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ORIGINAL PAPER

Correlates and antecedents of hospital admission for attempted suicide: a nationwide survey in Italy

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Abstract The present study examined data on symptom patterns in the week prior to admission for suicide attempt, in a nationwide representative sample of patients. Socio-demographic, clinical, and treatment data was gathered for 1,547 patients admitted over a 12-day index period during the year 2004 to 130 public and 36 private psychiatric facilities in Italy. Patients were evaluated in terms of whether they had been admitted for having attempted suicide or not. A detailed checklist was used to assess symptom pattern at admission; diagnoses were based on ICD-10 categories. Two-hundred thirty patients (14.8%) in the sample had been admitted for suicide attempt. Patients with depression or with personality disorders were more frequently observed among suicide attempters. First-contact patients were significantly more likely to have been admitted after a suicide attempt, the only exception being individuals with bipolar disorder, manic phase. No diagnosis was statistically related to admission after suicide attempt, once symptoms pattern at admission had been accounted for. Disordered eating behavior, depressive symptoms, substance abuse, and non-prescribed medication abuse were positively related to attempted suicide, as were any traumatic events in the week prior to admission; symptoms of psychosis (hallucinations/delusions) and lack of self-care were negatively associated with suicide attempt admission. Greater attention to symptoms immediately preceding or concomitant with admission after a suicide attempt can be a key factor in establishing the best treatment plan and discharge strategy, the most effective community-service referral, and targeted intervention programmes for patients hospitalized for a suicide attempt.

Keywords Suicide · Prevention · Depression · Bipolar disorder · In-patients

This paper is dedicated to the memory of Pierluigi Morosini, M.D., who was the Scientific Director of the National Mental Health Project and enthusiastically supported and contributed to the development and conduct of this national research project.

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Introduction

Suicide is a specific cause of death in mental disorders: up to 90% of completed suicides have a history of a diagnosable mental disorder [1, 2]. Moreover, most mental disorders have higher standardized mortality ratio for suicide, compared to the general population [3–5].

Attempted suicide represents the primary antecedent for completed suicide [6–10]; the phenomenon therefore merits special attention in any effort aimed at preventing subsequent suicide behavior. Indeed, those who attempted suicide had a 30–40 times increased risk of death from suicide compared to the general population [4]. Currently, suicide prevention programs are typically based on the early assessment and diagnosis of at-risk individuals and on the delivery of appropriate, effective treatments [11–13]. Yet, hospitalization remains the first-line intervention for patients who report planning or making an attempt [14, 15].

Correlates and determinants of hospitalization after attempted suicide

In western countries only 25–50% of the patients arriving in Emergency Rooms (ERs) are hospitalized after attempting suicide [6, 16–18]. The proportion is even lower for individuals attempting suicide by self-poisoning [8]. Conversely, hospital admission rates are as high as 70% in patients with symptoms of psychosis or with a previous history of attempted suicide [19, 20]. This fraction is likely to include those at the highest risk of repetition of attempt and completion of suicide.

Patients admitted after attempted suicide are specifically prone to suicidal behavior reiteration [21–25]. The risk is higher for first-episode patients [5, 21, 26], and during the first post-discharge year [27, 28], remaining at its highest up to 5-year post-discharge [29]. Illness severity can determine high hospitalization rates, but one can account for this higher post-discharge suicide risk, up to 100-times higher than the general population in the first 4-week post-discharge [30, 31], by the potential for interruption of care or discontinuation of pharmacological or psychosocial treatments [32, 33].

Although few studies have thoroughly investigated the characteristics of patients admitted to acute inpatient psychiatric facilities for attempted suicide, this information could be helpful in triage assessment. It could also serve to enhance general practitioners' and gatekeepers' ability to identify the early signs of post-discharge risk. In fact, clinical assessment, even via simple checklist, has shown evidence of being more effective than specific research tools (such as the suicidal intent scale, [34]) in guiding medical personnel's decisions to admit patients who have attempted suicide [6].

Despite the currently available amount of information on suicide risk [35], data on symptom patterns in the few weeks prior to hospitalization are limited. This information could be highly valuable for assessing the process of medical decision-making, which is directly linked to and affected by the organization of services. It may also serve on a larger scale, in helping us learn more about suicidal behavior, as suicide represents the outcome of thoughts and acts unfolding in a rather limited time-frame, such as a period of days or even hours [36].

