors to derive a single measure of the short-term (e.g., 12-month) risk of a suicide attempt. More specifically, prior

research has shown that suicide attempts are predicted by specific demographic factors,^{1, 14–16} family history factors,^{17, 18} childhood adversities,^{19–21} psychiatric disorders,^{7, 8, 22–26} and past history of suicidal behaviors.^{27, 28} However, this research has not yet provided clinicians with a method of systematically assessing these factors and using the resulting information to estimate the level of risk associated with their presence.

The primary goals of this study were to identify risk factors for 12-month suicide attempts and to use this information to develop a clinically useful method of predicting suicide attempts that addresses many of the limitations noted in prior work on this problem. Data are from the World Health Organization (WHO) World Mental Health (WMH) Survey Initiative, the size and scope of which provide a unique opportunity to carefully examine this low base-rate behavior. We report here on the 12-month prevalence of suicide ideation, plans, and attempts across these countries, and on the risk factors for 12-month suicide attempts among those with suicide ideation. We use a data-driven actuarial approach similar to that used successfully to develop prediction models for violent behavior^{29–33} and most recently to predict 12-month suicide attempts among US respondents.³⁴ As in that earlier work, our goal was to develop a risk index that clinicians can use to quickly and easily assess the risk of 12-month suicide attempts. The use of such risk indices has the additional advantage of estimating risk without asking directly about the behavior being predicted—as is done in approaches that rely on the endorsement of critical items—and so can be especially useful when assessing the likelihood of sensitive behaviors such as suicidal thoughts and attempts.

METHOD

Respondent Samples

The WMH surveys were carried out in 10 countries classified by the World Bank²⁰ as developed (Belgium, France, Germany, Israel, Italy, Japan, Netherlands, New Zealand, Spain, and United States) and 11 countries classified as developing (Brazil, Bulgaria, Colombia, India, Lebanon, Mexico, Nigeria, People's Republic of China, Romania, South Africa, and Ukraine) (see Table 1). All surveys were conducted face-to-face by trained lay interviewers among multi-stage household probability samples and were completed between 2001 and 2007. The total sample size was 108,705, with individual country sample sizes ranging from 2,357 in Romania to 12,790 in New Zealand. The weighted average response rate across all countries was 73.0%.

Procedures

All respondents completed a Part I interview that contained core diagnostic assessments, including the assessment of suicidal behaviors. All Part I respondents who met criteria for any disorder and a sub-sample of approximately 25% of other respondents were administered a Part II interview that assessed potential correlates and disorders of secondary interest. All respondents in Israel completed Part II. Data were weighted to adjust for differential sampling of Part I respondents into Part II, differential probabilities of selection within households, and to match samples to population socio-demographic distributions.

Standardized interviewer training procedures, WHO translation protocols for all study materials, and quality control procedures for interviewer and data accuracy were used in all WMH countries. These procedures are described in more detail elsewhere.³⁵ Informed consent was obtained before beginning interviews in all countries. Procedures for obtaining informed consent and protecting human subjects were approved and monitored for compliance by the Institutional Review Boards of the organizations coordinating the surveys in each country.

Measures of suicidal behaviors

Suicidal behaviors were assessed using Version 3.0 of the WMH Composite International Diagnostic Interview (CIDI).³⁶ The CIDI contains a module that assesses lifetime occurrence, age of onset, and recency of suicide ideation (“Have you ever seriously thought about committing suicide?”), plans (“Have you ever made a plan for committing suicide?”), and attempts (“Have you ever attempted suicide?”). Respondents who reported any of these experiences in the past 12 months are the focus of the current report. Based on evidence that reports of such experiences are higher in self-administered than interviewer-administered surveys,³⁷ responses to these questions were obtained in a self-administered booklet.

Risk factors for suicidal behaviors

We examined five sets of possible predictors of suicide attempts among ideators: socio-demographics, parental psychopathology, childhood adversities, respondent history of past suicidal behaviors, and 12-month respondent DSM-IV mental disorders. Each of these five has been found to predict suicide attempts in previous studies. The socio-demographics module assessed six previously documented predictors of suicide attempts: age, gender, education, family income, marital status, and employment.^{1, 14–16}

The measures of parental psychopathology included the five most commonly occurring disorders found in previous research to be associated with a wide range of suicidal behaviors^{17, 18}: major depressive episode, panic disorder, generalized anxiety disorder, substance dependence, and antisocial personality disorder. These parent disorders were assessed with respondent reports using the Family History Research Diagnostic Criteria (FH-RDC) Interview³⁸ and its expansion.³⁹ We also assessed parent history of attempted and completed suicides.

The childhood adversities included three broad classes that have been found to predict suicidal behaviors in previous studies:^{19–21} childhood losses (parental death, parental divorce, other major losses), indicators of childhood family dysfunction (parental criminal behavior, physical abuse, sexual abuse, family violence, economic adversity), and respondent serious physical illness. These childhood adversities were assessed with measures developed for the US National Comorbidity Survey.⁴⁰

The measures of past suicidal behaviors, which have consistently been found to predict future suicide attempts,^{27, 28} include information about history of ideation, plans and attempt. Respondent 12-month DSM-IV disorders, finally, were assessed using Version 3.0 of the WMH Composite International Diagnostic Interview (CIDI)³⁶ a fully-structured research diagnostic interview. The assessment included the vast majority of the disorders documented to predict suicide attempts in previous studies,^{7, 8, 22–26} including anxiety disorders (panic disorder, agoraphobia without a history of panic disorder, generalized anxiety disorder, specific phobia, social phobia, post-traumatic stress disorder, adult separation anxiety disorder), mood disorders (major depressive disorder, dysthymic disorder, bipolar disorder), externalizing disorders (adult attention-deficit/hyperactivity disorder, oppositional-defiant disorder, conduct disorder, intermittent explosive disorder), and substance disorders (alcohol and illegal drug abuse and dependence). Clinical reappraisal studies carried out in conjunction with a number of WMH surveys documented generally good concordance between DSM-IV diagnoses based on the CIDI and diagnoses based on blinded clinical reappraisal interviews with the Structured Clinical Interview for DSM-IV⁴¹ in probability sub-samples of WMH respondents.⁴² Organic exclusion rules and diagnostic hierarchy rules were used in making all respondent diagnoses.

