

Systematic review of risk factors for suicide and suicide attempt among psychiatric patients in Latin America and Caribbean

Germán L. Teti,¹ Federico Rebok,² Sasha M. Rojas,³
Leandro Grendas,² and Federico M. Daray²

Suggested citation

Teti GL, Rebok F, Rojas SM, Grendas L, Daray FM. Systematic review of risk factors for suicide and suicide attempt among psychiatric patients in Latin America and Caribbean. *Rev Panam Salud Publica*. 2014;36(2):124–33.

ABSTRACT

Objective. To analyze published evidence from the Latin America and Caribbean (LAC) region pertaining to risk factors for completed suicide and suicide attempts among psychiatric populations.

Methods. Potential studies were identified through systematic electronic searches in MEDLINE and LILACS. Included studies were cohort, case-control, and cross-sectional designed investigations of psychiatric samples in which suicide or a suicide attempt was reported as an outcome and evaluated with some measure of impact (odds ratio, risk ratio, or hazard ratio). Methodological quality was assessed using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations.

Results. Of the 2 987 identified studies, a total of 17 studies were reviewed to determine potential suicidal risk factors. Eleven studies used a case-control design, five used a cross-sectional design, and only one study used a prospective-cohort design. The main risk factors for suicide attempts in LAC included major depressive disorder (MDD), family dysfunction, and prior suicide attempt, while the main risk factors for completed suicide were male gender and MDD. The methodological quality of most of the studies was low.

Conclusions. This review provides evidence that the majority of relevant risk factors for suicide and suicide attempts in the LAC region are similar to those observed in Western societies but different from those reported in Eastern societies. Studies of higher methodological quality from the region are needed to support these results.

Key words

Suicide; suicide, attempted; risk factors; Latin America; Caribbean region.

Suicide and suicide attempts are critical issues among the general population and are classified among the leading causes of death and injuries worldwide.

Approximately 1 million individuals die by suicide each year (1). Estimations suggest that by the year 2020 the number of deaths by suicide will increase by 50%, reaching an annual rate of 1.53 million individuals (2). In the last 45 years, suicide rates have increased by 60% worldwide (2). Suicidal behavior is a more frequent problem than completed suicide. For every completed suicide there are 10–20 times more individuals who attempt suicide (3).

Across Latin America and the Caribbean (LAC), reported incidences of suicide occur at variable rates (4). In the Caribbean region, the rates range between 0.1 per 100 000 inhabitants (in Jamaica) and 23.1 per 100 000 inhabitants (in Guyana) (4). In South America, the highest incidences of suicide are observed in Uruguay and Cuba, with values that range between 17 and 18 per 100 000 inhabitants. The lowest rates of completed suicide are found in Peru

¹ Hospital Braulio A. Moyano, Buenos Aires, Argentina.

² 3^{ra} Cátedra de Farmacología, Facultad de Medicina, Universidad de Buenos Aires, Buenos Aires, Argentina. Send correspondence to: Federico M. Daray, fdaray@hotmail.com

³ Department of Psychological Science, University of Arkansas, Fayetteville, Arkansas, United States of America.

and Bolivia (1.9 and 2.3 per 100 000 inhabitants respectively). Other countries, including Argentina, Brazil, Chile, Colombia, Ecuador, and Venezuela, show intermediate incidence (2, 4).

Various strategies are available to significantly reduce the likelihood of death by suicide. Attention to the study of suicidal risk factors is a fundamental step in understanding and preventing suicide (5, 6). A risk factor for suicide is defined as any detectable characteristic of an individual or group of people proved to be associated with an increased probability of suicide (5, 7). This is particularly relevant because risk factors are identifiable and can serve as warning signs before the suicidal act, allowing for time to anticipate and apply appropriate intervention to prevent suicidal behavior (6). Risk factors for suicide and suicide attempt may not be universal. For this reason, culturally informed preventive strategies that enable improved assessment of risk factors across diverse populations are needed.

While suicide is a serious problem in high-income countries, 84% of all suicides worldwide occur in low- and middle-income countries. Unfortunately, current evidence for the latter group of countries is scarce and of poor quality (8). As mentioned above, risk factors for suicide may not be universal. To increase understanding of different suicidal risk factors across different cultures, evidence must be generated locally, worldwide. The aim of this study was to analyze published evidence from the LAC region on risk factors for completed suicide and suicide attempts among psychiatric populations.

MATERIALS AND METHODS

Literature review

A systematic literature search for evidence published between January 1966 and August 2012 was completed using the MEDLINE (PubMed) and LILACS (Latin American and Caribbean Health Sciences) databases. The search of the MEDLINE database used the following terms: (Suicide [Mesh] OR suicide* [Tiab] OR Suicide Attempt [Mesh] OR Suicide atte* [Tiab]) AND (Risk Factors [Mesh] OR risk* [Tiab]) AND (Follow-Up Studies [Mesh] OR Follow-up stud* OR Prospective Studies [Mesh] OR Prospective stud* OR Cohort Studies [Mesh]

Cohort Stud* [Tiab] OR Case-Control Studies [Mesh] OR Case-Control Stud* [Tiab]). The search of the LILACS database used the following combination of terms: "Suicide" or "suicide attempt" AND "risk factors" AND NOT "suicidal ideation." The reference lists of each retrieved article were also scanned to identify any additional papers of relevance. All research that met the inclusion criteria, in any language, were considered. The inclusion criteria were: 1) study is an original work; 2) included analysis of suicide attempts, defined as a potentially self-injurious act with a nonfatal outcome and evidence that the person intended at some level to kill himself/herself (9); 3) included analysis of completed suicide, defined as a death from injury, poisoning, or suffocation where there was evidence that the injury was self-inflicted and that the decedent intended to kill himself/herself (9); 4) included some measure of impact (odds ratio (OR), risk ratio (RR), or hazard ratio (HR)); 5) used a case-control, cross-sectional, or cohort study design; 6) was conducted with patients from the LAC region; and 7) included only clinical patients in the study sample. Exclusion criteria were: 1) study is a review; 2) examined only suicidal ideation as an outcome variable; 3) had no measures of impact (i.e., did not include ORs, RRs, or HRs); 4) was a case report or used a case series study design; and/or 5) was conducted with patients outside the LAC region.

