Observational study of suicide in Switzerland: comparison between psychiatric in- and outpatients

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Summary

AIMS OF THE STUDY: In Switzerland, suicide is a major cause of years of potential life lost. Among people who died by suicide, a significant number suffered from mental illness and were treated by psychiatric care institutions. Psychiatric patients are thus a specific target for suicide prevention. Based on data from a clinical committee reviewing every death by suicide of psychiatric patients in the Canton of Vaud (Switzerland), this observational study aimed to gain knowledge on sociodemographic and clinical characteristics of psychiatric patients who died by suicide by comparing in- and outpatients.

METHODS: Sociodemographic and clinical characteristics of patients who died by suicide in our department from January 2007 to December 2019 were analysed. In- and outpatients were compared.

RESULTS: The sample included 153 patients (64.7% males, n = 99). Three quarters (76.4%, n = 81) of the patients had at least one previous suicide attempt. In- and outpatients did not differ significantly in terms of sociodemographics data, psychiatric diagnosis or method of suicide. Almost all (97.2%) of the outpatients had at least one past psychiatric hospitalisation. We found gender disparities for several variables and a lower male/female suicide ratio than in the general Swiss population. Seventy-two percent of the outpatients (n = 49) had a last personal contact with clinicians less than a week before their suicide and 38.8 % of those less than 24 hours (28% of outpatients, n = 19).

CONCLUSIONS: Patients dying by suicide present most of the time a serious psychiatric history. In- and outpatients seem to have a similar clinical and sociodemographic profile and suicide prevention should thus not be addressed differently in these two groups. The time between death of outpatients and last contact with a therapist was shorter than expected.

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Introduction

Suicide is a major public health issue: the World Health Organization (WHO) estimated that 800,000 people died by suicide worldwide in 2019, which makes it one of the leading causes of premature death [1]. In Switzerland, suicide is among the first causes of years of potential life lost [2]. Between 60% and 98% of the people who die by suicide suffer from a mental illness [3] and about 20% who subsequently die from suicide have contact with mental health services within one month and 32% within a year before suicide [4]. Psychiatric patients and psychiatric institutions are thus a major target for suicide prevention.

Suicide in psychiatric inpatients and related risk factors have been the subject of many studies. Rates of suicide for psychiatric inpatients range from 200 to 920 per 100,000 admissions [5–13] and their incidence per 100,000 admissions to general hospitals ranges from 1.7 to 20.9 [13]. Compared with people who die by suicide in the general population, an adjusted ratio for suicide in the preceding year of 44.3 for psychiatric inpatients was reported [14]. Chronic mental illness, a family history of suicide, suicidal ideation, recent bereavement and delusions were identified as predictors for inpatient suicide [8].

On the other hand, suicide in psychiatric outpatients has been less investigated [15, 16], although these patients may have different profiles and need targeted preventive interventions. We did not find any study comparing suicide rates or suicide circumstances between psychiatric in- and outpatients.

Gender difference in suicide is a frequently investigated topic in the general population [17]. Regarding psychiatric patients, gender-related differences were incidentally reported by some studies: male patients who died by suicide are more likely to be single [15] and suffer from schizophrenia [18,19], female outpatients die more by drug intoxication [15] and are more likely to suffer from an affective disorder [20]. However, gender differences among psychiatric in- and outpatients who die by suicide have not been investigated.

Evidence is therefore lacking on sociodemographic characteristics and gender specificities of psychiatric in- and outpatients dying by suicide. We aimed to gain more information on those questions by analysing data from a committee

dedicated to review all suicides in the public institutions of the Canton of Vaud, Switzerland.

Material and methods

Study design and study setting

All critical incidents involving patients from the Psychiatric Department of the Lausanne University Hospital, which includes suicide and other deaths, major agitation and prolonged restraint (excluding suicide attempts, which are not evaluated by this committee), are reviewed by the Committee of Clinical Practice Review (CCPR). Its primary goal is to identify possible problematic issues related to the organisation of the clinic and to provide a feedback including a report, both specific to the case (e.g., meeting with clinicians involved in a given situation and restitution to the team) and general (e.g., a yearly newsletter summarising some illustrative situations in an anonymous format addressed to all clinicians of the department) [21].