Statistical analyses

We examined 12-month prevalence of ideation, plans and attempts using cross-tabulations. We then estimated the associations between hypothesized correlates of suicide ideation and, among ideators, planned and unplanned suicide attempts using bivariate and multivariate logistic regression analysis.⁴³ Logistic regression coefficients and 95% confidence intervals (CIs) were converted to odd ratios (ORs) for ease of interpretation. Continuous variables were divided into categories to minimize effects of extreme values. Categories were collapsed to stabilize associations when ORs did not differ meaningfully. Standard errors and significance tests were estimated with the Taylor series method⁴⁴ using SUDAAN software⁴⁵ to adjust for design effects. Multivariate significance was evaluated with Wald chi square tests based on design-corrected coefficient variance–covariance matrices. Statistical significance was evaluated with two-tailed, 0.05-level tests.

After identifying significant risk factors a summary risk index was constructed for planned and unplanned suicide attempts separately for developed and developing countries. We began by combining the predictors that had ORs over 2 or under 0.5 in the earlier bivariate models into new multivariate models. These models included statistical controls for country, age, and age squared in order to ensure that effects were not explained by these factors. The predictors that continued to have ORs above 2 or below 0.5 in the multivariate models were used to create the index by constructing a predicted probability of the outcome from a version of the multivariate model that contained only these predictors. This distribution of predicted probabilities was then inspected and divided into strata using the logic of stratum-specific likelihood ratios (SSLRs).⁴⁶ That is, we divided the distribution into strata large enough to find statistically significant monotonic relationships between all contiguous pairs of strata. Three measures of screening scale performance were then calculated for each stratum: positive predictive value (PPV; the proportion of the respondents in the stratum who made an attempt), sensitivity (SENS; the proportion of all attempters who were in the stratum), and specificity (SPEC; the proportion of all non-attempters who were in the stratum). We also calculated area under the receiver operator characteristic curve (AUC),⁴⁷ a summary measure of prediction accuracy that, unlike the more familiar Cohen's κ ,⁴⁸ is not influenced by marginal distributions.⁴⁹

RESULTS

Prevalence

Each type of suicidal behavior assessed occurs at a slightly higher rate in developing than in developed countries. More specifically, estimates of the 12-month prevalence of suicide ideation, plans and attempts are 2.0, 0.6, and 0.3%, respectively, for developed countries and 2.1, 0.7 and 0.4% for developing countries (Table 2). Overall, roughly one-third of 12-month ideators develop a suicide plan, and this proportion is significantly higher in developing than developed countries (34.1% vs. 28.9%, $\chi^2_1 = 4.6$, $p = .032$). A slightly lower percentage of 12-month ideators make a suicide attempt, and this proportion is also higher in developing than developed countries (20.2% vs. 15.1%, $\chi^2_1 = 6.1$, $p = .001$). Developing countries also have a higher prevalence of attempts among ideators with a suicide plan (41.8% vs. 32.6%, $\chi^2_1 = 4.0$, $p = .046$) and a non-significantly higher prevalence of attempts among ideators without a plan (9.0% vs. 8.0%, $\chi^2_1 = 0.3$, $p = .59$). Despite this low rate of unplanned suicide attempts, it is important to note that unplanned (presumably impulsive) attempts constitute 37.7% of all attempts in developed countries and 29.4% in developing countries.

Risk factors for 12-month suicide attempts among ideators

Suicide ideation is significantly more prevalent among women than men in both developed (2.2% vs. 1.7%, $\chi^2_1 = 12.5$, $p < .001$) and developing (2.4% vs. 1.6%, $\chi^2_1 = 25.1$, $p < .001$) countries. Suicide plans are significantly more common among women than men in developing (0.8% vs. 0.6%, $\chi^2_1 = 7.0$, $p = .008$), but not developed, countries. Gender differences in the prevalence of attempts are not significant in either developed or developing countries. Overall, few socio-demographics variables were associated with suicide attempts among ideators. Specifically, in developed countries, younger age (i.e., <50 years-old) predicted unplanned attempts among ideators and unemployment predicted planned attempts. In developing countries, being a student predicted unplanned attempts and unemployment again predicted planned attempts. The bivariate ORs of these significant predictors were in the range 2.4–9.4. (Detailed results are not reported, but are available on request.)

Parental psychopathology and other childhood family adversities were found to be consistently significant predictors of 12-month suicide ideation in both developed and developing countries, with ORs in the range 1.6–4.8 (Median: 2.7; Inter-quartile range [IQR]: 2.1–3.1). (Detailed results are not presented, but are available on request.) However, few of these measures significantly predicted either planned or unplanned suicide attempts among ideators (Table 3). In developed countries, childhood physical abuse predicted both planned and unplanned attempts, whereas sexual abuse predicted only planned suicide attempts, and childhood neglect and family violence predicted unplanned attempts. In developing countries, none of the 16 parental psychopathologies or childhood adversities considered in the analysis predicted planned attempts, while parental generalized anxiety disorder was the only significant predictor of unplanned attempts. The bivariate ORs of these significant predictors were in the range 2.3–4.4.

Respondent 12-month DSM-IV disorders were strong predictors of 12-month suicide ideation in both developed and developing countries. Virtually all of the 16 disorders considered were significant predictors of ideation, with ORs in the range 3.3–15.3 (Median: 7.1; Inter-quartile range: 4.9–9.1). (Detailed results are not presented, but are available on request.) However, few of these disorders significantly predicted suicide attempts among ideators (Table 4). In developed countries, specific phobia (OR=2.6) and conduct disorder (OR=16.4) were the only disorders that predicted planned suicide attempts, while none predicted unplanned attempts. In developing countries, panic disorder (OR=3.9), conduct disorder (OR=10.0), and drug abuse-dependence (OR=7.3) were the only disorders that predicted planned attempts positively. Generalized anxiety disorder was associated with a significantly *reduced* risk of making a planned attempt (OR=0.3). Adult separation anxiety disorder was the only disorder the predicted unplanned attempts positively (OR=4.0), while generalized anxiety disorder was associated with a significantly reduced risk of making an unplanned attempt (OR=0.0). The bivariate ORs of the significant positive predictors were in the range 2.6–16.4, although it should be noted that the confidence intervals for the higher ORs were quite wide because of the comparative rarity of the predictor disorders.