Data extraction

Each team member worked independently and extracted selected studies by using a data extraction sheet. Data were collected for the following variables: author name(s); year of publication; country of study; study design; study outcome (suicide or suicide attempt); evaluated risk factors; and ORs, RRs, or HRs with the corresponding 95% confidence intervals (CIs) and *P* values.

Quality assessment

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations were used to assess the methodological quality of the evaluated studies. The STROBE recommendations include a checklist of 22 items (criteria) designed to evaluate the

quality of scientific articles. The 22-criteria checklist evaluates three main study designs for analytical epidemiology: cohort, case-control, and cross-sectional (10). Two reviewers independently assessed the quality of the articles by calculating the percentage of the STROBE criteria met by each article ("STROBE score"), and any disagreement was resolved by consensus. Selected articles were listed in descending order by the STROBE score. The criteria used to determine the overall quality assessment (on a scale of A–D) has been used in previous reviews (e.g., (11)). Three categories of quality assessment were established: 1) the study fulfilled more than 80% of STROBE criteria, 2) the study met between 50–80% of STROBE criteria, and 3) the study met less than 50% of STROBE criteria.

RESULTS

Study sample

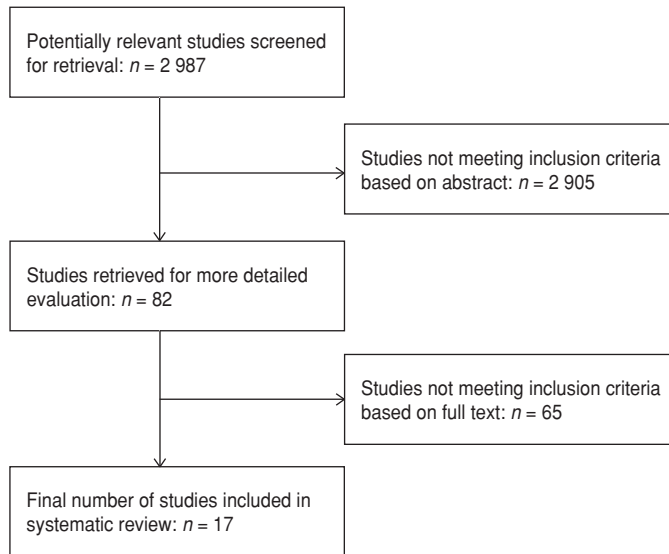
The primary literature search yielded a total of 2 987 studies. After initial review of each of the study abstracts, 2 905 studies were eliminated for not meeting the inclusion criteria described above, leaving a total of 82 articles to be read in greater detail. After applying the inclusion criteria to the full text, a total of 17 articles were included in the final review (Figure 1).

Table 1 describes the 17 studies selected for the literature review, including details about the control and case groups. Eleven of the studies used a case-control design, five used a cross-sectional design, and one had a prospective-cohort design. The majority of studies had a relatively low sample size; only five had a sample size with 200 or more patients. Almost all studies had a sample population of adult clinical patients; only five evaluated adolescent populations. All 17 studies evaluated risk factors associated with suicide attempts but only three evaluated risk factors associated with completed suicide. The studies included in the review were conducted in six different countries: five study samples were from Brazil, four from Cuba, three from Chile, two from Mexico, two from Colombia, and one from Argentina.

Risk factors

Table 2 provides a summary of all risk factors associated with completed sui-

FIGURE 1. Flow chart of systematic literature search for published evidence on risk factors for completed suicide and suicide attempts in psychiatric patients, Latin America and the Caribbean, 2012



cide and suicide attempts. Risk factors that appeared in more than one of the included studies are described below by type of variable.

Demographic variables. Female gender, a predetermined factor, was associated with a greater frequency of suicide attempts in three of the four studies that evaluated gender as a risk factor (12–15). In contrast, all studies evaluating the gender ratio for completed suicide indicated the frequency was greater among males than females (13, 16).

Physical and mental health. All seven studies that evaluated major depressive disorder (MDD) as a risk factor found an association with suicide attempts (6, 12, 14–18). Two of the studies (12, 15) obtained results from patients experiencing substance dependence or substance abuse. In addition, Torres et al. (17) found an association between suicide attempts and MDD among patients diagnosed with obsessive-compulsive disorder (OCD). All studies that examined MDD as a risk factor for completed suicide (7, 16) found an association for that variable.

Sixty percent of the studies that evaluated anxiety disorder as a risk factor found an association with suicide attempts (15–19). Post-traumatic stress disorder (PTSD) was also associated with suicide attempts in the two studies that evaluated this diagnosis (17, 20), but both

studies were conducted among patients with comorbid OCD (17) or comorbid bipolar disorder (20). Impulse control disorder was also found to be associated with suicide attempts in the two studies that evaluated it as a risk factor (6, 17). In addition, two-thirds of the studies that examined substance abuse as a risk factor for suicide attempts found a positive association (16, 19, 21). Alcohol intoxication prior to a suicide attempt was associated with an increased likelihood of a suicide attempt in the study that evaluated it as a risk factor (21). Finally, a prior suicide attempt was significantly associated with an increased risk of a new suicide attempt in each study that evaluated this variable as a risk factor (6, 13, 22).

Family variables. Each study that evaluated different forms of family dysfunction found a positive association for suicide attempts (18, 23–25). Two of these studies were obtained from an adolescent patient sample (24, 25). Family structure and lack of social support were risk factors for suicide attempts in all studies that evaluated these variables (6, 18, 23, 26).

Quality assessment

Table 3 lists the studies included in the literature review in descending order by STROBE score. All 17 studies had a STROBE score between 23% and 86%.

Only two studies (12%) had a STROBE score considered to be of high quality (above 80%).

