Violent and Serious Suicide Attempters: One Step Closer to Suicide?

Lucas Giner, MD, PhD; Isabelle Jaussent, PhD; Emilie Olié, MD; Séverine Béziat, MSc; Sébastien Guillaume, MD, PhD; Enrique Baca-Garcia, MD, PhD; Jorge Lopez-Castroman, MD, PhD; and Philippe Courtet, MD, PhD

ABSTRACT

Background: The use of violence in a suicide attempt and its medical consequences can be used to characterize specific subpopulations of suicide attempters that could be at higher risk of ever completing suicide.

Method: A population of 1,148 suicide attempters was consecutively recruited from 2001 to 2010. Violent suicide attempts were classified using Asberg's criteria. An overdose requiring hospitalization in an intensive care unit was considered a serious suicide attempt. In this exploratory study, we retrospectively compared 183 subjects who made a serious suicide attempt, 226 that made a violent suicide attempt, and 739 without any history of serious or violent suicide attempts with regard to demographic, clinical, and psychological characteristics and features of the suicide attempts using univariate and multivariate analyses.

Results: In comparison with subjects whose attempts were neither violent nor serious, violent attempters and serious attempters were more likely to make repeated suicide attempts (OR = 3.27 [95% CI, 1.39–7.70] and OR = 2.66 [95% CI, 1.29–5.50], respectively), with higher medical lethality (OR = 6.66 [95% CI, 4.74–9.38] and OR = 3.91 [95% CI, 2.89–5.29], respectively). Additionally, violent attempts were associated with male gender (OR = 6.79; 95% CI, 3.59–12.82) and family history of suicidal behavior (particularly if serious or violent: OR = 6.96; 95% CI, 2.82–17.20), and serious attempters were more likely to be older (OR = 1.49, 95% CI, 1.12–1.99).

Conclusions: One of every 3 attempters in our sample had made violent or serious suicide attempts in their lifetime. Violent attempters and serious attempters presented differential characteristics, closer to those of suicide completers, compared to the rest of the sample.

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Corresponding author: *Jorge Lopez-Castroman, MD, PhD, Departement d'Urgences et Post-Urgences Psychiatriques, Hopital Lapeyronie, 371, avenue du Doyen Gaston Giraud, 34295 Montpellier, France (jorgecastroman@gmail.com).*

Suicide is one of the leading causes of death in the world, particularly among the youth, and its prevention is a public health priority in many countries.[1] Mental disorders and previous suicide attempts are the main risk factors for a completed suicide.[2] There may be 10 to 40 attempts for every completed suicide,[3] amounting to a conservative figure of 15 million attempts per year in the world by 2020 as estimated by the World Health Organization.[4] The burden derived from all those suicidal acts is staggering if we consider the suffering of the attempter and his or her social network, the costs to the health care system, the consequences of disability, and the losses derived from a potentially avoidable death.

According to the literature, more than 2% of suicide attempters may complete suicide in the subsequent year and 7% within 10 years.[5,6] Although the risk of an eventual suicide varies between different samples of attempters, psychological autopsy studies show that at least 20%–30% of deaths by suicide were preceded by an unsuccessful attempt.[7,8] Differentiating those subjects is essential for suicide prevention programs. However, we can study the features of suicide completers only indirectly, either through psychological autopsies or by extrapolation of the results from nonlethal suicide attempts. Suicide attempts are very heterogeneous and may be viewed dimensionally from a "cry for help" to a nearly lethal attempt, each one being on the boundary with self-mutilation and completed suicide.[8,9] Multiple factors may explain the heterogeneity of suicide attempters.[10,11] In fact, the population of completed suicides may partially overlap the population of suicide attempters, and they share many risk factors.[12] These reasons favor a dimensional characterization of suicidal behavior according to the lethality or the intent of the suicidal act.[13]

The use of violent means to attempt suicide and the severity of the medical consequences of the attempt may be used to differentiate specific subpopulations of attempters.[12,14–16] Indeed, violent attempters, independent of their diagnoses, show specific features when compared with other attempters. These differences are related to suicidal phenotypes,[17] neuropsychological impairment,[18] aggressive behavior,[14,19] seasonality,[20] fetal and childhood development,[21] genetics,[16,22] and other biological markers.[14,19,23] However, no consensus exists on the definition of a violent attempt, and it might be classified according to the method, the lethality, or the planning. On the other hand, near-fatal attempts have been frequently used to investigate the boundary with completed suicides.[12,24] The definition of these near-fatal attempts is based on the severity or seriousness of their medical consequences, independent of the violence of the suicidal method.[24–26] Both violent and serious attempts have been associated with an increased risk of eventual suicide completion.[21,24]

In this study, we aim to investigate the characteristics of violent and serious suicide attempts within a large population of attempters that had been consecutively recruited after admission in a specialized unit. We hypothesize that the profile of violent attempters and serious attempters may serve to differentiate these subpopulations, which could be exposed to a higher risk of ever completing suicide compared to nonviolent and nonserious suicide attempters.

Clinical Points

- Violent suicide attempters and serious suicide attempters show an increased number of suicide attempts and a higher risk score at the suicidal act when compared with nonviolent, nonserious suicide attempters.
- Violent suicide attempters in particular share several features with suicide completers, such as family history of suicidal behavior, male gender, and higher medical lethality of the previous attempts.