History of prior suicidality was significantly associated with highly elevated odds of 12-month suicide ideation in both developed and developing countries, with bivariate ORs in the range 28.4–48.2. (Detailed results are not presented, but are available on request.) However, the ORs were less extreme and also more varied in predicting suicide attempts among ideators (Table 5). Three results are noteworthy. First, 12-month ideators with a past history of ideation in the absence of a lifetime plan or attempt were significantly *less* likely to make a first attempt in the 12 months before interview than were 12-month ideators with no prior history of suicide ideation. This pattern was found both in developed and developing countries, with ORs in the range 0.1–0.2. Similarly, 12-month ideators with a

prior history of a suicide plan but no prior attempt were significantly *less* likely to make a planned attempt in the 12 months before the interview than were 12-month ideators with no prior plan. Second, 12-month ideators with a history of prior unplanned (i.e., impulsive) attempts in both developed and developing countries have significantly elevated odds of an unplanned attempt (ORs=6.2–9.3) but not a planned attempt (ORs=1.3–2.7) than those with no prior history. Third, 12-month ideators with a history of prior planned attempts have modestly elevated odds of planned attempts in developed countries (OR=1.8) and of both planned and unplanned attempts in developing countries (ORs=1.7–1.8), although none of these associations is statistically significant. Taken together, these findings indicate that the presence of prior ideation and plans in the absence of a suicide attempt are associated with decreased likelihood of acting on suicide ideation in the prior 12 months; whereas the presence of a prior suicide attempt is associated with increased odds of acting on suicide ideation in the prior 12 months—with evidence of specificity such that those with unplanned attempts have a higher odds of subsequent unplanned attempts and those with planned attempts have a higher odds of subsequent planned attempts.

Summary risk index for 12-month suicide attempt among ideators

The summary risk indices, which are made up of the significant predictors from multivariate versions of the foregoing equations, have AUCs in the range of 74.0–79.7 across the four outcomes (i.e., planned and unplanned attempts in both developed and developing countries; Table 6). This means that a randomly selected suicide attempter could be distinguished from a randomly selected non-attempter with 74.0–79.7% accuracy based on their comparative scores on these risk indices—demonstrating a relatively high level of precision. The two indices for planned attempts are consistent across countries in that roughly half of planned attempts (sensitivity: 45.4–51.3%) were made by the roughly one-third to one-fourth of respondents classified as having the highest risk in both developed and developing countries (22.1–31.2%), while fewer than 10% of planned attempts were made by the roughly one-third to one-fourth of respondents classified as having low risk (27.2–34.8%). Stated differently, roughly two-thirds of respondents classified by the risk indices as having the highest risk made attempts (positive predictive value: 66.8–68.7%). The two indices for unplanned attempts have smaller proportions of respondents classified as having highest risk than the indices for planned attempts (3.6–11.6%), lower proportions of attempts made by people classified at highest risk (21.0–49.9%), and smaller proportions of respondents classified at highest risk who made attempts (38.5–46.9%). (Final versions of each risk index are available upon request.)

Even with a dataset as large as the one used here, the low 12-month prevalence of suicide attempts made it impossible to develop stable risk indices separately for each participating country. However, in order to get a rough indication of the performance of the summary risk indices in particular countries we calculated AUCs to assess concordance between predicted probability of an attempt and actual attempts. The predicted probability estimates were generated from separate equations for planned and unplanned attempts in developed and developing countries. Borrowing standard verbal descriptors used to characterize the strength of κ ,⁵⁰ the AUC estimates were substantial (>.80) for nearly 30% of the replications, moderate (>.70–.80) for an additional 25% of replications, and fair for another 25%. Prediction accuracy was considerably greater, though, in developed countries (nearly 50% substantial and 70% either moderate or substantial) than developing countries (less than 20% substantial and 40% either moderate or substantial) and somewhat greater for planned attempts (nearly one-third substantial and nearly 60% either moderate or substantial) than unplanned attempts (about one-fourth substantial and nearly 50% either moderate or substantial). (Detailed results are available on request.)

DISCUSSION

This study documented three noteworthy results. First, we provided estimates of the 12-month prevalence of suicidal behaviors among adults (18+ years-old) in 21 countries. A recent review of studies on the 12-month prevalence of suicidal behaviors reported widely-varying estimates found in prior studies.² The estimates obtained in the current study were in the lower end of these ranges for each suicidal behavior. This was most likely the result of two features of our study: we used conservative items for the assessment of each suicidal behavior (e.g., presence of suicide ideation required that a person have “seriously” thought about committing suicide rather than having merely “thoughts of death” as in some prior studies), and we used large representative samples of respondents from the general population (i.e., rather than small selective samples that may be at higher risk for suicidal behaviors, such as young adults or those in a clinical setting). Although it has been suggested that suicidal behaviors may differ between developed and developing countries,⁵¹⁻⁵² consistent with our prior report on the cross-national lifetime prevalence of suicidal behaviors¹ we found no differences in 12-month prevalence between developed and developing countries. The prevalence estimates for suicide attempts documented in this study complement cross-national data on suicide mortality maintained by the WHO⁵³ and suggest that across the countries examined here there are approximately 14.6 suicide attempts for every one suicide death (Median ratio: 14.6; IQR: 9.1–53.7)—a ratio consistent with those documented in prior reports.^{54, 55}

Second, we identified risk factors for 12-month suicidal behaviors across both developed and developing countries. Replicating the results of prior studies, female sex, younger age, lower education and income, unmarried status, unemployment, parent psychopathology, childhood adversities, the presence of every mental disorder assessed, and psychiatric comorbidity all emerged as significant risk factors for suicidal behaviors in this study.^{7, 56-58} Interestingly, analyses revealed that most of these factors are associated with suicide attempts because they are predictive of suicide ideation even though they do not significantly predict the occurrence of suicide attempts among those with suicide ideation. For instance, although the presence of a DSM-IV mental disorder was associated with significantly higher odds of experiencing suicide ideation in virtually every instance, few mental disorders predicted suicide attempts among those with ideation. Among those few disorders, conduct disorder emerged as the strongest and most consistent predictor of suicide attempts, with anxiety and substance use disorders also showing significant results in several instances. These findings are consistent with those from a recent study of the prediction of lifetime suicide attempts¹ and suggest that disorders characterized by impulse-control and anxiety may be most important in predicting the transition from suicidal thoughts to suicide attempts.

Our analyses also add to the growing literature on the importance of prior history of suicidal behaviors in predicting subsequent suicide attempts.^{27, 28, 59} The current study extends earlier work on this topic by differentiating two processes involved in the transition from suicidal thoughts to attempts. In line with prior findings, a history of prior suicide attempt was found to be strongly predictive of 12-month suicide attempts.^{28, 34, 60} Our analysis adds to prior research by showing specificity in this process, though, such that a history of unplanned (impulsive) suicide attempts predicts subsequent unplanned attempts (but not planned ones), while a history of planned attempts predicts subsequent planned attempts (but not unplanned ones). This is an important specification for clinicians working with potentially suicidal patients, especially patients with a history of unplanned suicide attempts.