DISCUSSION

Suicide has been linked to multiple risk factors, including mental health factors, social factors, and biological factors (5). For the purposes of suicide prevention, it is fundamental to understand the factors associated with an increased likelihood of suicide and suicide attempts. To the best of the authors' knowledge, this study is the first systematic review of risk factors for suicide and suicide attempts among psychiatric patients in the LAC region. A total of 17 articles were systematically examined to search for relevant risk factors associated with completed suicide or suicide attempts among patients from LAC. This study did not identify significant differences in risk factors for suicide and suicide attempts in the LAC region compared to those for the general population of Western countries. The LAC risk factors for suicide and suicide attempt did differ, in some respects, from those seen in Eastern countries. While the literature review for this study indicated a total of 23 prominent risk factors, only 10 were examined in more than one study. Taken collectively, the 10 prevalent risk factors indicate that male gender and MDD are significantly associated with completed suicide. Risk factors for suicide attempts included female gender, MDD, anxiety disorder, PTSD, previous suicide attempt, and family dysfunction.

Consistent with studies based on community and clinical samples from Western societies (27–29), the current study found that women had a greater likelihood of attempting suicide whereas men had a higher rate of completed suicide. This finding differs from those reported in China and India (8, 30–32). Substantial research suggests a prior suicide attempt is the greatest predictor of a future suicide attempt or completed suicide (33–37). A meta-analysis based on psychological autopsy found suicide attempts and deliberated self-harm to be the most significant risk factors associated with suicidal behavior (OR = 16.33; 95% CI = 7.51–35.52) (34). Similarly, findings from this review suggest a prior suicide attempt to be a prominent risk factor for suicide and suicide attempts among psychiatric patients in LAC.

TABLE 1. Authors, year of publication, location (country), design, sample demographics, and studied outcome of 17 studies included in literature review on risk factors for suicide and suicide attempts in psychiatric patients, Latin America and the Caribbean, 2012

Authors, date (source)	Country	Design	Sample size	Clinical patient detail	Female/male (%)	Studied outcome
Bella, Fernández, & Willington, 2010 (26)	Argentina	Cross-sectional	35 ^a / 41 ^b	Adolescent inpatients hospitalized due to suicide attempt ^a Previous adolescent inpatients not hospitalized during study ^b	43 / 33 (56 / 44)	Suicide attempt
Borges & Rosovsky, 1996 (21)	Mexico	Cross-sectional	40 ^a / 372 ^b	ER patients (>15 years) admitted due to suicide attempt ^a ER patients admitted for other reason ^b	71 / 341 (17 / 83)	Suicide attempt
da Silveria & Jorge, 2004 (12)	Brazil	Case control	49 ^a / 162 ^b	Adult psychoactive substance user outpatients reporting past suicide attempts ^a Adult psychoactive substance user outpatients with no suicidal behavior ^b	26 / 185 (87 / 12)	Suicide attempt
Guibert Reyes & Torres Miranda, 2001 (23)	Cuba	Case control	31 ^a / 31 ^b	Adults admitted to psychiatric facility due to suicide attempt ^a Adults without history of suicide attempt or psychiatric disorders ^b	Not specified	Suicide attempt
Guibert Reyes & Del Cueto de Inastrilla, 2003 (6)	Cuba	Case control	46 ^a / 92 ^b	Clinical sample (12–85 years) with suicide attempt in last three years ^a Healthy sample without suicide attempt in last three years ^b	84 / 54 (61 / 39)	Suicide attempt
Jaar, Gómez, Orellana et al., 1998 (22)	Chile	Prospective cohort	30 ^a / 60 ^b	All patients attempted suicide in the last 30 days Patients who reattempted suicide and were living during time of follow-up ^a Patients who did not reattempt suicide ^b	92 ^c / 0 (100 / 0)	Suicide attempt
Leiva Henríquez, Alamos Lara, Prüssing Santibáñez et al., 2008 (24)	Chile	Case control	43 ^a / 67 ^b	Adolescent patients discharged after intentional self-poisoning ^a Adolescents patients discharged during the same period without any suicidal intention ^b	94 / 16 (85 / 15)	Suicide attempt
Malbergier & De Andrade, 2001 (15)	Brazil	Case control	30 ^a / 30 ^b	Adult HIV-positive patients with a history of drug-injecting behavior ^a Adult HIV-negative patients with a history of drug-injecting behavior ^b	13 / 47 (22 / 78)	Suicide attempt
Neves, Malloy-Diniz, Barbosa et al., 2009 (19)	Brazil	Case control	99 ^a / 140 ^b	All adult patients were diagnosed with bipolar subtype II or I Patients with a lifetime history of suicide attempts ^a Patients without a history of suicidal behavior ^b	171 / 68 (72 / 28)	Suicide attempt
Noa López & Miranda Vázquez, 2010 (25)	Cuba	Case control	54 ^a / 108 ^b	Adolescent patients with a history of suicide attempts ^a Adolescent patients without a history of suicidal behavior ^b	Not specified	Suicide attempt
Pacheco, Lizana, Celhay, 2010 (14)	Chile	Case control	46 ^a / 81 ^b	Adolescents hospitalized due to suicide attempt ^a Adolescents with no suicidal behavior history and hospitalized for other mental health reason ^b	75 / 52 (59 / 41)	Suicide attempt
Palacio, García, Diago et al., 2007 (7)	Colombia	Case control	108 ^a / 108 ^b	Psychological autopsy of adults who died by suicide ^a Psychological autopsy of adults who died by other accidents ^b	42 / 174 (19 / 81)	Completed suicide

(Continues)