METHOD

Sample

We retrospectively examined a sample of 1,148 adult patients who were consecutively hospitalized for a suicide attempt in 1 university hospital in France (Lapeyronie Hospital in Montpellier) between July 2001 and November 2010. A *suicide attempt* was defined as a self-destructive act with some degree of intent to end one's own life. Violent suicide attempts were classified using the criteria of Asberg and colleagues.[27] According to these criteria, a suicide attempt was defined as violent when the method of suicide attempt was hanging, use of firearms, jumping from heights, several deep cuts, car crash, burning, gas poisoning, drowning, electrocution, or jumping under a train. Suicide attempts were defined as nonviolent when the method was drug overdose or superficial wrist cutting. Cutting was considered violent if needing surgical treatment, ie, deep sutures to close an open wound. An overdose requiring hospitalization in an intensive care unit was considered a serious suicide attempt. Consequently, nonserious, nonviolent suicide attempts consisted of drug overdoses or superficial wrist cutting that did not require treatment in an intensive care unit.

Trained psychiatrists interviewed the patients with a semistructured clinical interview when they were clinically stable and a few days before discharge to avoid influence of current depressive symptoms. We characterized the lifetime history of suicide attempts by the method of the attempts and the medical damage caused by them. Subjects reporting a violent or serious suicide attempt in their lifetime were correspondingly classified as violent or serious attempters. According to this classification, subjects were included in the serious suicide attempt group, the violent suicide attempt group, or the nonserious, nonviolent suicide attempt group. When personal history indicated at least 1 violent and 1 serious suicide attempt, patients were classified as violent attempters. Therefore, the serious suicide attempt group differentiates individuals that had made nonviolent life-threatening attempts to investigate their particular features, as opposed to the aggressive features of violent attempters.

All subjects gave oral and written informed consent after a full explanation of the nature of the procedures. This study was conducted within a larger ongoing multicenter study[28] of suicidal behavior, which has been approved by the local research ethics committees.

Assessment

Current *DSM-IV* diagnoses were assessed by the 5.0.0 French version of the Mini-International Neuropsychiatric Interview (MINI).[29] At least 2 psychiatrists, including the interviewer and another psychiatrist blind to the research procedure, assessed by consensus current and lifetime diagnoses according to the MINI. Any further information available from relatives of the patient or medical records was used to confirm lifetime diagnoses.

Suicide attempts were characterized on the basis of clinical assessment and personal and family history (first- and second-degree relatives) of suicidal behavior. To evaluate the lethality and intent of the suicide attempts, we used the French versions of 2 scales: the Risk Rescue Rating Scale (RRRS)[30] and the Suicidal Intent Scale (SIS).[31] The RRRS measures the medical danger of the attempt (risk factors) and the probabilities of being discovered and rescued (rescue factors) and summarizes them in a compound ratio. This ratio is related to the lethality, or probability of inflicting irreversible damage, of the attempt. The SIS is a 15-item ordinal scale that is rated by summing up the scores on each item (varying from 0 to 2). The SIS measures specifically one's intent to die by any suicide attempt. The French versions of these scales have been previously validated.[10]

Age at first suicide attempt was defined as the age at which the patient first made a suicide attempt and was assessed by the interviewer and then blindly rated by an independent psychiatrist according to medical charts. Personality traits and dimensions were assessed using self-administered questionnaires: Barrat Impulsiveness Scale, version 10 (BIS-10)[32]; Buss-Durkee Hostility Inventory (BDHI)[33]; Beck Hopelessness Scale[34]; and the State-Trait Anger Expression Inventory (STAXI).[35]

Statistical Analyses

In a first step, multinomial logistic regressions were performed to determine differences in clinical and psychological characteristics between the 3 groups (serious suicide attempters; violent suicide attempters; and nonserious, nonviolent suicide attempters) adjusted by age and gender (Table 1). Associations were quantified using odds ratios (ORs) and their 95% CIs. In a second step, multivariate multinomial logistic regression analyses were performed with all variables with P values $<.10$ in the initial analysis to include potential confounders. Two separate models were used (violent suicide attempt vs nonserious, nonviolent suicide attempt and serious suicide attempt vs nonserious, nonviolent suicide attempt) (Table 2).[36] When appropriate, the interaction terms were tested using Wald χ^2 tests given by the logistic regression model. Spearman rank order correlations were applied to measure associations between 2 continuous variables. Given the exploratory nature of our epidemiologic study, significance level was set at $P<.05$. Given the exploratory nature of our study and following the suggestions of several authors, we decided not to correct for multiple testing.[37–39] Analyses were performed using SAS statistical software (version 9.2; SAS Inc, Cary, North Carolina).

Table 1. Baseline Sociodemographic, Clinical Characteristics, Psychological Assessment, and Personal and Familial Features of Suicidal Behavior According to the Type of Suicide Attempt[a]