The present study reports data from the second phase of the 'PROGRES-Acute' Project (PROGetto RESidenze, i.e., Residential Care Project for Acute Patients)—a national survey aimed at obtaining comprehensive data on public and private inpatient facilities in Italy [37, 38].

The aims of this paper were to explore symptom patterns and factors recorded in the week prior to admission and to analyze the determinants of admission for attempted suicide, in an effort to obtain helpful information on the process of care in a country where all acute admissions for mental disorders are made in General Hospital Psychiatric Units or in private inpatient facilities.

Methods

Data collection

All 21 Italian regional health administrations, with the exception of Sicily, agreed to participate in the study. Each region appointed a coordinator, who organized and supervised data collection and trained research assistants in test administration and data collection. The project began in 2001 and was completed in 2005.

All patients admitted for any reason during a full 12-day index period (on a 24-h basis) were enrolled and assessed by research assistants within 3 days of admission. The investigation was carried out on a stratified random sample of 130 public and 36 private inpatient facilities.

Information on treatment, socio-demographic, and clinical characteristics was obtained either from patient records or from treating physicians by asking them to fill out a form that had been specifically developed for the PROGRES study [37, 39].

Diagnoses were based on the ICD-10 [40] and were assigned by the treating physician, on the basis of a detailed clinical evaluation: Multiple sources were used to classify the current episode of admission, including symptoms at presentation, medical records, the reason for admission recorded in the hospital clinical record, and the results of standardized assessment on the 24-item BPRS [41, 42], and the personal and social performance scale (PSP), designed to evaluate a patient's functioning on a 0–100-point scale in the week preceding the index assessment period, in four main areas: (1) socially useful activities; (2) personal and social relationships; (3) self-care; and (4) disturbing and aggressive behavior [43].

An admission episode included any episode of care with patients being admitted to a psychiatric facility directly or from any other ward and then transferred. Variables assessed were: age, gender, nationality, marital status, living situation, occupational status, education, diagnosis according to ICD-10 criteria, suicidality status, type of admission (voluntary vs. committed), and symptom profile and precipitating factors during the week prior to admission, using a checklist (see "Appendix 2").

Subjects gave informed consent to participate in an anonymous aggregate reporting of findings. Researchers followed the Declaration of Helsinki guidelines in complying with ethical issue related to the study.

Statistical analysis

The Mann–Whitney test for non-normal distributions was used to compare the continuous variables.

Explorative analyses were conducted by applying binary logistic regression with enter method, for socio-demographic characteristics, diagnostic groups and symptoms pattern separately, in order to remove confounding effects and interactions.

We first analyzed age, gender, marital status, living situation, occupational status, and education; these socio-demographic characteristics were considered first, under the assumption that they are generally not amenable to intervention. We then analyzed clinical data, such as diagnosis, type of admission (voluntary vs. committed), type of facility (public vs. private), and admission as first-ever/not-first-ever contact with a psychiatric service The diagnostic groups known to be significantly associated with suicide risk (both positively and negatively) were entered in the regression, but some diagnostic variables less likely to be associated with suicide risk (organic mental disorders and mental retardation) were entered into an 'all other' group (in an effort to retain the highest degree of power as possible) and were considered the reference group. Finally, we considered data pertaining to the patient's previous week, in terms of any contact with a health provider, symptom pattern at presentation, and precipitating factors for admission.

Finally, multivariate analyses were conducted by applying binary logistic regression with stepwise backward elimination using all predictor variables; as pointed out by Lee and Koval [44], enter probability level $P = 0.05$ could be too stringent and then the value for enter probability level was ranged from 0.05 to 0.25.

Classification accuracy of different models obtained ranging enter probability level was compared according to Hanley and McNeil [45]. Usually 0.5 cut-off level classification of each case is used, but classification is sensitive to relative size of each group; this fact always favors classification into larger group. A good description of classification accuracy can be obtained by plotting ROC (receiver operating characteristic) curve. ROC curve shows the probability of detecting true attempted suicide cases (sensitivity) and false attempted suicide case (1-specificity) for an entire range of possible cut-points. Using ROC curve it is possible also to select a cut-point that maximizes both sensitivity and specificity or a cut-point depending by a determined value of specificity or sensitivity [46].