TABLE 1. Continued

Authors, date (source)	Country	Design	Sample size	Clinical patient detail	Female/male (%)	Studied outcome
Quarantini, Miranda-Scippa, Nery-Fernandes et al., 2010 (20)	Brazil	Cross-sectional	40 ^a / 60 ^d / 254 ^b	All adult outpatients were diagnosed with bipolar disorder I Patients with comorbid post-traumatic stress disorder (PTSD) ^a Patients with comorbid trauma ^d Patients without PTSD or trauma ^b	248 / 106 (70 / 30)	Suicide attempt
Trenzado Rodríguez, Canosa Besu, González Pérez et al., 2008 (13)	Cuba	Cross-sectional	135 ^a / 51 ^d	Adult & adolescent patients with a history of suicide attempts ^a Adult & adolescent patients who died by suicide ^d	Not specified	Completed suicide & suicide attempt
Torres, Ramos-Cerqueira, Ferrão et al., 2011 (17)	Brazil	Cross-sectional	64 ^a / 518 ^b	All adult outpatients had a lifetime diagnosis of obsessive compulsive disorder (OCD) ^e Patients with a history of suicide attempts ^a Patients with no history of suicide attempts ^b	328 / 254 (56 / 44)	Suicide attempt
Tuesca Molina & Navarro Lechuga, 2003 (16)	Colombia	Case control	60 ^a / 56 ^b / 37 ^d / 56 ^b	Patients who received treatment following suicide attempts ^a Patients who died by suicide ^d Patients seeking mental health treatment without a history of suicidal behavior ^b	67 / 49 (58 / 42)	Suicide attempt & completed suicide
Villa Manzano, Robles-Romero, Gutiérrez-Román et al., 2009 (18)	Mexico	Case control	25 ^a / 25 ^b	Adult patients admitted to the hospital due to suicide attempt by intoxication ^a Adult patients admitted into the hospital due to intoxication, but without suicidal behavior ^b	30 / 20 (60 / 40)	Suicide attempt

^a Case group.

^b Control group.

^c Follow-up data were not provided for two patients who completed suicide.

^d Authors also examined past and current suicidal ideation but for the purpose of the study only suicide attempts was examined.

^e Second case group.

The evidence suggests that individuals suffering from affective disorders are at an increased likelihood for suicide (35, 38–40). Among the observed research from the LAC region, all studies found MDD to be a risk factor for suicide and suicide attempts. The relationship between anxiety disorders and suicide attempts has been a subject of great debate in previous literature (41, 42). Specifically, research reports that patients suffering from anxiety disorders are at an even higher risk for suicide than previously assumed (43, 44). In the LAC region, three of five studies indicated a significant relation between anxiety disorder and suicide attempts. However, it was unclear which type of anxiety disorder was more associated with suicide attempts. In the current study, all research that evaluated PTSD as a risk factor found a positive association with suicide attempts. Several studies indicate substance use disorder is re-

lated to suicidal behavior among clinical populations (45–47). For example, in the systematic review by Hawton et al. (47), substance misuse (alcohol and/or drug) was a variable associated with risk for suicide in individuals with depression. In the current study, only two-thirds of the reviewed works identified substance abuse as a risk factor for suicide attempts. However, alcohol intoxication prior to suicide attempt was a risk factor in the one study that evaluated it as a risk factor (21). Based on these results, future research in the LAC region may benefit by examining suicidal risk factors specific to these disorders separately and among comorbid relationships.

Family dysfunction is considered a critical factor for suicidal behavior among individuals from Western societies (48, 49). The current study found a variety of family factors associated with suicide attempts. Specifically, four of the reviewed studies suggest

increases the likelihood of suicide attempts among patients. In addition, a poor family structure was found to be positively associated with suicide attempts. Therefore, it seems important to gain further understanding of family risk factors among patients in LAC. However, future research is needed to quantify the operational definition of family dysfunction in the LAC region. In this study, the articles that evaluated family dysfunction as a risk factor used different instruments to assess this construct. It is important to consider the social context when evaluating risk factors for suicidal behaviors. Results from community samples and patients from high-income countries indicate limited social connectedness is associated with suicidal behaviors (50). However, social disconnection may differ across different cultures. For example, widowed, divorced, or separated women from India and China report a reduced risk of

TABLE 2. Risk factors significantly associated with suicide attempt and completed suicide based on 17 studies included in literature review of published studies in psychiatric patients, Latin America and the Caribbean, 2012

Risk factor	No. of studies positively associated/ No. of studies that evaluated risk factor	Authors, date (source)	OR, RR, or HR ^a	95% CI ^b	P
Suicide attempt					
<i>Demographic variables</i>					
Female gender	3 / 4	da Silveria & Jorge, 2004 (12)	4.30	1.10–5.80	< 0.02
		Pacheco, Lizana, Celhay, 2010 (14)	2.30	1.08–5.12	0.01
		Trenzado Rodríguez, Canosa Besu, González Pérez et al., 2008 (13)	3.20	NR ^c	NR
		Malbergier & De Andrade, 2001 (15)	1.85	0.33–10.33	0.48
		Noa López & Miranda Vázquez, 2010 (25)	2.60	1.23–5.47	0.05
<i>Psychosocial variables</i>					
Conflicts at school	1 / 1	Noa López & Miranda Vázquez, 2010 (25)	3.20	1.53–6.83	0.01
Adverse life events	1 / 1	Villa Manzano, Robles-Romero, Gutiérrez-Román et al., 2009 (18)	8.80	2.10–36.00	NR
Lack of social support	2 / 2	Guibert Reyes & Torres Miranda, 2001 (23)	11.20	NR	0.005
		Guibert Reyes & Del Cueto de Inastrilla, 2003 (6)	3.80	1.81–8.03	NR
<i>Physical & mental health variables</i>					
Chronic illness	1 / 1	Tuesca Molina & Navarro Lechuga, 2003 (16)	8.31	2.43–31.20	< 0.001
Prior hospitalization	1 / 1	Tuesca Molina & Navarro Lechuga, 2003 (16)	3.98	1.36–11.85	NR
Substance use	2 / 3	Borges & Rosovsky, 1996 (21)	3.80	0.90–15.60	NR
		Tuesca Molina & Navarro Lechuga, 2003 (16)	4.18	1.03–18.20	NR
		Neves, Malloy-Diniz, Barbosa et al., 2009 (19)	1.73	NR	0.24
Alcoholic intoxication prior to attempt	1 / 1	Borges & Rosovsky, 1996 (21)	5.10	1.07–25.8	NR
Prior suicide attempt	3 / 3	Guibert Reyes & Del Cueto de Inastrilla, 2003 (6)	10.06	2.78–29.32	NR
		Jaar, Gómez, Orellana et al., 1998 (22)	6.20	1.73–23.54	0.001
		Trenzado Rodríguez, Canosa Besu, González Pérez et al., 2008 (13)	3.47	1.07–11.22	0.038
Low self-esteem	1 / 1	Villa Manzano, Robles-Romero, Gutiérrez-Román et al., 2009 (18)	8.2	2.00–35.00	NR
Hopelessness	1 / 1	Guibert Reyes & Del Cueto de Inastrilla, 2003 (6)	3.56	1.70–7.45	NR
Hostility	1 / 1	Guibert Reyes & Del Cueto de Inastrilla, 2003 (6)	2.79	1.36–5.77	NR
Major depressive disorder (MDD)	7 / 7	da Silveria & Jorge, 2004 (12)	2.20	1.10–4.10	<0.05
		Guibert Reyes & Del Cueto de Inastrilla, 2003 (6)	13.03	5.58–30.40	NR
		Malbergier & De Andrade, 2001 (15)	5.07	1.15–22.43	0.032
		Pacheco, Lizana, Celhay, 2010 (14)	3.05	1.50–5.90	0.003
		Torres, Ramos-Cerqueira, Ferrão et al., 2011 (17)	28.75	3.93–210.10	0.001
		Tuesca Molina & Navarro Lechuga, 2003 (16)	16.44	4.51–65.80	NR
		Villa Manzano, Robles-Romero, Gutiérrez-Román et al., 2009 (18)	22.00	3.00–90.00	NR
Post-traumatic stress disorder (PTSD)	2 / 2	Quarantini, Miranda-Scippa, Nery-Fernandes et al., 2010 (20)	1.31	0.98–1.76	NR
		Torres, Ramos-Cerqueira, Ferrão et al., 2011 (17)	1.90	1.03–3.49	NR
Impulse-control disorder	2 / 2	Guibert Reyes & Del Cueto de Inastrilla, 2003 (6)	3.87		NR
		Torres, Ramos-Cerqueira, Ferrão et al., 2011 (17)	2.35		0.001
Anxiety disorder	3 / 5	Torres, Ramos-Cerqueira, Ferrão et al., 2011 (17)	1.80	1.04–3.10	0.036
		Tuesca Molina & Navarro Lechuga, 2003 (16)	5.11	1.74–15.33	0.19