Variable	Nonsevere, Nonviolent Suicide Attempt (n = 739)			Serious Suicide Attempt (n = 183)			Violent Suicide Attempt (n = 226)			Global *P* Value	Serious Suicide Attempt vs Nonserious, Nonviolent Suicide Attempt, OR (95% CI)	Violent Suicide Attempt vs Nonserious, Nonviolent Suicide Attempt, OR (95% CI)
	n (%)	Median (range)	Mean (SD)	n (%)	Median (range)	Mean (SD)	n (%)	Median (range)	Mean (SD)			
Age, y[b]		39.2 (18.0–83.4)	38.9 (13.5)		43.0 (18.0–68.6)	42.7 (12.3)		44.0 (18.2–74.2)	42.2 (12.7)	**.0001**	1.24 (1.10–1.40)	1.21 (1.08–1.35)
Male gender	165 (22.3)			41 (22.4)			111 (49.1)			**< .0001**	1.00 (0.68–1.48)	3.36 (2.46–4.59)
Married or living-in couple	257 (34.8)			64 (35.2)			81 (35.8)			.96		
Mental disorders[c]												
Schizophrenia	9 (1.2)			4 (2.2)			7 (3.2)			.12		
Major depressive episode	547 (74.2)			124 (67.8)			150 (67.0)			.06	0.72 (0.51–1.03)	0.72 (0.51–1.00)
Bipolar disorders	167 (22.7)			54 (30.0)			62 (27.8)			.09	1.45 (1.01–2.09)	1.26 (0.89–1.79)
Anxiety disorders	500 (74.1)			131 (78.0)			136 (67.3)			.15		
Eating disorders	127 (17.3)			39 (21.7)			25 (11.4)			.08	1.62 (1.06–2.49)	1.04 (0.64–1.69)
Substance/alcohol misuse	229 (31.1)			67 (37.2)			84 (37.8)			.05	1.50 (1.05–2.13)	1.26 (0.91–1.76)
Assessment scales												
BIS-10 total score[d]		61 (24–116)	62.2 (16.0)		62 (25–99)	62.5 (14.9)		63 (22–112)	63.3 (17.4)	.25		
BDHI[e]												
Assault		3 (0–10)	3.9 (2.7)		3 (0–10)	3.8 (2.7)		4 (0–10)	4.3 (2.7)	.41		
Indirect hostility		5 (0–9)	5.3 (1.9)		5 (1–9)	4.9 (2.0)		5 (0–9)	5.2 (2.1)	.72		
Irritability		8 (1–11)	7.5 (2.1)		8 (1–11)	7.5 (2.1)		8 (1–11)	7.3 (2.3)	.83		
Negativism		3 (0–5)	3.1 (1.4)		3 (0–5)	3.2 (1.3)		3 (0–5)	2.9 (1.3)	.38		
Resentment		5 (0–8)	5.2 (1.8)		5 (0–8)	5.0 (2.0)		5 (0–8)	4.8 (1.9)	.11		
Suspicion		6 (0–10)	5.8 (2.2)		6 (0–10)	5.6 (2.2)		6 (1–10)	5.4 (2.2)	.42		
Verbal hostility		8 (0–13)	7.8 (2.5)		8 (1–13)	7.5 (2.3)		8 (2–13)	7.8 (2.3)	.78		
Guilt		7 (0–9)	6.6 (1.9)		7 (1–9)	6.6 (1.9)		7 (1–9)	6.3 (1.9)	.51		
STAXI[f]												
State anger		19 (10–40)	20.9 (7.9)		20 (10–40)	20.5 (7.2)		19 (10–39)	20.5 (7.5)	.95		
Trait anger		24 (10–40)	24.4 (6.1)		25 (11–37)	24.5 (6.0)		24 (11–40)	24.2 (6.0)	.54		
Anger-in		21 (9–32)	21.7 (5.0)		20 (9–32)	20.8 (4.9)		21 (10–31)	20.5 (5.0)	**.02**	0.84 (0.69–1.02)	0.79 (0.66–0.95)
Anger-out		17 (8–32)	17.0 (4.8)		16 (8–29)	16.6 (4.8)		15 (8–32)	16.2 (5.4)	.58		
Anger control		21 (9–32)	21.3 (4.6)		21 (10–31)	21.0 (4.2)		21 (10–31)	20.8 (4.5)	.15		
Beck Hopelessness Scale[f]		10 (0–20)	10.1 (4.9)		111 (1–19)	10.9 (5.0)		10 (0-20)	10.1 (4.5)	.25		
Features of suicide attempts												
Age at first suicide attempt, y[d]		30 (7–76)	32.3 (14.2)		28 (8–66)	30.6 (14.0)		31 (7–72)	32.1 (14.2)	.18		
No. of suicide attempts		2 (1–20)	2.1 (2.0)		3 (1–21)	4.0 (3.9)		2 (1–20)	3.4 (3.6)	**< .0001**	1.30 (1.22–1.39)	1.30 (1.21–1.39)
No. of suicide attempts												
1	359 (48.8)			43 (23.9)			66 (30.0)			**< .0001**	1	1
2	194 (26.4)			44 (24.4)			71 (32.3)				2.00 (1.26–3.18)	2.60 (1.73–3.90)
≥ 3	182 (24.8)			93 (51.7)			83 (37.7)				4.90 (3.20–7.49)	4.24 (2.81–6.41)
RRRS[e]												
Risk score		7 (5–13)	7.1 (1.4)		12 (7–14)	11.5 (1.7)		10 (5–15)	10.1 (3.0)	**< .0001**	7.35 (5.72–9.44)	4.38 (3.53–5.43)
Rescue score		13 (5–15)	11.9 (2.6)		12 (5–15)	11.4 (2.2)		12 (5–15)	12.0 (2.3)	**.02**	0.87 (0.76–1.01)	1.12 (0.97–1.28)
Suicidal Intent Scale[e]												
Planning score		5 (0–16)	5.8 (3.2)		7 (0–15)	7.3 (3.5)		6 (0–15)	6.6 (3.4)	**< .0001**	1.32 (1.19–1.47)	1.17 (1.06–1.29)
Expectancy of lethality		9 (0–14)	8.6 (3.9)		12 (0–14)	11.0 (3.0)		12 (0–14)	11.0 (3.1)	**< .0001**	1.49 (1.33–1.68)	1.48 (1.33–1.64)
Family history of suicidal behavior	286 (39.9)			73 (41.5)			104 (47.9)			**.006**	1.16 (0.82–1.63)	1.70 (1.23–2.34)
Family history of suicide	135 (19.0)			36 (20.7)			51 (23.8)			.22		
Family history of suicide attempts												
No	469 (74.0)			114 (72.6)			122 (64.9)			**< .0001**	1	1
Yes: serious or violent	40 (6.3)			13 (8.3)			31 (16.5)				1.39 (0.72–2.70)	4.02 (2.33–6.95)
Yes: nonserious, nonviolent	125 (19.7)			30 (19.1)			35 (18.6)				1.12 (0.71–1.77)	1.47 (0.93–2.32)

[a]Continuous variables are expressed by median (range) and mean (SD). Significant *P* values (<.05) are bolded. Odds ratios are shown only for global *P* value. [b]Age was expressed by median (range); mean (SD) and OR expressed for 10-point increase. [c]Adjusted for gender and age. [d]Odds ratio for 10-point increase. [e]Odds ratio for 2-point increase. [f]Odds ratio for 5-point increase.