We performed an observational study of all cases of patients who died by suicide reviewed by the CCPR between 2007 and 2019 (without exclusion criteria).

Data collection methods and data flow

An ad hoc evaluation form was developed and implemented in the CCPR from 2016 to 2019. The same form was retrospectively filled in for the reviews provided by the CCPR between 2007 and 2016.

The selection of data for the form was based on variables identified in the literature on existing self-harm monitoring systems [22–24] and on our clinical experience. The data included sociodemographic (e.g., age, gender, marital status, nationality, socio-economic situation, education, professional activity) and clinical information (e.g., main psychiatric diagnosis, treatment, drug use, past history of suicide attempt or hospitalisation for suicide attempt, method of suicide, recent and past significant life events, last contact with a psychiatric clinician and evaluation of suicidality formalised or not by a structured evaluation of suicidality).

Ethical considerations

The project was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. The local ethics committee on human research (CER-VD) approved the project (no. 2017-01932). The articles of law concerning research on deceased persons (LRH, art. 36 and 37) [25] require consent of the research participant given during that person's lifetime or, in the absence of a document attesting to the consent or refusal of the deceased, from a relative or a person designated by the deceased during his or her lifetime. The CER-VD considered, however, that it would not be ethical to contact the relatives, which could revive painful experiences and reveal confidential data about the deceased.

Statistical analyses

Because of the descriptive nature of our analysis, power calculations and sample size were not predetermined.

Comparisons between groups were performed using the Wilcoxon rank sum test [26] for continuous variables and Fisher's exact test [27] for categorical variables. To compare the differences observed in some variables (such as method of suicide) between in- and outpatients, a series of serially adjusted logistic regressions were performed (first adjusted for age and gender, then socioeconomic situation and finally the hospitalisation status). Confidence intervals (CIs) were calculated using the profile likelihood which provides reliable confidence intervals for estimated parameters [28]. All statistical analyses were performed using R (4.1.1) Environment for statistical computing [29]. Tables were produced using Stargazer [30] and *gtsummary* packages in R [31]. All statistical tests were two-tailed and significance was determined at the 0.05 level.

Results

Description of the population

Data of 153 suicides were analysed. Sociodemographic characteristics of the sample are presented in table 1. The majority of the patients were male (65%, n = 99) and of Swiss nationality (71%, n = 109). The sample shows an almost equal distribution of patients aged 18–35 years (31.4%, n = 48), 35–50 (30.7%, n = 47) and 50–66 (28.1%, n = 43), but not for patients above 66 years 7.8% (n = 12). Regarding marital status, 48% (n = 71) of patients were single, 20.3% (n = 30) in a partnership (married of cohabiting) and 31.4 % were either divorced (18%), separated (10%) or widowed (3.4%). Sixty-five percent of the patients (n = 67) were reported as facing a difficult socioeconomic situation, 35% as non-problematic (n = 36) (missing data, n = 50). An overwhelming majority (82.3%, n = 93) had low/medium education (they did not attend high school, college or university).

Mood disorders were the most frequent main diagnoses (39%, n = 56), followed by schizophrenia and other psychotic disorders (32%, n = 46), and personality disorders (15%, n = 21). Hanging was the most commonly used method of suicide (28%, n = 37), followed by jumping from a height (21%, n = 27) and by transportation (collision with a train, for example) (15 %, n = 20). Three quarters (76%, n = 81) of the patients had at least one previous suicide attempt (85% of the outpatients and 74% of the inpatients). Most patients mentioned suicidal thoughts at their last consultation (66%, n = 92). Therapists frequently used a formalised scale to evaluate the suicide potential (46%, n = 62).