(Continues)

TABLE 2. Continued

Risk factor	No. of studies positively associated/ No. of studies that evaluated risk factor	Authors, date (source)	OR, RR, or HR ^a	95% CI ^b	P
Anxiety disorder		Villa Manzano, Robles-Romero, Gutiérrez-Román et al., 2009 (18)	8.31	2.43–31.19	0.44
		Malbergier & De Andrade, 2001 (15)	2.85	0.59–13.82	
		Neves, Malloy-Diniz, Barbosa et al., 2009 (19)	1.34	NR	NR
Borderline personality disorder	1 / 1	Neves, Malloy-Diniz, Barbosa et al., 2009 (19)	6.04	NR	0.000
<i>Family variables</i>					
Family dysfunction	4 / 4	Guibert Reyes & Torres Miranda, 2001 (23)	13.52		0.002
		Leiva Henríquez, Alamos Lara, Prüssing Santibáñez et al., 2008 (24)	6.44	NR	0.000
		Noa López & Miranda Vázquez, 2010 (25)	6.45	2.06–14.17	0.001
		Villa Manzano, Robles-Romero, Gutiérrez-Román et al., 2009 (18)	25.0	4.00–151	NR
Family history of psychiatric illness	1 / 1	Noa López & Miranda Vázquez, 2010 (18)	8.63	3.85–19.61	NR
Family structure	2 / 2	Bella, Fernández, Willington, 2010 (26)	15.00	4.47–50.30	NR
		Noa López & Miranda Vázquez, 2010 (18)	1.36	NR	NR
Completed suicide					
<i>Demographic variables</i>					
Male gender	2 / 2	Trenzado Rodríguez, Canosa Besu, González Pérez et al., 2008 (13)	2.92	0.000	NR
		Tuesca Molina & Navarro Lechuga, 2003 (16)	4.7	NR	NR
<i>Psychosocial variables</i>					
Adverse life events	1 / 1	Palacio, García, Diago et al., 2007 (7)	12.08	5.62–38.2	0.001
<i>Physical & mental health variables</i>					
Chronic illness	1 / 1	Tuesca Molina & Navarro Lechuga, 2003 (16)	8.31	2.43–31.19	0.000
Anxiety disorders	1 / 1	Tuesca Molina & Navarro Lechuga, 2003 (16)	7.33	2.78–19.8	NR
Expression of wish to die	1 / 1	Palacio, García, Diago et al., 2007 (7)	7.76	3.19–18.89	0.001
MDD	2 / 2	Palacio, García, Diago et al., 2007 (7)	4.58		NR
		Tuesca Molina & Navarro Lechuga, 2003 (16)	18.16		NR
Previous suicide attempt	1 / 1	Palacio, García, Diago et al., 2007 (7)	3.83		NR
Substance abuse	1 / 1	Palacio, García, Diago et al., 2007 (7)	2.72	1.50–4.92	NR
<i>Family variables</i>					
Completed suicide among first-degree relatives	1 / 1	Palacio, García, Diago et al., 2007 (7)	10.82		0.003

^a OR: odds ratio; RR: risk ratio; HR: hazard ratio.

^b CI: confidence interval.

^c NR: not reported.

suicide versus other causes of death, compared to married women, whereas women and men from the United States who have separated from their spouses are at higher risk for suicidal behaviors compared to married individuals (30). In the current study, the lack of social support was associated with suicide attempts in the two studies that evaluated this risk factor, similar to findings from high-income countries.