Abbreviations: BDHI = Buss-Durkee Hostility Inventory; BIS-10 = Barratt Impulsiveness Scale, version 10; RRRS = Risk Rescue Rating Scale; STAXI = State-Trait Anger Expression Inventory.

RESULTS

Description of the Sample

In the population of 1,148 attempters, 226 subjects (19.7%) reported a lifetime violent suicide attempt, 183 (15.9%) a lifetime serious suicide attempt, and 739 (64.4%) had neither violent nor serious suicide attempts. The median age of the population was 40.6 years (range, 18.0–83.4), and 72.4% of the subjects were women. A minority of the sample was married (35.1%) or reported university studies (38.1%). Among the 226 violent suicide attempters, 42 reported also a serious attempt. The methods of violent attempts according to the RRRS were distributed as follows: (1) deep cuts (n = 63, 31.2%); (2) asphyxia, hanging, strangulation, or drowning (n = 76, 37.6%); and (3) fall from a height or firearm (n = 63, 31.2%).

Comparisons of Sociodemographic, Clinical, and Psychological Features

When compared with nonserious, nonviolent suicide attempters, both serious and violent suicide attempters were significantly older (OR = 1.24 [95% CI, 1.10–1.40], OR = 1.21 [95% CI, 1.08–1.35], respectively), while only violent suicide attempters had a significantly higher number of male subjects (OR = 3.36; 95% CI, 2.46–4.59) (Table 1). To simplify the exposition of results, henceforward we will describe only significant differences between the groups (*P* values < .1) after adjustment by age and gender. The comparisons between violent and serious suicide attempters are not shown, but significant results will be mentioned.

Regarding clinical diagnoses, violent suicide attempters were less frequently diagnosed with major depressive disorder than nonserious, nonviolent suicide attempters (OR = 0.72; 95% CI, 0.51–1.00). On the other hand, bipolar disorders, eating disorders, and substance or alcohol misuse were significantly associated with serious suicide attempters (OR = 1.45 [95% CI, 1.01–2.09], OR = 1.62 [95% CI, 1.06–2.49], OR = 1.50 [95% CI, 1.05–2.13], respectively). When comparing these groups for personality traits, we found only 1 significant difference: violent suicide attempters had lower scores on the STAXI anger-in subscale than nonserious, nonviolent suicide attempters (OR = 0.79; 95% CI, 0.66–0.95).

Characteristics of Personal and Familial Suicidal Behavior

Both serious and violent suicide attempters made more suicide attempts than nonserious, nonviolent suicide attempters through their lifetime (*P* < .0001 in both comparisons) (Table 1). Indeed, serious and violent suicide attempters were more likely to have made more than 2 attempts (OR = 4.90 [95% CI, 3.20–7.49], OR = 4.24 [95% CI, 2.81–6.41], respectively) than only 1 when compared with nonserious, nonviolent suicide attempters. Serious and violent suicide attempters also presented higher risk scores on the RRRS and higher planning and lethality expectancy scores on the SIS than nonserious, nonviolent suicide attempters (*P* < .0001 for all comparisons).

Of note, the number of suicide attempts was significantly correlated with other dimensions of the attempts: lethality as measured by the RRRS (risk score: $r = 0.28$, $P < .0001$; rescue score: $r = 0.18$, $P < .0001$) and expectancy of lethality as measured by the SIS ($r = 0.20$, $P < .0001$).

Violent suicide attempters, but not serious suicide attempters, reported more frequently than nonserious, nonviolent suicide attempters a family history of suicidal behavior (OR = 1.70; 95% CI, 1.23–2.34), particularly a family history of violent or serious attempts (OR = 4.02; 95% CI, 2.33–6.95).

When compared to the serious suicide attempters, the violent suicide attempters had higher rescue scores on the RRRS (OR = 1.28; 95% CI, 1.07–1.52), and they declared more frequently a family history of serious or violent attempts (OR = 2.90; 95% CI, 1.41–5.96). Risk scores on the RRRS scale were not significantly different between violent suicide attempters and serious suicide attempters.