We also found that risk of the transition from suicidal thoughts to attempts was significantly *lower* among those who had thought of suicide in the past but never made an attempt than

even among those who had never had suicidal thoughts before the past 12 months. This intriguing result, coupled with the earlier finding that more than 60% of the transitions from suicide ideation to attempt occur in the first year after onset of ideation,¹ suggests that resisting the urge to make a suicide attempt when suicidal thoughts first occur is associated with decreased risk of acting on these thoughts when they return. An important next step is to study people with a history of ideation who never made a suicide attempt in greater detail in an effort to understand what characterizes such people (e.g., good impulse control, low severity of suicide ideation) and what strategies they use to resist the urge to make a suicide attempt. Importantly, these findings should not be interpreted to mean that those who have thought about suicide in the past but not made an attempt are not at risk of making a future suicide attempt, but only that evidence of not having made a previous attempt despite having suicide ideation is a predictor of low risk of future attempts compared to people with more recent first onset of ideation. It is important for clinicians to conduct a thorough risk assessment with each patient encountered and to use ongoing monitoring of suicide risk.^{61–63}

Third and perhaps most important, we developed risk factor indices for 12-month suicide attempts tailored for planned versus unplanned attempts and with versions available for both developed and developing countries. Although only a handful of factors emerged as predictors of suicide attempts among ideators, our analyses revealed that all four summary risk indices using these factors showed good discrimination properties (as evidenced by moderate to substantial AUCs of .74–.80) in the total sample that also performed quite well when applied to most developed countries and to a substantial minority of developing countries. These results suggest that the indices might prove useful in predicting suicide attempts in clinical settings; however, this remains an important question for future study. Although suicide prevention programs that include a focus on screening in order to identify people at elevated risk for suicide are among the only prevention programs that have shown an ability to decrease the rate of suicide death,⁶⁴ such programs are not used in most clinical settings. What has been lacking is an empirically derived screening instrument that can be feasibly used in clinical settings to assess key risk factors and determine a person's level of risk for suicide attempt. Although it will be important to test the prospective predictive ability of these indices in actual clinical settings, the risk indices developed in this study represent an important initial step toward bridging the gap between the science and practice of suicide risk assessment.

Several additional features of the risk indices developed here warrant further comment. First, our risk indices had strong correlations with planned and unplanned attempts among suicide ideators from a large and heterogeneous set of developed and developing countries, suggesting these indices may have good generality in the prediction of suicide attempts—and indirectly supporting the cross-cultural validity of the WMH-CIDI measure used to assess these risk factors. Second, the performance of our risk indices was only slightly lower than the one developed using a much more homogenous sample³⁴ and is similar to the AUC reported among a selective group of psychiatric patients.⁶⁵ Our results also suggest that we may be able to predict suicide attempts with the same level of accuracy possible in other areas of medicine in which actuarial approaches that combine risk factors from multiple domains have proven more accurate than clinical prediction, such as in the prediction of violence and sexual offending^{30, 66} and the prediction of death from natural causes among the elderly.⁶⁷ Third, and finally, it is important to note that these indices are not intended to serve as a comprehensive suicide assessment by themselves, but instead may be best used to identify those at high risk for suicide attempt so that they can receive a more focused, in-depth assessment of current risk for suicidal behavior.

The results of this study should be interpreted with four important limitations in mind. First, our analysis was based on retrospective self-reports. This concern is limited somewhat by our focus on suicide attempts in only the past 12-months; however, it is possible that time-varying risk factors (e.g., marital status, income) reported for the past 12-months may have changed after respondents' suicide attempts. Retrospective recall of childhood adversities and parental psychopathology might have been influenced by respondents' current mood or recent suicide attempt.^{68, 69} Given these issues, these results should be considered preliminary until the risk indices developed are cross-validated prospectively. Second, although the overall response rate was at an acceptable level, response rates varied across countries and in some cases were below commonly accepted standards. We controlled for differential response using post-stratification adjustments, but it is possible that response rates were related to the presence of suicidal behaviors or mental disorders, which could have biased cross-national comparisons. Third, there may have been cross-national differences in the willingness to report on suicidal behaviors and in the interpretation of items assessing risk factors. Significant efforts were dedicated to carefully translating and back-translating the WHO-CIDI used in this study in order to minimize such concerns;³⁶ however, differences in factors such as the stigma about suicide and childhood maltreatment are likely to persist cross-nationally despite these efforts. Fourth, although we examined a broad set of potential risk factors, many important factors were not included in this study. Psychotic disorders, although known to be associated with suicidal behavior, were not assessed because prior studies have shown that they are dramatically overestimated using structured interviews such as the WMH-CIDI.^{70, 71} We also did not include many family history (e.g., history of schizophrenia or bipolar disorder), psychological (e.g., hopelessness), social (e.g., lack of social support) or biological (e.g., serotonergic functioning) factors known to be associated with suicidal behaviors. Any one study cannot assess all such factors; however, the limited focus used is important to bear in mind when interpreting the results.

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Table 1

WMH Sample characteristics - Developed and developing countries

I. Developed	Country	Survey ¹	Sample Characteristics ²	Field Dates	Age Range	Age		Part I		Part II		Response Rate ³
						Mean	SE	n	n	n	n	
	Belgium	ESEMeD	Stratified multistage clustered probability sample of individuals residing in households from the national register of Belgium residents. NR	2001-2	18+	47.0	0.4	2419	1043	486	486	50.6
	France	ESEMeD	Stratified multistage clustered sample of working telephone numbers merged with a reverse directory (for listed numbers). Initial recruitment was by telephone, with supplemental in-person recruitment in households with listed numbers. NR	2001-2	18+	46.8	0.4	2894	1436	727	727	45.9
	Germany	ESEMeD	Stratified multistage clustered probability sample of individuals from community resident registries. NR	2002-3	18+	48.0	0.5	3555	1323	621	621	57.8
	Israel	NHS	Stratified multistage clustered area probability sample of individuals from a national resident register. NR	2002-4	21+	44.4	0.1	4859	--	--	--	72.6
	Italy	ESEMeD	Stratified multistage clustered probability sample of individuals from municipality resident registries. NR	2001-2	18+	47.5	0.4	4712	1779	853	853	71.3
	Japan	WMHJ2002-2006	Un-clustered two-stage probability sample of individuals residing in households in nine metropolitan areas (Fukuiage, Higashi-ichiki, Ichiki, Kushikino, Nagasaki, Okayama, Sano, Tamano, Tendo, and Tochigi)	2002-6	20+	51.2	0.3	3417	1305	425	425	59.2
	Netherlands	ESEMeD	Stratified multistage clustered probability sample of individuals residing in households that are listed in municipal postal registries. NR	2002-3	18+	45.3	0.4	2372	1094	516	516	56.4
	New Zealand	NZMHS	Stratified multistage clustered area probability sample of household residents. NR	2004-5	18+	44.6	0.3	12790	7435	--	--	73.3
	Spain	ESEMeD	Stratified multistage clustered area probability sample of household residents. NR	2001-2	18+	45.7	0.3	5473	2121	960	960	78.6
	United States	NCS-R	Stratified multistage clustered area probability sample of household residents. NR	2002-3	18+	44.8	0.4	9282	5692	3197	3197	70.9
II. Developing												
	Brazil	São Paulo Megacity	Stratified multistage clustered area probability sample of household residents in	2005-7	18+	39.1	0.2	5037	2942	--	--	81.3