In the general population of LAC, specifically among adolescents, suicide rates have been rising in almost all Latin American countries. Nicaragua reports

the highest rates of completed suicide among adolescents in Latin America (51). To date, family or personal history of suicide attempt, intra-family violence, physical and sexual abuse, poor communication between family members, frequent moves of the family nucleus, rigid family environment, authoritarianism or loss of authority between parents, identification and idealization of figures (icons) of other adolescents who committed suicide, and crowding and living together in small and closed space are thought to be risk factors for suicidal behavior among adolescents in LAC

(51). Suicide rates among the elderly are also increasing, especially in Argentina, Chile, Cuba, Puerto Rico, and Uruguay. Specific risk factors among this population include loneliness and estrangement, social isolation, and income reduction accompanied by changes in the economic situation (50). Studies among community samples from this region would help to further identify unique risk factors for suicidal behavior among individuals in the LAC region.

This study includes an evaluation of quality for each study included in the literature review. Only 12% of the studies

TABLE 3. Percentage of STROBE^a quality criteria met (“STROBE score”) for 17 studies included in literature review on risk factors significantly associated with suicide attempt and completed suicide in psychiatric patients, Latin America and the Caribbean, 2012

Authors, date (source)	STROBE score (%) ^b	Overall quality assessment ^c
Torres, Ramos-Cerqueira, Ferrão et al., 2011 (17)	86	A
Borges & Rosovsky, 1996 (21)	82	A
Jaar, Gómez, Orellana et al., 1998 (22)	64	B
Bella, Fernández, Willington, 2010 (26)	59	B
Quarantini, Miranda-Scippa, Nery-Fernandes et al., 2010 (20)	59	B
Malbergier & De Andrade, 2001 (15)	55	B
Guilbert Reyes & Del Cueto de Inastrilla, 2003 (6)	50	B
Noa López & Miranda Vázquez, 2010 (25)	45	C
Pacheco, Lizana, Celhay, 2010 (14)	45	C
Neves, Malloy-Diniz, Barbosa et al., 2009 (19)	45	C
Trenzado Rodríguez, Canosa Besu, González Pérez et al., 2008 (13)	45	C
Villa Manzano, Robles-Romero, Gutiérrez-Román et al., 2009 (18)	45	C
Leiva Henríquez, Alamos Lara, Prussing Santibanez et al., 2008 (24)	41	C
Guilbert Reyes & Torres Miranda, 2001 (23)	32	C
Tuesca Molina & Navarro Lechuga, 2003 (16)	32	C
Palacio, García, Diago et al., 2007 (7)	27	C
da Silveria & Jorge, 2004 (12)	23	C

^a Strengthening the Reporting of Observational Studies in Epidemiology (10).

^b In descending order.

^c Scale of A–D.

were of high quality (STROBE score of 80% or greater), indicating the need for work of higher quality from this region. Initially, the authors planned to complete a meta-analysis of all of the studies included in the review. However, due to the low quality of the studies found in the review, the meta-analysis was eliminated. The validity of the results from a meta-analysis depends on the quality of the individual studies, and analysis of a combination of biased studies can further boost the bias. Thus, carrying out more high-quality scientific studies in areas in the LAC region will help generate public health policies based on valid data.

This study had some limitations. As noted, the majority of the studies found in the literature review were of poor quality based on their STROBE score. Furthermore, only one of the 17 studies

used a prospective study design, the design that produces the most accurate results when evaluating risk factors. Data from five of the included studies were cross-sectional, limiting the authors' ability to infer causal relationships between the studied risk factors and outcome variables (suicide attempts and completed suicide). Despite the limitations related to the study designs, studies were included in the review to help identify possible associations between exposure variables and an event at a given time. Future work pertinent to the study of risk factors for suicidal behavior within this region would benefit from using prospective study designs. Notwithstanding the limitations described above, the current study provides a detailed evaluation of empirical evidence on risk factors for suicide

and suicide attempts observed among clinical patients from the LAC region. The results suggest that the majority of relevant risk factors for suicide attempts and completed suicide found in the LAC region are similar to those observed in Western societies but differ from those reported in Eastern societies. Future research of higher quality is needed, including studies with robust designs and larger samples, to better understand the risk factors for suicide attempts and completed suicide in the LAC region.

Conclusions

Based on this study, the main risk factors for suicide attempts include MDD, family dysfunction, and prior suicide attempt, and the main risk factors for completed suicide include male gender and MDD. The methodological quality of the majority of studies on suicide attempts and completed suicide in the LAC region conducted between 1966 and 2012 was of low quality. The risk factors for both suicide attempts and completed suicide in the LAC region are similar to those observed in Western societies but different than those reported in Eastern societies.

Acknowledgments. Germán L. Teti is a recipient of a research fellowship from the Ministry of Health of the City of Buenos Aires. Federico Rebok is a recipient of a Ramón Carrillo-Arturo Oñativa research fellowship from the Ministry of Health of Argentina, and a researcher for the Ministry of Health of the City of Buenos Aires. Federico Manuel Daray is a researcher for the National Scientific and Technical Research Council (*Consejo Nacional de Investigaciones Científicas y Técnicas*, CONICET).

Conflicts of interest. None.

REFERENCES

1. Nock MK, Borges G, Bromet EJ, Cha CB, Kessler RC, Lee S. Suicide and suicidal behavior. *Epidemiol Rev.* 2008; 30(1):133–54.
2. World Health Organization. Programmes: mental health. Suicide prevention (SUPRE) [Internet]. Geneva: WHO; 2013. Available from: http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/ Accessed 23 May 2013.
3. Bobes García J, Giner Ubago J, Saiz Ruiz J, editors. Suicidio y psiquiatría: recomendaciones preventivas y de manejo del comportamiento suicida. Madrid: Triacastela; 2011.
4. Kohn R, Friedmann H. Epidemiología del suicidio, los intentos y las ideaciones suicidas en América Latina y el Caribe. In: Rodríguez JJ, Kohn R, Aguilar-Gaxiola S, editors. *Epidemiología de los trastornos mentales en América Latina y el Caribe*. Washington: Pan American Health Organization; 2009. Pp. 193–207.
5. Simon RI. Preventing patient suicide: clinical assessment and management. 1st ed. American Psychiatric Publishing; 2010.
6. Guilbert Reyes W, Del Cueto de Inastrilla ER. Factores psicosociales de riesgo de la con-