Multivariate Analyses

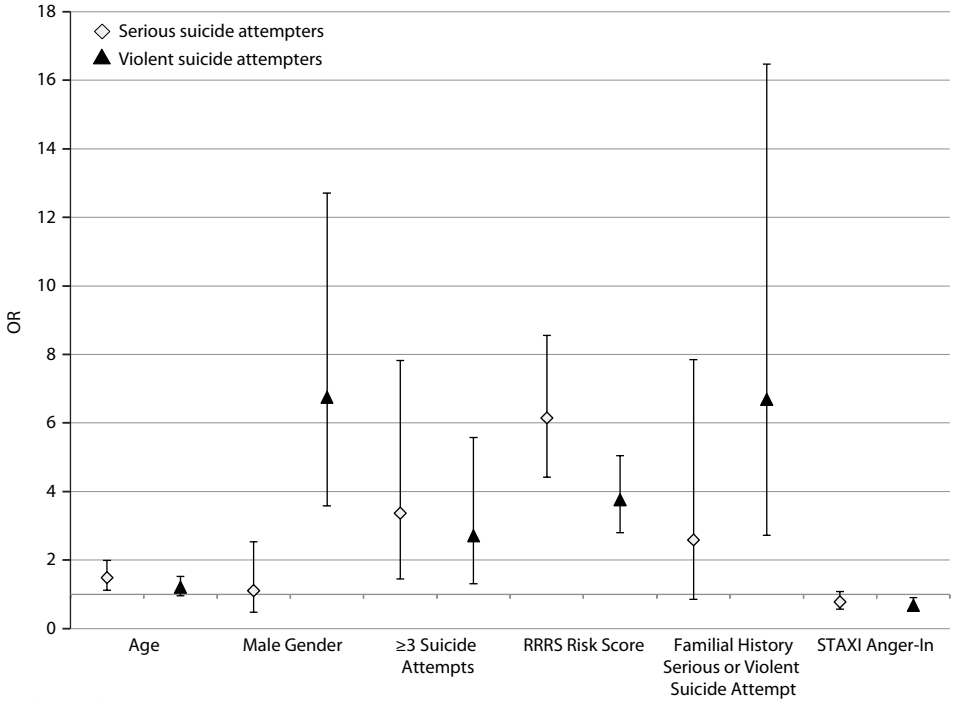
To identify which clinical characteristics were independently associated with violent or serious suicide attempts, we built a multivariate multinomial model (Table 2, Figure 1). Both serious and violent suicide attempters were more likely to have attempted suicide at least 3 times (OR = 3.27 [95% CI, 1.39–7.70] and OR = 2.66 [95% CI, 1.29–5.50], respectively) and to have a higher risk score on the

Table 2. Multivariate Multinomial Analysis in 2 Separate Models (violent suicide attempt vs nonserious, nonviolent suicide attempt and serious suicide attempt vs nonserious, nonviolent suicide attempt)

Variable	Global *P* Value[a]	Serious Suicide Attempt vs Nonserious, Nonviolent Suicide Attempt, OR (95% CI)	Violent Suicide Attempt vs Nonserious, Nonviolent Suicide Attempt, OR (95% CI)
Age[b]	**.02**	1.49 (1.12–1.99)	1.21 (0.95–1.53)
Male gender	**< .0001**	1.09 (0.47–2.54)	6.79 (3.59–12.82)
Familial history of suicidal behavior			
No	**.0004**	1	1
Yes: serious or violent		2.71 (0.88–8.33)	6.96 (2.82–17.20)
Yes: nonserious, nonviolent		2.17 (0.94–5.00)	2.24 (1.08–4.66)
Major depressive episode	.68		
Bipolar disorder	.89		
Eating disorders	.66		
Alcohol or substance misuse	.39		
No. of suicide attempts			
1	**.03**	1	1
2		1.69 (0.71–4.02)	1.76 (0.88–3.52)
≥ 3		3.27 (1.39–7.70)	2.66 (1.29–5.50)
RRRS risk score[c]	**< .0001**	6.66 (4.74–9.38)	3.91 (2.89–5.29)
RRRS rescue score[c]	**.03**	0.80 (0.59–1.10)	1.23 (0.93–1.62)
SIS planning score[c]	.61		
SIS expectancy of lethality[c]	.22		
STAXI anger-in[d]	**.03**	0.79 (0.57–1.09)	0.68 (0.52–0.90)

[a]Significant *P* values (< .05) are bolded.
[b]Odds ratio for 10-point increase.
[c]Odds ratio for 2-point increase.
[d]Odds ratio for 5-point increase.
Abbreviations: RRRS = Risk Rescue Rating Scale, SIS = Suicidal Intent Scale, STAXI = State-Trait Anger Expression Inventory.

Figure 1. Odds Ratios and 95% CIs[a] of Variables Independently Associated With Violent or Serious Suicide Attempts When Compared With Nonviolent, Nonserious Attempts in the Multivariate Model



[a]Error bars indicate 95% CI.
Abbreviations: RRRS = Risk Rescue Rating Scale, STAXI = State-Trait Anger Expression Inventory.

RRRS (OR = 6.66 [95% CI, 4.74–9.38] and OR = 3.91 [95% CI, 2.89–5.29], respectively) in comparison with nonserious, nonviolent suicide attempters. According to the model, male gender, lower scores on the STAXI anger-in subscale, and family history of suicidal behavior, particularly when violent or serious, were associated with violent suicide attempters, while serious suicide attempters were significantly older when compared to nonserious, nonviolent suicide attempters (Table 2). Higher scores on the RRRS rescue subscale among violent attempters remained in the multivariate analysis as the only difference with serious attempters (OR = 1.24; 95% CI, 1.06–1.45).