I. Developed	Country	Survey ¹	Sample Characteristics ²	Field Dates	Age Range	Sample Size				Response Rate ⁵	
						Age	Part I	Part II	Part II and Age ≤ 44 ⁴		
						Mean	SE	n	n	n	
			the São Paulo metropolitan area.								
	Bulgaria	NSHS	Stratified multistage clustered area probability sample of household residents. NR	2003-7	18+	47.6	0.3	5318	2233	741	72.0
	Colombia	NSMH	Stratified multistage clustered area probability sample of household residents in all urban areas of the country (approximately 73% of the total national population)	2003	18-65	36.8	0.3	4426	2381	1731	87.7
	India	WMHI	Stratified multistage clustered area probability sample of household residents in Pondicherry region. NR	2003-5	18+	38.1	0.4	2992	1373	642	98.6
	Lebanon	LEBANON	Stratified multistage clustered area probability sample of household residents. NR	2002-3	18+	39.5	0.4	2857	1031	595	70
	Mexico	M-NCS	Stratified multistage clustered area probability sample of household residents in all urban areas of the country (approximately 75% of the total national population).	2001-2	18-65	35.3	0.2	5782	2362	1736	76.6
	Nigeria	NSMHW	Stratified multistage clustered area probability sample of households in 21 of the 36 states in the country, representing 57% of the national population. The surveys were conducted in Yoruba, Igbo, Hausa and Efik languages.	2002-3	18+	35.8	0.2	6752	2143	1203	79.3
	PRC	B-WMH S-WMH	Stratified multistage clustered area probability sample of household residents in the Beijing and Shanghai metropolitan areas.	2002-3	18+	39.8	0.5	5201	1628	570	74.7
	PRC	Shenzhen	Stratified multistage clustered area probability sample of household residents and temporary residents in the Shenzhen area.	2006-7	18+	29.4	0.1	7134	2476	1993	80
	Romania	RMHS	Stratified multistage clustered area probability sample of household residents. NR	2005-6	18+	45.5	0.5	2357	--	--	70.9
	South Africa	SASH	Stratified multistage clustered area probability sample of household residents. NR	2003-4	18+	37.1	0.3	4351	--	--	87.1
	Ukraine	CMDPSD	Stratified multistage clustered area probability sample of household residents. NR	2002	18+	46.1	0.4	4725	1720	541	78.3

¹ ESEMeD (The European Study Of The Epidemiology Of Mental Disorders); NHS (Israel National Health Survey); WMH/2002-2006 (World Mental Health Japan Survey); NZMHS (New Zealand Mental Health Survey); NCS-R (The US National Comorbidity Survey Replication); NSHS (Bulgaria National Survey of Health and Stress); NSMH (The Colombian National Study of Mental Health); WMHI

(World Mental Health India); LEBANON (Lebanese Evaluation of the Burden of Ailments and Needs of the Nation); M-NCS (The Mexico National Comorbidity Survey); NSMHW (The Nigerian Survey of Mental Health and Wellbeing); B-WMH (The Beijing World Mental Health Survey); S-WMH (The Shanghai World Mental Health Survey); RMHS (Romania Mental Health Survey); SASH (South Africa Stress and Health Study); CMDPSD (Comorbid Mental Disorders during Periods of Social Disruption);

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² Most WMH surveys are based on stratified multistage clustered area probability household samples in which samples of areas equivalent to counties or municipalities in the US were selected in the first stage followed by one or more subsequent stages of geographic sampling (e.g., towns within counties, blocks within towns, households within blocks) to arrive at a sample of households, in each of which a listing of household members was created and one or two people were selected from this listing to be interviewed. No substitution was allowed when the originally sampled household resident could not be interviewed. These household samples were selected from Census area data in all countries other than France (where telephone directories were used to select households) and the Netherlands (where postal registries were used to select households). Several WMH surveys (Belgium, Germany, Italy) used municipal resident registries to select respondents without listing households. The Japanese sample is the only totally un-clustered sample, with households randomly selected in each of the four sample areas and one random respondent selected in each sample household. 16 of the 22 surveys are based on nationally representative (NR) household samples, while two others are based on nationally representative household samples in urbanized areas (Colombia, Mexico).

³ The response rate is calculated as the ratio of the number of households in which an interview was completed to the number of households originally sampled, excluding from the denominator households known not to be eligible either because of being vacant at the time of initial contact or because the residents were unable to speak the designated languages of the survey.

⁴ Brazil, Israel, New Zealand, Romania, and South Africa did not have an age restricted Part II sample. All other countries, with the exception of India, Nigeria, People's Republic of China, and Ukraine (which were age restricted to ≤ 39) were age restricted to ≤ 44 .

⁵ The weighted average response rate is 73%.