The area under the receiver operating characteristic area (AUC) allows an evaluation of the global assessment of the performance of a test or a classification, sometimes called diagnostic accuracy; reported effect size intervals for AUC are: small effect sizes (0.528–0.556); medium effect sizes (0.584–0.638); large effect sizes (0.714–0.760); very large effect sizes (above 0.760) [47].

All data were coded and analyzed using the Statistical Package for Social Science (SPSS) for Windows (Chicago, IL 60606, USA), version 13, or Excel 2003 (Microsoft® Office).

Results

Two-hundred thirty (14.8%) of all the 1,547 patients admitted in the 12-day periods had attempted suicide. Women were over-represented among these patients, although this excess did not reach statistical significance (Table 1).

The age distributions for attempters and non-attempters did not differ. Individuals of non-Italian nationality—both European and non-European immigrants—were observed more frequently in the attempted suicide group. Sex, marital, occupational, and educational status, as well as living situation did not significantly differentiate patients admitted after attempted suicide from those who were not. Classification accuracy of socio-demographic variables, based on AUC, was 0.620, indicating a modest discriminating power of these variables, as far as suicidal status was concerned.

Diagnostic status

With organic mental disorders or mental retardation used as the reference category, patients admitted for attempting suicide were significantly more likely to have received a diagnosis of bipolar disorder, depressive episode, unipolar depression, or personality disorder, but were significantly less likely to have received a diagnosis of bipolar disorder, manic episode (Table 2).

Moreover, patients at their first-ever contact with mental health services were more likely to have been admitted for attempting suicide than individuals already known to specialized services. This difference (not shown in Table 2) was largely due to patients with depression (OR = 2.4, 95% CI 1.4–4.1), bipolar disorder, depressive episode (OR = 27.2, 95% CI 3.0–244.3), and with schizophrenia (OR = 2.4, 95% CI 1.1–5.7). Conversely, none of the patients diagnosed with bipolar disorder-manic episode and at their first mental-health contact had been admitted after attempting suicide. Finally, the legal status of the admission (voluntary/compulsory) was not statistically related to attempted suicide prior to admission. Public facilities were more likely to have admitted suicide attempters than private facilities [$n = 209$ (16.2%) vs. $n = 21$ (8.3%), OR = 2.1, 95% CI 1.3–3.4].

Table 1 Sociodemographic characteristics of the sample ($N = 1,547$)

Explanatory variables	No suicide attempt ($N = 1,317$)		Suicide attempt ($N = 230$)		OR (95% CI)
	N	Percentage	*N*	Percentage	
Sex					
Male	706	53.6	109	47.4	1
Female	611	46.4	121	52.6	1.27 (0.93–1.72)
Age in years (<24)					
<18–24	104	7.9	25	10.9	1
25–44	615	46.7	114	49.6	0.69 (0.42–1.15)
45–64	464	35.2	70	30.4	0.55 (0.28–0.91)
65-older	134	10.2	21	9.1	0.57 (0.26–1.26)
Nationality					
Italian	1,257	95.4	211	91.7	**1**
Non-Italian	60	4.6	19	8.2	**1.78 (1.03–3.07)**
Marital status					
Never married	689	52.9	118	50.6	1
Married or cohabiting	372	28.6	67	28.7	0.84 (0.57–1.24)
Separated/divorced	171	13.1	35	15.0	1.15 (0.72–1.83)
Widowed	69	5.3	13	5.5	1.18 (0.59–2.37)
Occupational status					
Unemployed	552	48.8	86	50.3	1
Employed[a]	164	14.5	31	18.1	1.07 (0.67–1.71)
Retired	414	36.6	54	31.6	0.85 (0.59–1.24)
Educational status					
Compulsory school or less (≤8 years)	1,160	86.1	190	82.6	1
High school or higher (≥13 years)	187	13.9	40	17.4	1.20 (0.80–1.80)
Living situation					
At home	1,133	90.3	200	92.6	1
Institution	95	7.6	15	6.9	1.12 (0.62–2.02)
Homeless	27	2.1	1	0.5	0.22 (0.03–1.67)

Significant results are in bold

[a] Including student/housewife, as these individuals are not expected to be seeking employment

Classification accuracy of diagnostic and admission variables, based on AUC, was 0.743.