DISCUSSION

In this study, we found clinical and psychological differences between serious and violent suicide attempts and nonserious, nonviolent suicide attempts. Violent attempters and serious attempters were older and had made more previous attempts with more serious medical consequences, but they also had more lethality expectancy and planning than nonserious, nonviolent suicide attempters, even after adjustment for sex and age. Indeed, the more previous attempts, the higher the risk of having made serious or violent attempts. This finding agrees with the literature: the risk of a violent or serious attempt may increase with repetition, according to clinical and epidemiologic studies.[40] The detection of mild correlations between the number of attempts and their lethality (both expected and attained) in our study underlines suicide attempt repetition as a marker of risk for deadly attempts. The advancing age and the higher number of suicide attempts are independent factors of completed suicide,[41] but a greater attempt planning has also been linked with an increased lethality of the attempts.[42]

Multivariate analyses confirmed that violent suicide attempters and serious suicide attempters share common characteristics that differentiate them from nonserious, nonviolent suicide attempters (increased number of suicide attempts, higher risk score at the suicidal act). Moreover, violent attempters were associated with male gender and family history of suicidal behavior (particularly if violent or completed), both of them well-established risk factors for suicide.[41] Violent attempters also showed less expression of anger toward themselves (STAXI anger-in) than nonserious, nonviolent suicide attempters. Nonetheless, previous studies have reported higher,[43] or nondifferent,[44] anger-in scores when comparing violent and nonviolent suicide attempts. Although the association between anger traits and suicidal behavior seems to be consistent with previous research,[44] the role of anger traits in specific subpopulations of attempters is still to be clarified. In fact, we did not find any other significant difference regarding anger between the groups in our study. Of note, not all subjects in the violent suicide attempt group made medically serious attempts. Indeed, the lethality of the suicide attempts did not differ between serious suicide attempt and violent suicide attempt groups, despite the fact that the use of a violent means is classically viewed as more lethal. Moreover, this result could not be explained by differences in intent or planning of the suicide

attempts. Differences in the medical damage caused by violent attempts may be related to history of mood disorders. In a prior study,[11] violent suicide attempt in people with a history of mood disorders presented higher levels of suicidal intent than violent suicide attempt in people without such history, while suicidal intent among people who made nonserious, nonviolent suicide attempts was situated between the 2 groups of violent suicide attempt, regardless of the history of mood disorders.

Importantly, we found no significant differences in impulsivity or aggressiveness as measured by the BIS-10 and the BDHI between the different types of suicide attempters. These findings agree with previous reports suggesting that impulsivity or aggression does not determine the result of a suicide attempt.[45] Impulsive aggression is a candidate endophenotype for suicidal behavior,[46] which may be facilitated directly[47] or indirectly[48] when such traits are present. Some authors have signaled that impulsive or aggressive states, but not impulsivity or aggressiveness as traits, are associated with suicidal acts.[49]

The association with particular psychiatric diagnoses might also approach the violent suicide attempt and serious suicide attempt groups to the characteristics of completed suicides. While depression is the most frequent mental disorder found in completed suicides, other less frequent mental disorders may convey a higher risk of suicide.[41] In our sample, violent suicide attempters were less often diagnosed with major depression but showed nonsignificantly higher rates of bipolar disorder, schizophrenia, and substance misuse than nonserious, nonviolent suicide attempters. Patients diagnosed with bipolar disorders, substance use disorders (particularly when comorbid with other mental disorders), or eating disorders were overrepresented in the serious suicide attempt group. However, none of these diagnoses were significantly associated with serious or violent attempts at the multivariate analyses level. This might be related to the effect of the familial history of suicidal behavior in the multivariate analysis. In fact, the presence of a familial history of suicidal behavior has been associated with bipolar disorder in mood-disordered attempters,[50] and is common among attempters with substance use disorders.[51] The small number of patients with schizophrenia prevented us from ascertaining whether schizophrenia was associated with more frequent violent attempts in our sample. However, there is consistent evidence of the association of schizophrenia with suicide, particularly violent suicide, and high lethality attempts.[52,53] Interestingly, Beautrais[12] compared a large sample of suicides and medically serious attempts and found that male gender and nonaffective psychoses were characteristically associated with the first group. Violent attempters in our sample were more likely to have family history of violent or serious suicidal behavior and to be rescued (they presented higher rescue scores of the RRRS) than serious attempters. Altogether, our results suggest an escalation in suicidal intent, starting from nonserious, nonviolent suicide attempt, followed by serious suicide attempt, and, finally, violent suicide attempt, which could be related to lower social support[12] and communication difficulties.[24] To bridge the gap with completed suicide, future studies will need to investigate the factors that separate these attempts from a fatal outcome. They could be related to questions not addressed in our study, such as accessibility to care or lethal means, life events, or social support.

This study examines a large sample of consecutively admitted suicide attempters that were comprehensively characterized regarding psychiatric disorders, psychological dimensions, and characterization of suicidal behavior. However, some limitations should be contemplated. The study is retrospective in design. Prospective studies would confirm our results if violent or serious attempters were found to be associated with subsequent completed suicide compared to nonviolent/nonserious attempts. Moreover, the definitions of violent and serious suicide attempts are not derived from consensus but were based on previous studies. Finally, suicidal acts analyzed in this study were considered attempts only if the patients acknowledged at least some suicidal intent in them. Yet, it has been suggested that a significant number of patients tend to mislabel an act as suicidal even if no suicidal intent exists.[54]

In conclusion, violent attempters and serious attempters present differential characteristics, closer to the phenotype of suicide completers, compared to other suicide attempters. Common features with suicide completers would include family history of suicidal behavior, male gender, and higher medical lethality of the previous attempts.[41] In contrast, suicide completers have also been associated with high levels of lifetime aggression, impulsivity, and hopelessness, as well as several psychiatric diagnoses that were not significantly associated with serious or violent suicide attempters in our study. Thus, the transitions between states in the suicidal process might not be linear.[55] The characterization of subgroups of suicide attempters, such as serious and violent attempters, is essential to understand the blurred boundary with completed suicide and to implement more effective prevention strategies. Further research is needed to confirm our findings, particularly studies comparing either serious or violent suicide attempts with samples of completed suicides.