Table 2

Twelve-month prevalence of suicide ideation, plans, and attempts in the WMH surveys

	In the total sample						Among 12-month ideators							
	Ideation		Plan		Attempt		Plan		Attempt		Attempt/Plan		Attempt/No plan	
	%	(se)	%	(se)	%	(se)	%	(se)	%	(se)	%	(se)	%	(se)
I. Developed countries														
Female	2.2	(0.1)	0.6	(0.1)	0.3	(0.0)	27.4	(2.1)	14.6	(1.6)	34.6	(3.8)	7.0	(1.4)
Male	1.7	(0.1)	0.5	(0.1)	0.3	(0.0)	31.0	(3.0)	15.8	(2.3)	30.0	(5.3)	9.4	(1.8)
Total	2.0*	(0.1)	0.6	(0.0)	0.3	(0.0)	28.9	(1.8)	15.1	(1.4)	32.6	(3.3)	8.0	(1.1)
(n) /	(1064/51,771)	(327/51,771)	(173/51,771)	(173/51,771)	(327/1064)	(173/1064)	(110/327)	(63/737)						
II. Developing countries														
Female	2.4	(0.1)	0.8	(0.1)	0.5	(0.0)	33.6	(2.0)	19.2	(1.6)	41.5	(3.6)	7.9	(1.4)
Male	1.6	(0.1)	0.6	(0.1)	0.4	(0.1)	34.8	(2.8)	21.7	(2.9)	42.2	(5.7)	10.7	(3.0)
Total	2.1*	(0.1)	0.7*	(0.0)	0.4	(0.0)	34.1	(1.6)	20.2	(1.4)	41.8	(3.2)	9.0	(1.4)
(n) /	(1197/56,893)	(414/56,893)	(236/56,893)	(236/1197)	(414/1197)	(236/1197)	(176/414)	(60/783)						

* Significant gender difference at the .05 level, two-sided test

l numerator n refers to the number of cases with each suicide outcome, denominator n refers to the number of cases in the total sample or in the conditional sample among ideators, ideators with a plan and ideators without a plan

Table 3

Bivariate associations of parental psychopathology and other childhood family adversities with 12-month suicide attempts among 12-month ideators in the WMH surveys¹

	Among 12-month ideators															
	Developed				Attempt/No plan				Developing							
	n	% (se)	OR	(95% CI)	n	% (se)	OR	(95% CI)	n	% (se)	OR	(95% CI)				
I. Parental psychopathology																
Parent Suicide	15	7.2 (1.9)	0.4	(0.1–2.0)	30	6.4 (1.4)	0.9	(0.1–6.9)	31	7.5 (1.5)	1.3	(0.4–3.9)	30	3.5 (0.8)	0.7	(0.1–3.2)
Parent Depression	23	6.7 (1.6)	2.1	(0.7–6.5)	26	3.5 (0.9)	0.5	(0.1–2.2)	27	5.8 (1.2)	1.0	(0.4–2.4)	31	4.5 (1.1)	2.8	(0.9–9.1)
Parent Panic	18	6.0 (1.4)	2.9	(0.8–10.0)	40	5.6 (1.1)	1.3	(0.3–5.3)	73	18.7 (2.3)	1.5	(0.7–3.3)	73	8.8 (1.3)	1.5	(0.5–4.4)
Parent GAD	20	6.4 (1.5)	1.4	(0.4–4.8)	31	4.2 (0.9)	1.1	(0.3–3.6)	31	6.5 (1.3)	1.1	(0.3–3.5)	36	5.3 (1.2)	3.5*	(1.1–11.4)
Parent Substance Abuse	17	5.9 (1.5)	0.6	(0.2–2.1)	40	4.9 (0.8)	2.1	(0.8–5.6)	59	13.1 (1.7)	0.9	(0.4–1.7)	86	9.7 (1.2)	0.5	(0.2–1.3)
Parent ASP	11	3.5 (1.1)	2.5	(0.7–9.6)	28	3.7 (0.7)	1.5	(0.6–3.6)	27	6.3 (1.4)	1.0	(0.4–2.7)	45	5.6 (1.0)	0.5	(0.1–2.1)
II. Other childhood family adversities																
Parent Death	20	6.0 (1.4)	0.8	(0.2–2.6)	49	6.1 (0.9)	1.5	(0.4–6.5)	82	17.8 (2.2)	1.3	(0.7–2.3)	109	13.4 (1.6)	0.6	(0.2–2.1)
Parent Divorce	19	9.3 (2.3)	2.7	(0.9–7.6)	60	10.1 (1.3)	0.8	(0.3–2.2)	29	6.3 (1.3)	1.2	(0.4–3.2)	48	5.9 (1.0)	0.3	(0.1–1.8)
Other Parent Loss	17	5.1 (1.3)	0.4	(0.1–1.5)	37	5.1 (1.0)	2.2	(0.5–8.9)	45	11.1 (1.8)	1.0	(0.3–2.9)	75	8.8 (1.2)	0.3	(0.1–1.5)
Parent Criminal	11	4.3 (1.4)	3.8	(0.8–18.6)	34	4.9 (0.7)	2.7	(0.7–10.0)	26	6.2 (1.4)	0.9	(0.3–2.5)	42	6.2 (1.0)	1.4	(0.3–5.5)
Physical abuse	101	27.9 (3.2)	2.3*	(1.2–4.5)	150	19.2 (1.8)	2.8*	(1.4–5.6)	125	28.7 (2.4)	1.1	(0.6–2.1)	169	19.8 (2.1)	1.0	(0.5–1.9)
Sexual abuse	67	18.6 (2.6)	2.3*	(1.1–4.7)	102	12.0 (1.5)	2.2	(0.8–6.0)	18	3.3 (0.9)	1.6	(0.4–6.8)	22	2.7 (0.7)	1.8	(0.5–6.6)
Neglect	23	8.9 (1.9)	2.0	(0.8–5.0)	23	3.4 (0.7)	4.4*	(1.1–17.3)	48	12.5 (2.1)	0.8	(0.3–1.9)	70	8.0 (1.2)	1.2	(0.4–3.8)
Physical Illness	25	7.3 (1.7)	1.8	(0.7–4.5)	53	6.4 (1.0)	1.8	(0.8–4.4)	22	5.7 (1.2)	1.4	(0.4–4.6)	32	4.5 (1.0)	2.1	(0.5–8.6)
Family violence	90	24.3 (3.0)	2.0	(0.9–4.0)	148	17.2 (1.6)	3.6*	(1.9–7.0)	73	17.1 (2.0)	1.4	(0.7–2.6)	100	11.1 (1.4)	1.0	(0.3–3.0)
Economic adversity	20	8.8 (2.3)	1.6	(0.6–4.7)	35	4.9 (0.9)	2.3	(0.6–9.1)	16	4.3 (1.4)	0.4	(0.1–1.3)	24	2.7 (0.6)	0.5	(0.1–4.8)

* Significant at the .05 level, two-sided test

¹ Based on logistic regression analysis controlling for country

Table 4
 Bivariate associations of 12-month DSM-IV/CIDI disorders with 12-month suicide attempts among 12-month ideators in the WMH surveys¹