Suicide attempters had a similar mean BPRS score (51.3, 95% CI 49.3–53.4 vs. non-attempters 54.4, 95% CI 53.4–55.4, Mann–Whitney $U = 103,266.5$, $P = 0.07$), and a higher PSP score (50.3, 95% CI 47.6–53.0 vs. 44.8, 95% CI 43.8–45.9, Mann–Whitney $U = 98,223.5$, $P = 0.0001$).

Patterns of care and antecedents of admission

Patients in contact with any practitioner in the month prior to admission were not less likely to have attempted suicide (Table 3).

Patients admitted after suicide attempt were more frequently suffering from non-prescribed medication abuse, depression, disordered eating behavior, and substance abuse, and were less likely to be showing psychotic symptoms.

A history of traumatic events prior to admission was more frequently observed in suicidal patients. Interestingly, lack of self-care was less frequently found in suicidal patients.

Classification accuracy of symptom pattern in the week prior to admission, based on AUC, was 0.804, indicating the best discriminating power in distinguishing patients on the basis of suicidal status than socio-demographic and diagnostic and admission variables.

A further exploratory (principal component analysis) factorial analysis was conducted on symptom pattern in the week prior to admission: Kaiser–Meyer–Olkin test = 0.67 (fair sampling adequacy). We extracted eight factors with eigenvalues of >1, but we were able to detect only five

Table 2 Psychiatric admissions by diagnostic group, treatment history, and admission status

Explanatory variables	No suicide attempt ($N = 1,317$)		Suicide attempt ($N = 230$)		OR (95% CI)
	n	Percentage	*n*	Percentage	
Diagnosis					
Organic mental disorder and mental retardation	53	4.0	8	3.5	1
Mental and behavioral disorders due to psychoactive substance use	112	8.5	21	9.1	1.47 (0.58–3.57)
Schizophrenia, schizotypal and delusional disorders	518	39.3	38	16.5	0.61 (0.25–1.46)
Mood disorders					
Bipolar affective disorder					
Depressive episode	95	7.2	32	13.9	**3.11 (1.25–7.73)**
Manic episode	94	7.1	3	1.3	**0.24 (0.06–1.00)**
Mixed state episode	27	2.1	3	1.3	0.87 (0.21–3.69)
NOS	36	2.7	0	0	–
Depression and related disorders	198	15.0	63	27.4	**2.47 (1.05–5.82)**
Neurotic, stress-related and somatoform disorders	44	3.3	15	6.5	2.55 (0.94–6.91)
Behavioral syndromes associated with physiological disturbances and physical factors	9	0.7	3	1.3	2.67 (0.56–12.6)
Disorders of adult personality and behavior	122	9.3	40	17.4	**2.72 (1.13–6.59)**
Other/unknown	9	0.7	4	1.7	2.62 (0.61–11.2)
Contact					
Already known to the service	1,047	80.5	139	62.3	1
First-contact ever	254	19.5	84	37.7	**2.10 (1.51–2.91)**
Admission					
Voluntary	1,132	87.0	204	70.8	1
Compulsory admission	169	13.0	21	29.2	0.96 (0.57–1.62)
Setting					
Public facility	1,085	82.4	209	90.9	1
Private facility	232	17.6	21	9.1	**0.38 (0.23–0.62)**

Statistically significant results are in bold

factors by using scree plot criteria. Cumulative variance, related to eight factors, was only 52.7%, and only three factors showed absolute loading values of >0.35. We therefore opted not to rely on the extracted factors in further analyses of symptom pattern in the week prior to admission. We then ran a comprehensive multivariate analysis via a logistic model. Logistic models per se exclude variables that are not specifically linked to outcomes; redundant symptoms were therefore eliminated from the following logistic regression, which included all variables.

Multivariate analyses

We carried out a backward logistic regression analyses to identify the reliable determinants of attempted suicide admission in our sample taking into account all confounding effects and interactions.