Author affiliations: Department of Psychiatry, University of Seville, Seville (Dr Giner); IIS-Fundacion Jimenez Diaz, Department of Psychiatry, CIBERSAM, Madrid (Drs Baca-Garcia and Lopez-Castroman), Spain; Inserm, U1061, Université Montpellier 1 (Drs Olié, Guillaume, and Courtet and Mss Jaussent and Béziat); Department of Emergency Psychiatry, Centre Hospitalier Régional Universitaire de Montpellier (Drs Olié, Guillaume, Lopez-Castroman, and Courtet), Montpellier, France; and Department of Psychiatry, New York State Psychiatric Institute and Columbia University, New York (Dr Baca-Garcia).

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REFERENCES

1. World Health Organization. Suicide prevention (SUPRE). www.who.int/mental_health/prevention/suicide/suicideprevent/en/index.html Accessed December 17, 2013.
2. McGirr A, Turecki G. The relationship of impulsive aggressiveness to suicidality and other depression-linked behaviors. *Curr Psychiatry Rep*. 2007;9(6):460–466.
3. Schmidtke A, Bille-Brahe U, DeLeo D, et al. Attempted suicide in Europe: rates, trends and sociodemographic characteristics of suicide attempters during the period 1989–1992: results of the WHO/EURO Multicentre Study on Parasuicide. *Acta Psychiatr Scand*. 1996;93(5):327–338.
4. Hoven CW, Mandell DJ, Bertolote JM. Prevention of mental ill-health and suicide: public health perspectives. *Eur Psychiatry*. 2010;25(5):252–256.
5. Owens D, Horrocks J, House A. Fatal and non-fatal repetition of self-harm: systematic review. *Br J Psychiatry*. 2002;181(3):193–199.
6. Beautrais AL. Suicide and serious suicide attempts in youth: a multiple-group comparison study. *Am J Psychiatry*. 2003;160(6):1093–1099.
7. Mann JJ, Waternaux C, Haas GL, et al. Toward a clinical model of suicidal behavior in psychiatric patients. *Am J Psychiatry*. 1999;156(2):181–189.
8. Innamorati M, Pompili M, Masotti V, et al. Completed versus attempted suicide in psychiatric patients: a psychological autopsy study. *J Psychiatr Pract*. 2008;14(4):216–224.
9. Mann JJ, Arango VA, Avenevoli S, et al. Candidate endophenotypes for genetic studies of suicidal behavior. *Biol Psychiatry*. 2009;65(7):556–563.
10. Misson H, Mathieu F, Jollant F, et al. Factor analyses of the Suicidal Intent Scale (SIS) and the Risk-Rescue Rating Scale (RRRS): toward the identification of homogeneous subgroups of suicidal behaviors. *J Affect Disord*. 2010;121(1–2):80–87.
11. Astruc B, Torres S, Jollant F, et al. A history of major depressive disorder influences intent to die in violent suicide attempters. *J Clin Psychiatry*. 2004;65(5):690–695.
12. Beautrais AL. Suicides and serious suicide attempts: two populations or one? *Psychol Med*. 2001;31(5):837–845.
13. Linehan MM. Suicidal people: one population or two? *Ann N Y Acad Sci*. 1986;487(1, psychobiology):16–33.
14. Jokinen J, Nordström A-L, Nordström P. Cholesterol, CSF 5-HIAA, violence and intent in suicidal men. *Psychiatry Res*. 2010;178(1):217–219.
15. Marcinko D, Martinac M, Karlović D, et al. Are there differences in serum cholesterol and cortisol concentrations between violent and non-violent schizophrenic male suicide attempters? *Coll Antropol*. 2005;29(1):153–157.
16. Stefulj J, Kubat M, Balija M, et al. TPH gene polymorphism and aging: indication of combined effect on the predisposition to violent suicide. *Am J Med Genet B Neuropsychiatr Genet*. 2006;141B(2):139–141.
17. Brådvik L. Violent and nonviolent methods of suicide: different patterns may be found in men and women with severe depression. *Arch Suicide Res*. 2007;11(3):255–264.
18. Jollant F, Bellivier F, Leboyer M, et al. Impaired decision making in suicide attempters. *Am J Psychiatry*. 2005;162(2):304–310.
19. Lindqvist D, Janelidze S, Erhardt S, et al. CSF biomarkers in suicide attempters—a principal component analysis. *Acta Psychiatr Scand*. 2011;124(1):52–61.
20. Lin H-C, Chen C-S, Xirasagar S, et al. Seasonality and climatic associations with violent and nonviolent suicide: a population-based study. *Neuropsychobiology*. 2008;57(1–2):32–37.
21. Mittendorfer-Rutz E, Wasserman D, Rasmussen F. Fetal and childhood growth and the risk of violent and non-violent suicide attempts: a cohort study of 318,953 men. *J Epidemiol Community Health*. 2008;62(2):168–173.
22. Neves FS, Malloy-Diniz LF, Romano-Silva MA, et al. Is the serotonin transporter polymorphism (5-HTTLPR) a potential marker for suicidal behavior in bipolar disorder patients? *J Affect Disord*. 2010;125(1–3):98–102.
23. Lindqvist D, Janelidze S, Hagell P, et al. Interleukin-6 is elevated in the cerebrospinal fluid of suicide attempters and related to symptom severity. *Biol Psychiatry*. 2009;66(3):287–292.
24. Horesh N, Levi Y, Apter A. Medically serious versus non-serious suicide attempts: relationships of lethality and intent to clinical and interpersonal characteristics. *J Affect Disord*. 2012;136(3):286–293.