	Among 12-month ideators															
	Developed				Attempt/No plan				Developing							
	n	% (se)	OR	(95% CI)	n	% (se)	OR	(95% CI)	n	% (se)	OR	(95% CI)				
I. Anxiety disorders																
Panic disorder	65	18.5 (2.3)	1.8	(0.9–3.6)	68	9.7 (1.6)	1.3	(0.6–3.1)	22	5.4 (1.3)	3.9*	(1.4–11.3)	28	3.1 (0.7)	3.3	(1.4–8.2)
Agoraphobia without panic	16	4.9 (1.4)	1.2	(0.4–4.0)	30	4.1 (0.9)	0.3	(0.0–1.9)	35	7.0 (1.4)	1.1	(0.5–2.5)	29	2.8 (0.6)	1.2	(0.3–4.2)
Generalized anxiety disorder	38	13.0 (2.5)	1.1	(0.5–2.6)	91	11.8 (1.4)	0.6	(0.2–1.6)	24	5.6 (1.3)	0.3*	(0.1–0.9)	34	4.1 (1.0)	0.0*	(0.0–0.0)*
Specific phobia	87	30.8 (3.6)	2.6*	(1.4–5.0)	144	20.2 (1.7)	1	(0.5–2.0)	78	23.5 (2.5)	0.8	(0.4–1.6)	116	16.3 (1.7)	1.0	(0.4–2.7)
Social phobia	91	33.7 (3.4)	0.9	(0.5–1.7)	139	20.6 (1.9)	1.4	(0.6–3.1)	40	9.5 (1.9)	0.9	(0.4–2.1)	52	6.5 (1.1)	0.8	(0.3–2.0)
Post-traumatic stress disorder	67	17.4 (2.3)	1.6	(0.8–3.2)	98	13.9 (1.8)	1.1	(0.5–2.7)	20	4.4 (0.9)	1.7	(0.4–7.4)	24	3.5 (0.8)	0.3	(0.1–1.3)
Adult separation anxiety disorder ³	14	13.3 (4.0)	1.2	(0.3–4.6)	29	8.9 (1.5)	1.4	(0.4–5.0)	29	10.2 (2.0)	1.2	(0.4–3.1)	28	5.6 (1.5)	4.0*	(1.1–15.0)
Any anxiety disorder	204	63.4 (3.3)	1.8	(0.9–3.7)	347	45.8 (2.2)	1.4	(0.7–2.7)	158	37.0 (2.7)	1.4	(0.8–2.4)	228	29.2 (2.0)	1.1	(0.6–2.4)
II. Mood disorders																
Major depressive disorder	150	50.0 (3.3)	0.9	(0.5–1.6)	253	34.1 (2.1)	1.6	(0.9–2.7)	157	33.3 (2.6)	1.1	(0.6–1.8)	191	25.2 (1.9)	1.6	(0.8–3.5)
Dysthymic disorder	28	12.3 (2.8)	1.1	(0.3–3.7)	43	5.4 (1.0)	0.3	(0.1–1.6)	21	5.2 (1.1)	1.0	(0.3–3.4)	18	2.3 (0.6)	2.2	(0.6–8.3)
Bipolar disorder	50	17.7 (2.5)	1.5	(0.8–3.0)	68	12.8 (1.9)	0.9	(0.3–2.3)	29	12.4 (2.4)	0.7	(0.3–1.5)	28	4.1 (1.0)	0.8	(0.2–2.9)
Any mood disorder	203	63.0 (3.3)	1.1	(0.6–2.0)	325	43.8 (2.3)	1.5	(0.9–2.6)	176	38.1 (2.7)	1.1	(0.7–1.9)	214	27.5 (1.9)	1.6	(0.8–3.4)
III. Externalizing disorders																
Attention-deficit hyperactivity disorder	15	10.7 (2.9)	1.3	(0.4–4.8)	16	5.4 (1.6)	1.2	(0.3–5.2)	6	1.8 (0.8)	0.2	(0.0–1.2)	4	0.6 (0.3)	3.3	(0.3–3.3)
Oppositional-defiant disorder	8	8.2 (2.8)	1.5	(0.3–6.7)	9	3.2 (1.2)	4.8	(0.9–25.2)	3	3.2 (2.4)	3.0	(0.3–30.5)	4	1.3 (0.7)	3.3	(0.3–3.3)
Conduct disorder	4	2.4 (1.4)	16.4*	(1.0–265.1)	4	1.1 (0.6)	8.7	(0.8–91.5)	6	2.1 (0.6)	10.0*	(1.0–96.1)	4	0.7 (0.4)	3.2	(0.4–23.5)
Intermittent explosive disorder	17	19.1 (4.1)	1.1	(0.3–4.0)	27	11.1 (2.3)	0.6	(0.1–3.3)	47	13.6 (2.1)	1.3	(0.6–2.6)	60	8.5 (1.3)	2.3	(0.8–6.4)
Any impulse-control disorder ³	34	22.9 (3.5)	1.3	(0.5–3.5)	44	12.7 (2.0)	1.3	(0.4–3.9)	55	14.4 (2.0)	1.3	(0.6–2.8)	68	8.5 (1.2)	1.6	(0.7–3.8)
IV. Substance use disorders																
Alcohol abuse or dependence	55	18.9 (2.6)	1.3	(0.6–2.7)	63	8.9 (1.2)	1	(0.3–2.8)	44	13.1 (2.6)	2	(0.9–4.4)	52	7.8 (1.2)	0.3	(0.1–1.6)
Illicit drug abuse or dependence	38	13.8 (2.8)	2.5	(0.8–7.7)	38	5.7 (1.1)	2	(0.7–5.9)	18	4.3 (1.2)	7.3*	(1.9–28.2)	19	3.5 (0.8)	3.3	(0.3–3.3)
Any substance use disorder	71	25.1 (3.1)	1.9	(0.8–4.5)	84	12.2 (1.4)	1.4	(0.6–3.4)	54	15.5 (2.7)	2.6*	(1.2–5.8)	62	9.6 (1.3)	0.3	(0.1–1.2)
V. Number of Disorders																
Any	266	80.7 (2.6)	1.3	(0.5–2.9)	490	65.8 (2.1)	1.2	(0.6–2.6)	280	65.8 (2.9)	2.2*	(1.1–4.4)	384	49.1 (2.2)	1.7	(0.8–3.7)

Table 5
 Multivariate association between respondent history of suicidality and 12-month suicide attempts among 12-month ideators in the WMH surveys[†]