Preliminarily, we varied *p*-enter and cut-point in classification, to avoid too stringent criteria. Using the most conservative values (*p*-enter = 0.05) resulted in a solution strictly comparable to the one produced by the more liberal criteria (*p*-enter = 0.25). AUC did not vary between the different solutions [$p(z) > 0.20$], extracting a data-based cut-point around 13–14%, which roughly match the fraction of cases with attempted suicide really observed in the sample.

We therefore used the most restrictive criteria (*p*-enter = 0.05) to carry out the multivariate backward logistic regression (Table 4).

No socio-demographic variable resulted significantly related to attempted suicide, except nationality, with non-Italian patients more likely to be among those who attempted suicide.

Public facilities had more frequently admitted patients attempting suicide prior to admission. Patients at their first

Table 3 Patterns of care: reasons contributing to admission (%)

Explanatory variables	No suicide attempt ($N = 1,317$)		Suicide attempt ($N = 230$)		OR (95% CI)
	N	Percentage	*N*	Percentage	
Treated in month prior to admission					
Yes	1,038	81.7	166	75.5	1
In treatment	233	18.3	54	24.5	1.33 (0.90–2.00)
Symptom pattern during week prior to admission					
No					1
Agitation	629	47.8	72	31.3	0.91 (0.61–1.34)
Confusion	466	35.4	66	27.8	0.77 (0.52–1.14)
Hallucinations/delusions	575	43.7	46	20.0	**0.47 (0.32–0.68)**
Disordered eating behavior	128	9.7	43	18.7	**2.73 (1.74–4.28)**
Severe anxiety	866	65.8	174	75.7	1.18 (0.81–1.72)
Depression	582	44.2	166	72.2	**2.57 (1.79–3.70)**
Alcohol abuse	223	16.9	40	17.4	0.76 (0.48–1.20)
Substance abuse	93	7.1	28	12.2	**2.35 (1.41–3.94)**
Abuse of non-prescribed medications	64	4.9	52	22.6	**4.83 (3.11–7.50)**
Precipitating factors for admission					
No					1
Work/social functioning problems	837	63.6	138	60.0	0.96 (0.67–1.37)
Social withdrawal	687	52.2	124	53.9	1.38 (0.98–1.96)
Lack of self-care	571	43.4	65	28.3	**0.42 (0.28–0.61)**
Conflict with family members	565	42.9	107	46.5	1.31 (0.93–1.85)
Conflict with others	404	30.7	50	21.7	1.02 (0.67–1.56)
Violent behavior toward objects	106	8.0	12	5.2	0.70 (0.31–1.58)
Violent behavior toward people	144	10.9	21	9.1	1.08 (0.57–2.05)
General medical condition	125	9.5	18	7.8	1.05 (0.59–1.85)
Drug side effects	53	4.0	10	4.3	1.25 (0.56–2.75)
Traumatic events	99	7.5	49	21.3	**2.87 (1.87–4.40)**
Victim of violence	46	3.5	10	4.3	1.49 (0.55–4.07)
Crime committed	13	1.0	7	3.0	3.23 (0.92–11.4)

Statistically significant results are in bold

contact were statistically more likely to have been admitted after attempting suicide.

Disordered eating behavior, symptoms of depression, substance abuse, and abuse of non-prescribed mediation were positively related to attempted suicide, as were any traumatic event in the week prior to admission.

Conversely, symptoms of psychosis (hallucinations/delusions) and lack of self-care were negatively associated with admission for suicide attempt.

Classification accuracy of the model, based on AUC, was 0.832 and clearly superior to the other models tested (Fig. 1). The best model was found to correctly classify 79.9% of patients as admitted for attempting suicide, and 69.5% for a non-attempted suicide admission, with a cut-off point fixed at 12.5%.

Discussion

The data yielded in this study confirm several of the main reported correlates of attempted suicides among patients with mental disorders, i.e., that these correlates are observed more frequently in women than in men [10, 48], although the difference in our sample did not reach statistical significance, and that individuals of different ethnicity (immigrants) present a greater risk [16]. At the same time, however, when we controlled for clinical variables, no socio-demographic variables were found to be positively associated with attempted suicide.