- ducta suicida. *Rev Cubana Med Gen Integr* [online]. 2003;19(5).
7. Palacio C, García J, Diago J, Zapata C, Lopez G, Ortiz J, et al. Identification of suicide risk factors in Medellín, Colombia: a case-control study of psychological autopsy in a developing country. *Arch Suicide Res*. 2007;11(3): 297–308.
 8. Phillips MR, Cheng HG. The changing global face of suicide. *Lancet*. 2012;379(9834): 2318–9.
 9. O'Carroll PW, Berman AL, Maris RW, Moscicki EK, Tanney BL, Silverman MM. Beyond the Tower of Babel: a nomenclature for suicidology. *Suicide Life Threat Behav*. 1996;26(3):237–52.
 10. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, et al. Declaración de la Iniciativa STROBE (Strengthening the Reporting of Observational studies in Epidemiology): directrices para la comunicación de estudios observacionales. *Gac Sanit*. 2008;22(2):144–50.
 11. Olmos M, Antelo M, Vazquez H, Smecuel E, Mauriño E, Bai JC. Systematic review and meta-analysis of observational studies on the prevalence of fractures in coeliac disease. *Dig Liver Dis*. 2008;40(1):46–53.
 12. da Silveira DX, Jorge MR. Reports of attempted suicide among Brazilian addicts. *Psychol Rep*. 2004;95(1):71–4.
 13. Trenzado Rodríguez N, Canosa Besu LB, González Pérez H. Epidemiología del suicidio en Cárdenas. *Rev Medica Electron* [online]. 2008;30(4).
 14. Pacheco PB, Lizana CP, Celhay SI. Diferencias clínicas entre adolescentes hospitalizados por intento suicida y adolescentes hospitalizados por otra causa psiquiátrica. *Rev Med Chile*. 2010;138(2):160–7.
 15. Malbergier A, de Andrade AG. Depressive disorders and suicide attempts in injecting drug users with and without HIV infection. *AIDS Care*. 2001;13(1):141–50.
 16. Tuesca-Molina R, Navarro-Lechuga E. Factores de riesgo asociados al suicidio e intento de suicidio. *Salud UNINORTE*. 2003;17:19–28.
 17. Torres AR, Ramos-Cerqueira AT, Ferrão YA, Fontenelle LF, do Rosário MC, Miguel EC. Suicidality in obsessive-compulsive disorder: prevalence and relation to symptom dimensions and comorbid conditions. *J Clin Psychiatry*. 2011;72(1):17–26; quiz 119–20.
 18. Villa Manzano AI, Robles-Romero MA, Gutiérrez-Román EA, Martínez-Arriaga MG, Valadez-Toscano FJ, Cabrera Pivaral CE. Magnitud de la disfunción familiar y depresión como factores de riesgo para intento de suicidio. *Rev Med Inst Mex Seguro Soc*. 2009; 47(6):643–6.
 19. Neves FS, Malloy-Diniz LF, Barbosa IG, Brasil PM, Corrêa H. A polaridade do primeiro episódio no transtorno bipolar é um preditor para tentativa de suicídio (violenta e não violenta) futura? *Rev Bras Psiquiatr*. 2009;31(2): 114–8.
 20. Quarantini LC, Miranda-Scippa A, Nery-Fernandes F, Andrade-Nascimento M, Galvão-de-Almeida A, Guimarães JL, et al. The impact of comorbid posttraumatic stress disorder on bipolar disorder patients. *J Affect Disord*. 2010;123(1–3):71–6.
 21. Borges G, Rosovsky H. Suicide attempts and alcohol consumption in an emergency room sample. *J Stud Alcohol*. 1996;57(5):543–8.
 22. Jaar HE, Gómez A, Orellana VG, Núñez MC, Montino RO, Lolas Stepke F. La conducta suicida en mujeres: un estudio prospectivo. *Rev Med Chile*. 1998;126(8):924–9.
 23. Guibert Reyes W, Torres Miranda N. Intento suicida y funcionamiento familiar. *Rev Cubana Med Gen Integr*. 2001;17(5):452–60.
 24. Leiva Henríquez H, Alamos Lara L, Prüssing Santibáñez L, Uriarte Ruiz A. Intento de suicidio: características clínicas y epidemiológicas. Sexta Región de Chile 2002–2004. *An Pediatr (Barc)*. 2008;69(2):110–4.
 25. Noa López J, Miranda Vázquez M. Factores de riesgo de intento suicida en adolescentes. *MEDISAN* [online]. 2010;14(3).
 26. Bella ME, Fernández RA, Willington JM. Identificación de factores de riesgo en intentos de suicidio en la infancia y adolescencia. *Rev Argent Salud Publica*. 2010;1(3):24–9.
 27. Canetto SS, Sakinofsky I. The gender paradox in suicide. *Suicide Life Threat Behav*. 1998;28(1):1–23.
 28. Brent DA, Baugher M, Bridge J, Chen T, Chiappetta L. Age- and sex-related risk factors for adolescent suicide. *J Am Acad Child Adolesc Psychiatry*. 1999;38(12):1497–505.
 29. Oquendo MA, Bongiovi-García ME, Galfalvy H, Goldberg PH, Grunebaum MF, Burke AK, et al. Sex differences in clinical predictors of suicidal acts after major depression: a prospective study. *Am J Psychiatry*. 2007;164(1): 134–41.
 30. Patel V, Ramasundarahettige C, Vijayakumar L, Thakur JS, Gajalakshmi V, Gururaj G, et al. Suicide mortality in India: a nationally representative survey. *Lancet*. 2012;379(9834): 2343–51.
 31. Law S, Liu P. Suicide in China: unique demographic patterns and relationship to depressive disorder. *Curr Psychiatry Rep*. 2008;10(1):80–6.
 32. Ji J, Kleinman A, Becker AE. Suicide in contemporary China: a review of China's distinctive suicide demographics in their sociocultural context. *Harv Rev Psychiatry*. 2001;9(1): 1–12.
 33. McGaughey J, Long A, Harrisson S. Suicide and parasuicide: a selected review of the literature. *J Psychiatr Ment Health Nurs*. 1995;2(4):199–206.
 34. Yoshimasu K, Kiyohara C, Miyashita K; Stress Research Group of the Japanese Society for Hygiene. Suicidal risk factors and completed suicide: meta-analyses based on psychological autopsy studies. *Environ Health Prev Med*. 2008;13(5):243–56.
 35. Oquendo MA, Galfalvy H, Russo S, Ellis SP, Grunebaum MF, Burke A, et al. Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. *Am J Psychiatry*. 2004;161(8): 1433–41.
 36. Mann JJ, Waternaux C, Haas GL, Malone KM. Toward a clinical model of suicidal behavior in psychiatric patients. *Am J Psychiatry*. 1999;156(2):181–9.
 37. Galfalvy H, Oquendo MA, Carballo JJ, Sher L, Grunebaum MF, Burke A, et al. Clinical predictors of suicidal acts after major depression in bipolar disorder: a prospective study. *Bipolar Disord*. 2006;8(5 Pt 2):586–95.
 38. Gladstone GL, Mitchell PB, Parker G, Wilhelm K, Austin MP, Evers K. Indicators of suicide over 10 years in a specialist mood disorders unit sample. *J Clin Psychiatry*. 2001;62(12): 945–51.
 39. Berglund M, Nilsson K. Mortality in severe depression. A prospective study including 103 suicides. *Acta Psychiatr Scand*. 1987;76(4): 372–80.
 40. Abreu LN, Lafer B, Baca-Garcia E, Oquendo MA. Suicidal ideation and suicide attempts in bipolar disorder type I: an update for the clinician. *Rev Bras Psiquiatr*. 2009;31(3):271–80.
 41. Vickers K, McNally RJ. Panic disorder and suicide attempt in the National Comorbidity Survey. *J Abnorm Psychol*. 2004;113(4):582–91.
 42. Hornig CD, McNally RJ. Panic disorder and suicide attempt. A reanalysis of data from the Epidemiologic Catchment Area study. *Br J Psychiatry*. 1995;167(1):76–9.
 43. Khan A, Leventhal RM, Khan S, Brown WA. Suicide risk in patients with anxiety disorders: a meta-analysis of the FDA database. *J Affect Disord*. 2002;68(2–3):183–90.
 44. Nepon J, Belik SL, Bolton J, Sareen J. The relationship between anxiety disorders and suicide attempts: findings from the National Epidemiologic Survey on Alcohol and Related Conditions. *Depress Anxiety*. 2010;27(9): 791–8.
 45. Darke S, Ross J. Suicide among heroin users: rates, risk factors and methods. *Addiction*. 2002;97(11):1383–94.
 46. Sher L. Risk and protective factors for suicide in patients with alcoholism. *ScientificWorld Journal*. 2006;6:1405–11.
 47. Hawton K, Casañas I Comabella C, Haw C, Saunders K. Risk factors for suicide in individuals with depression: a systematic review. *J Affect Disord*. 2013;147(1–3):17–28.
 48. McDermut W, Miller IW, Solomon D, Ryan CE, Keitner GL. Family functioning and suicidality in depressed adults. *Compr Psychiatry*. 2001;42(2):96–104.
 49. Prinstein MJ, Boergers J, Spirito A, Little TD, Grapentine WL. Peer functioning, family dysfunction, and psychological symptoms in a risk factor model for adolescent inpatients' suicidal ideation severity. *J Clin Child Psychol*. 2000;29(3):392–405.
 50. Fassberg MM, van Orden KA, Duberstein P, Erlangsen A, Lapiere S, Bodner E, et al. A systematic review of social factors and suicidal behavior in older adulthood. *Int J Environ Res Public Health*. 2012;9(3):722–45.
 51. Tellez-Vargas J, Forero Vargas J. Suicide in Latin America. In: Pompili M. *Suicide: a global perspective*. Oak Park, IL: Bentham Science Publishers; 2012. Pp. 185–200.