25. Beautrais AL. Further suicidal behavior among medically serious suicide attempters. *Suicide Life Threat Behav*. 2004;34(1):1–11.
26. Rapeli CB, Botega NJ. Clinical profiles of serious suicide attempters consecutively admitted to a university-based hospital: a cluster analysis study. *Rev Bras Psiquiatr*. 2005;27(4):285–289.
27. Asberg M, Träskman L, Thorén P. 5-HIAA in the cerebrospinal fluid: a biochemical suicide predictor? *Arch Gen Psychiatry*. 1976;33(10):1193–1197.
28. Lopez-Castroman J, Jaussent I, Beziat S, et al. Suicidal phenotypes associated with family history of suicidal behavior and early traumatic experiences. *J Affect Disord*. 2012;142(1–3):193–199.
29. Sheehan DV, Lecrubier Y, Sheehan KH, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for *DSM-IV* and *ICD-10*. *J Clin Psychiatry*. 1998;59(suppl 20):22–33, quiz 34–57.
30. Weisman AD, Worden JW. Risk-rescue rating in suicide assessment. *Arch Gen Psychiatry*. 1972;26(6):553–560.
31. Beck RW, Morris JB, Beck AT. Cross-validation of the Suicidal Intent Scale. *Psychol Rep*. 1974;34(2):445–446.
32. Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt Impulsiveness Scale. *J Clin Psychol*. 1995;51(6):768–774.
33. Buss AH, Durkee A. An inventory for assessing different kinds of hostility. *J Consult Psychol*. 1957;21(4):343–349.
34. Beck AT, Weissman A, Lester D, et al. The measurement of pessimism: the hopelessness scale. *J Consult Clin Psychol*. 1974;42(6):861–865.
35. Forgays DK, Spielberger CD, Ottaway SA, et al. Factor structure of the State-Trait Anger Expression Inventory for middle-aged men and women. *Assessment*. 1998;5(2):141–155.
36. Kleinbaum DG, Klein M. *Logistic Regression: A Self-Learning Text*. 3rd ed. New York, NY: Springer; 2010.
37. Bender R, Lange S. Adjusting for multiple testing—when and how? *J Clin Epidemiol*. 2001;54(4):343–349.
38. Rothman KJ. Statistics in nonrandomized studies. *Epidemiology*. 1990;1(6):417–418.
39. Savitz DA, Olshan AF. Describing data requires no adjustment for multiple comparisons: a reply from Savitz and Olshan. *Am J Epidemiol*. 1998;147(9):813–814, discussion 815.
40. Lopez-Castroman J, Perez-Rodriguez M de LM, Jaussent I, et al; European Research Consortium for Suicide (EURECA). Distinguishing the relevant features of frequent suicide attempters. *J Psychiatr Res*. 2011;45(5):619–625.
41. Hawton K, van Heeringen K. Suicide. *Lancet*. 2009;373(9672):1372–1381.
42. Nakagawa A, Grunebaum MF, Oquendo MA, et al. Clinical correlates of planned, more lethal suicide attempts in major depressive disorder. *J Affect Disord*. 2009;112(1–3):237–242.
43. Jandl M, Steyer J, Kaschka WP. Suicide risk markers in major depressive disorder: a study of electrodermal activity and event-related potentials. *J Affect Disord*. 2010;123(1–3):138–149.
44. Giegling I, Olgiati P, Hartmann AM, et al. Personality and attempted suicide. Analysis of anger, aggression and impulsivity. *J Psychiatr Res*. 2009;43(16):1262–1271.
45. Baca-García E, Diaz-Sastre C, Basurte E, et al. A prospective study of the paradoxical relationship between impulsivity and lethality of suicide attempts. *J Clin Psychiatry*. 2001;62(7):560–564.
46. Turecki G. Dissecting the suicide phenotype: the role of impulsive-aggressive behaviours. *J Psychiatry Neurosci*. 2005;30(6):398–408.
47. Mann JJ. Neurobiology of suicidal behaviour. *Nat Rev Neurosci*. 2003;4(10):819–828.
48. Joiner TE Jr, Brown JS, Wingate LR. The psychology and neurobiology of suicidal behavior. *Annu Rev Psychol*. 2005;56(1):287–314.
49. Baca-Garcia E, Diaz-Sastre C, García Resa E, et al. Suicide attempts and impulsivity. *Eur Arch Psychiatry Clin Neurosci*. 2005;255(2):152–156.
50. Guillaume S, Jaussent I, Jollant F, et al. Suicide attempt characteristics may orientate toward a bipolar disorder in attempters with recurrent depression. *J Affect Disord*. 2010;122(1–2):53–59.
51. Roy A. Characteristics of drug addicts who attempt suicide. *Psychiatry Res*. 2003;121(1):99–103.
52. Haukka J, Suominen K, Partonen T, et al. Determinants and outcomes of serious attempted suicide: a nationwide study in Finland, 1996–2003. *Am J Epidemiol*. 2008;167(10):1155–1163.
53. Gómez-Durán EL, Martin-Fumadó C, Hurtado-Ruíz G. Clinical and epidemiological aspects of suicide in patients with schizophrenia. *Actas Esp Psiquiatr*. 2012;40(6):333–345.
54. Nock MK, Kessler RC. Prevalence of and risk factors for suicide attempts versus suicide gestures: analysis of the National Comorbidity Survey. *J Abnorm Psychol*. 2006;115(3):616–623.
55. Baca-Garcia E, Perez-Rodriguez MM, Oquendo MA, et al. Estimating risk for suicide attempt: are we asking the right questions? passive suicidal ideation as a marker for suicidal behavior. *J Affect Disord*. 2011;134(1–3):327–332.