In this sample, symptoms of depression and substance abuse were the most important features linked to admission after attempted suicide; hallucinations/delusions were less

Table 4 Correlates of attempted suicide at admission: multivariate analysis

Explanatory variables	Odds ratio (95% CI)	*P* value
Nationality		
Italian	1	
Non-Italian	**2.16 (1.10–4.26)**	**0.026**
Type of admission		
Not first-contact	1	
First-contact ever	**1.77 (1.23–2.55)**	**0.002**
Setting		
Public facility	1	
Private facility	**0.36 (0.21–0.60)**	**<0.001**
Symptoms pattern week prior admission		
No	1	
Hallucinations/delusions	**0.62 (0.40–0.95)**	**0.030**
Disordered eating behavior	**2.49 (1.56–3.96)**	**<0.001**
Depression	**2.42 (1.63–3.59)**	**<0.001**
Substance abuse	**2.55 (1.47–4.42)**	**<0.001**
Abuse of non-prescribed medication	**4.79 (3.02–7.59)**	**<0.001**
Precipitating factors for the admission		
No	1	
Lack of self-care	**0.53 (0.36–0.78)**	**0.001**
Traumatic events	**2.38 (1.52–3.74)**	**<0.001**

Statistically significant results in bold

* Based on backward logistic regression (*p*-enter = 0.05)

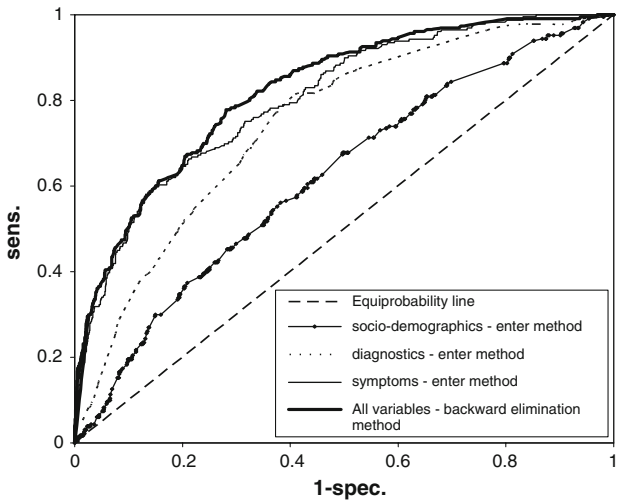

Fig. 1 ROC curve obtained from all possible cut-point of cases classification; probability of attempted suicide was obtained from logistic regression

frequently observed. Traumatic/stressful events before the attempt remained statistically significant even after clinical variables were included—a finding showing that stressful events represent an independent risk factor for suicidal behavior [49].

Individuals at their first-ever contact with a mental health service were more likely to have attempted suicide before admission—most probably because the event itself mobilizes individuals and their immediate social networks (e.g., family, friends, and general practitioners) and leads to contact with mental health services. In this case, the suicide attempt can be considered to represent a 'sentinel' event of underlying psychopathology [50].

Indications for treatment

Not unsurprisingly, our findings point to depression as a major risk factor for attempted suicide, and to early referral to mental health professionals as a requisite for effective prevention. As observed in past studies [51], in our sample hallucinations and delusions are generally associated with lower risk—most probably because their disruptive impact leads patients to hospitals before more severe consequences can occur. The same reason can account for negative association of lack of self-care with admission after attempted suicide; relatives are likely to require hospitalization for severely impaired patients before the most severe consequences could occur.

Substance abuse (including both illicit and legally available but non-prescribed substances) is a frequent correlate of attempted suicide [52, 53]. Hence, the timely referral of substance abusers to appropriate services could reduce their risk of repeated suicide attempts. In Italy, however, mental health- and drug addiction service links are still weak and need improvement [54]. The problem is likely to similarly affect any country presenting rigid distinctions between mental health and drug addiction services, poor service integration, limited referral practices, and/or problematic management of patients with dual diagnosis.

Disturbed eating behavior, symptoms of depression, and abuse of both licit (but non-prescribed) medication and illegally available substances classified attempted suicide patients more accurately than a clinical diagnosis of depression or personality disorder did. This is not surprising, as diagnoses are based on symptoms, and in our sample many of the symptoms linked to admission after a suicide attempt make up a profile that is compatible with the diagnosis of major depressive disorder (both uni- and bipolar). This clinical picture is frequently complicated with substance abuse, both as an attempt to self-medicate depression and anxiety, and as a result of disinhibition secondary to hypomania in both bipolar I and II and in individuals with a hyperthymic temperament [53].