Manuscript received on 28 February 2014. Revised version accepted for publication on 14 June 2014.

RESUMEN**Revisión sistemática de los factores de riesgo de suicidio e intento de suicidio entre los pacientes psiquiátricos de América Latina y el Caribe**

Objetivo. Analizar los datos probatorios publicados de la región de América Latina y el Caribe (ALC) que fueran pertinentes a los factores de riesgo de suicidio consumado e intentos de suicidio entre las poblaciones psiquiátricas.

Métodos. Se seleccionaron los posibles estudios mediante búsquedas electrónicas sistemáticas en MEDLINE y LILACS. Se incluyeron estudios cuyos diseños de investigación fueran de cohortes, de casos y controles, o transversales de muestras psiquiátricas, y en los que el suicidio o un intento de suicidio se notificaran como un resultado, y se evaluaran mediante alguna medida de la repercusión (razón de posibilidades, razón de riesgos o razón de riesgos instantáneos). Se evaluó la calidad metodológica mediante el uso de las recomendaciones de la iniciativa de Fortalecimiento de la Notificación de los Estudios Observacionales en Epidemiología (STROBE, por sus siglas en inglés).

Resultados. Se analizaron 17 de los 2 987 estudios seleccionados con objeto de determinar los posibles factores de riesgo de suicidio. Once estudios usaron un diseño de casos y controles, cinco usaron un diseño transversal, y un único estudio usó un diseño de cohortes prospectivo. Los principales factores de riesgo de intento de suicidio en ALC fueron el trastorno depresivo mayor (TDM), la disfunción familiar y el intento de suicidio previo, mientras que los principales factores de riesgo de suicidio consumado fueron el sexo masculino y el TDM. La mayor parte de los estudios mostraron una mala calidad metodológica.

Conclusiones. Esta revisión aporta datos probatorios de que la mayor parte de los factores de riesgo pertinentes al suicidio y los intentos de suicidio en la región de ALC son similares a los observados en las sociedades occidentales pero diferentes a los notificados en las sociedades orientales. Se necesitan estudios regionales de mayor calidad metodológica para apoyar estos resultados.

Palabras clave

Suicidio; intento de suicidio; factores de riesgo; América Latina; región del Caribe.