	Among 12-month ideators															
	Developed						Developing									
	Attempt/Plan		Attempt/No plan		Attempt/Plan		Attempt/No plan		Attempt/Plan		Attempt/No plan					
n	% (se)	OR	(95% CI)	n	% (se)	OR	(95% CI)	n	% (se)	OR	(95% CI)					
History of ideation only	15	7.2 (2.3)	0.1*	(0.0-0.6)	372	50.5 (2.3)	0.2*	(0.1-0.6)	33	8.1 (1.6)	0.2*	(0.1-0.6)	338	43.4 (2.2)	0.6	(0.3-1.5)
History of ideation and plan only	29	8.9 (2.0)	0.1*	(0.1-0.3)	79	10.1 (1.3)	3.0	(1.0-9.3)	33	7.4 (1.5)	0.2*	(0.1-0.4)	78	9.4 (1.4)	0.5	(0.1-3.4)
History of ideation and unplanned attempt	112	36.3 (3.2)	1.3	(0.5-3.5)	61	7.3 (1.0)	6.2*	(2.6-14.6)	89	20.9 (2.5)	2.7	(1.0-7.2)	54	6.0 (1.0)	9.3*	(4.2-21.0)
History of ideation and planned attempt	137	39.4 (3.3)	1.8	(0.8-3.7)	82	11.6 (1.6)	0.8	(0.2-2.8)	133	32.7 (3.1)	1.8	(1.0-3.2)	71	8.6 (1.1)	1.7	(0.5-5.9)
No history of ideation, plan or attempt			1.0				1.0				1.0				1.0	

* Significant at the .05 level, two-sided test

[†] Based on multivariate logistic regression analysis controlling for country, age, age²

Table 6

Performance of summary risk indices for 12-month suicide attempt

I. Developed Countries					
a. Attempts/Plan					
	PPV ¹ (se)	Sens ² (se)	Spec ³ (se)	OR ⁴ (95% CI)	(n) ⁵
1	4.2 (1.8)	4.5(1.8)	49.5(4.2)	1.0(1.0–1.0)	(98)
2	23.1 (10.1)	4.9(2.3)	7.8(2.5)	7.4(1.8–30.8)	(22)
3	40.8 (5.0)	45.2(6.1)	31.8(3.4)	17.1(6.6–44.7)	(134)
4	66.8 (7.1)	45.4(6.4)	10.9(2.3)	55.5(18.9–163.3)	(73)
Total	32.6 (3.3)	100.0(0.0)	100.0(0.0)	$\chi^2_4 = 54.5(<.001)^*$	(327) ⁶
AUC 79.7					
b. Attempts/No Plan					
	PPV ¹ (se)	Sens ² (se)	Spec ³ (se)	OR ⁴ (95% CI)	(n) ⁵
1	0.0 (0.0)	0.0(0.0)	12.6(1.5)	-(---)	(93)
2	2.3 (0.8)	12.2(4.2)	44.8(2.4)	1.0 (1.0–1.0)	(310)
3	12.5 (2.2)	66.8(7.0)	40.5(2.4)	6.2 (2.8–13.8)	(303)
4	46.9 (9.4)	21.0(6.3)	2.1(0.5)	40.1(13.9–115.7)	(31)
Total	8.0 (1.1)	100.0(0.0)	100.0(0.0)	$\chi^2_4 = 48.1(<.001)^*$	(737) ⁷
AUC 76.9					
II. Developing Countries					
a. Attempts/Plan					
	PPV ¹ (se)	Sens ² (se)	Spec ³ (se)	OR ⁴ (95% CI)	(n) ⁵
1	12.1 (3.3)	7.9(2.2)	41.0(3.7)	1.0(1.0–1.0)	(114)
2	41.0 (4.3)	40.8(4.5)	42.2(3.6)	4.6(2.2–9.7)	(177)
3	68.7 (5.0)	51.3(4.8)	16.8(2.7)	16.4(7.6–35.4)	(123)
Total	41.8 (3.2)	100.0(0.0)	100.0(0.0)	$\chi^2_4 = 52.7(<.001)^*$	(414) ⁸
AUC 74.0					
b. Attempts/No Plan					

	PPV ₁ (se)	Sens ₂ (se)	Spec ₃ (se)	OR ⁴ (95% CI)	(n) ⁵
1	4.0 (1.0)	29.8(6.9)	70.5(2.0)	1.0(1.0–1.0)	(523)
2	8.4 (2.1)	20.3(5.3)	21.7(1.9)	1.9(0.9–4.2)	(179)
3	38.5 (7.9)	49.9(8.6)	7.9(1.2)	18.8(8.4–42.1)	(81)
Total	9.0 (1.4)	100.0(0.0)	100.0(0.0)	$\chi^2_4 = 53.9(<.0001)$ *	(783) ⁹

AUC 74.9

* Significance at 0.05 level

¹ Percent with attempts among each row category

² Sensitivity: out of those that had an attempt, % of each row category

³ Specificity: out of those that did not have an attempt, % of each row category

⁴ Significance tests control for countries, predicting 12-mo attempt with categorical risk factor levels.

⁵ Number of cases in each row category

⁶ Among ideators with a plan in developed countries

⁷ Among ideators without a plan in developed countries

⁸ Among ideators with a plan in developing countries

⁹ Among ideators without a plan in developing countries

Appendix Table 1

Risk factors included in the summary risk indices

I. Planned attempt developed

Psychiatric disorders: specific phobia, conduct, drug abuse and dependence

Adversities: parent depression, parent panic, parent ASP, parent divorce, parent criminal, physical abuse, sexual abuse, family violence

Prior suicidality: No prior attempt but had prior plan, No prior plan or attempt but had prior ideation

Demographics: employment: student or other

II. Unplanned attempt developed

Psychiatric disorders: NONE

Adversities: parent substance abuse, parent criminal, physical abuse, sexual abuse, neglect, family violence, econ. adversity

Prior suicidality: Prior attempt, No prior attempt but had prior plan, No prior plan or attempt but had prior ideation

Demographics: less than 50

III. Planned attempt developing

Psychiatric disorders: panic, conduct, alcohol abuse or dependence, drug abuse or dependence

Adversities: NONE

Prior suicidality: No prior attempt but had prior plan, No prior plan or attempt but had prior ideation

Demographics: employment: retired or other

IV. Unplanned attempt developing

Psychiatric disorders: adult separation anxiety, intermittent explosive disorder

Adversities: parent depression, parent panic, parent GAD

Prior suicidality: Prior attempt, No prior attempt but had prior plan

Demographics: employment: student