Limitations and strengths of the study

The main limitation of the study is that the symptoms could not be compared with those of patients for whom there had been a decision not to admit after a suicide attempt, only with the group of patients who had been admitted for reasons other than a suicide attempt. However, still our data allow a profiling of how patients admitted for attempted suicide differ from patients admitted for other reasons, to be considered for further studies. These patients, indeed, are likely to include those with the highest risk of repetition of attempt.

Other limitations of this study are that it is cross-sectional and that it relied on clinically based diagnoses, which did not involve the use of standardized assessment methods, and in general did not take co-morbidity into account, particularly for personality disorders; indeed, the study was aimed at evaluating real-setting processes, where standardized assessment is not generally applied (at least not in Italy). Moreover, the sample sizes of some diagnostic groups were too small to allow for meaningful comparison.

Finally, no data on targeted suicidal behavior assessment at entry were available, especially, in terms of degree of attempt lethality and patient's intent to die at the moment of the act. This limitation is due, once again, to the fact that, in Italy ordinary treatment settings (with the exception of some university centers) do not involve the standardized assessment of suicidal risk.

Nevertheless, the study presents some important strengths: (1) the nationwide dimension of the data gathered; (2) the large size of its investigated sample, which moreover, was representative of all individuals admitted in a mixed (public-private) mental health care system, such as the one currently operating in Italy [55]; and (3) the availability of information on patients' symptom status 1 week prior to admission, which allowed us to identify the immediate correlates of the events leading up to admission, including attempted suicide. Although we used a simple checklist to obtain pattern of symptoms and correlates of admission in our sample, this checklist reflects the current clinical practice in the Italian mental health care system, where detailed assessment of symptoms is rarely done; therefore, the results of this study might be generalized to other similar settings, and as well replicated with low cost.

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Appendix 1

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Appendix 2

Symptoms profile and precipitating factors in the week prior to admission

Agitation	Any exaggerated verbal, vocal or motor activity, with or without aggressive behavior, not justifiable on the basis of an urgent or important need
Confusion	Disorientation in time and space and/or attentive deficits preventing from acting in an appropriate way
Hallucinations/ delusions	Hallucinations: perceptions without any confirmable real existence.
	Delusions: erroneous perceptions or judgments about reality.
Disordered eating behavior	Any instance of irregular or erratic eating behavior with actual or probable consequences on health state
Severe anxiety	Any occurrence of anxiety at levels higher than habitually tolerated by the subject, with appreciable conduct abnormalities.
Depression	Low or bad mood or lack of interest in habitual activities and pleasure, longer than a week, irrespectively by the occurrence of associated symptoms (disordered sleep, disordered eating, guilt, suicidality)
Alcohol abuse	Use of alcohol out of control of the subject, despite the presence of physical, relational, occupational, or legal problems
Substance abuse	Use of illicit substances out of control of the subject, despite the presence of physical, relational, occupational, or legal problems

Appendix continued

Abuse of non-prescribed medications	Use of non-prescribed therapeutic drugs out of control of the subject, despite the presence of physical, relational, occupational, or legal problems
Work/social functioning problems	Any occurrence of relevant work or social functioning impairment
Social withdrawal	Any instance of relevant withdrawal from social or interactions with others
Lack of self-care	Lack of care for hygiene or self-presentation (i.e., dress, hair, beard)
Conflict with family members	Any occurrence of conflict with family members causing difficulties to the subject or to his/her family members
Conflict with neighbors	Any occurrence of conflict with neighbors causing difficulties to the subject or to his/her counterparts
Violent behavior toward objects	Any instance of physical assault directed toward objects or things
Violent behavior toward people	Any instance of physical or verbal assault directed toward people, whether known or unknown
General medical condition	Any occurrence of physical/somatic disorder requiring treatment
Drug side effects	Any occurrence of side effects from treatment requiring changes of dosage, or drug withdrawal or the prescription of additional therapeutics
Traumatic events	Any event causing the potential of bodily or psychic harm, or with a foreseeable impact on public personal identity (image), causing stressful reactions
Victim of violence	Any occurrence of victimization, i.e., being the victim of assault, aggression or robbery
Crime committed	Any occurrence of law violation, causing or not referral to justice

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