We analysed significant events recorded in the reports of the CCPR (tables 1, 2, 4, 8, 9) for cases mostly from 2016 to 2019 (family conflict, change/transition of treating physician/caregiver, school or professional breakdown, asked for/ or were refused a disability insurance, intimate partner relationship conflict). Data for the years 2007 to 2016 were missing which explains the small numbers.

Comparison between in- and outpatients

Almost all of the outpatients (97.2%, n = 70) and inpatients (n = 70) had at least one past hospitalisation. Most of the sociodemographic and clinical characteristics showed no significant differences (table 2) between the two groups.

Table 1:

Characteristics of the sample.

Characteristics		Total sample (n = 153)
Gender, n (%)	Female	53 (35%)
	Male	99 (65%)
	Missing data	1
Age (years) median (IQR)		43 (32–53)
Education, n (%)	Low/medium level	93 (82%)
	High level	20 (18%)
	Missing data	40
Socioeconomic situation, n (%)	Not problematic	36 (35%)
	Problematic	67 (65%)
	Missing data	50
Marital status, n (%)	Single	71 (48%)
	Married/cohabiting	30 (20.3%)
	Divorced	27 (18%)
	Separated	15 (10%)
	Widow	5 (3.4%)
	Missing data	5
Inpatient, n (%)	Inpatient	69 (49%)
	Missing data	12
Diagnosis, n (%)	Mood disorders	56 (39%)
	Schizophrenia spectrum and other psychotic disorders	46 (32%)
	Personality disorders	21 (15%)
	Substance-related and addictive disorders	12 (8.3%)
	Feeding and eating disorders	2 (1.4%)
	Anxiety disorders	7 (4.9%)
	Missing data	9
Previous suicide attempt, n (%)	No	25 (24%)
	One	31 (29%)
	Two	14 (13%)
	Three	11 (10%)
	More than three	25 (24%)
	Missing data	47
Number of past hospitalisations, n (%)	Fewer than four	71 (53%)
	Four or more	63 (47%)
	Missing data	19
Last contact, n (%)	More than one week	24 (17%)
	Less than one week	39 (27%)
	Less than 24 hours	82 (57%)
	Missing data	8
Evaluation of suicide, n (%)	No	23 (17%)
	Yes, formalised	62 (46%)
	Yes, not formalised	49 (37%)
	Missing data	19
Suicidal ideas at last contact, n (%)	No	47 (34%)
	Yes	92 (66%)
	Missing data	14
Suicide methodn (%)	Hanging	37 (28%)
	Jumping from a height	27 (21%)
	By transportation (train, car, etc.)	20 (15%)
	Intoxication with medication	13 (9.9%)
	Firearm	7 (5.3%)
	Other intoxication	6 (4.6%)
	Other	21 (16%)
	Missing data	22
Recent significant event[1]		
Family conflict, n (%)	No	82 (63%)
	Yes	48 (37%)
	Missing data	23
Change/transition of treating physician/caregiver, n (%)	No	39 (64%)
	Yes	22 (36%)
	Missing data	92
Recent move, n (%)	No	42 (88%)

	Yes	6 (12%)
	Missing data	105
School or professional breakdown, n (%)	No	35 (70%)
	Yes	15 (30%)
	Missing data	103
Asked for or were refused a disability insurance, n (%)	No	36 (72%)
	Yes	14 (28%)
	Missing data	103
Intimate partner relationship conflict, n (%)	No	98 (74%)
	Yes	34 (26%)
	Missing data	21

IQR: interquartile range

[1] Data available only between 2016 and 2019

Outpatients (19%, n = 11) more often than inpatients (1.6%, n = 1) used intoxication by medication as a suicide method (Fisher's exact test p <0.001). About three quarters (72%, n = 49) of the outpatients had a last personal contact with clinicians less than a week before suicide (38.8 % of those less than 24 hours), as did 95.6% (n = 65) of the inpatients (90.8% of those less than 24 hours) (Fisher's exact test p <0.001 for the last contact. See also table 3 for the logistic regressions). About 60% (n = 34) of the inpatients had a formalised suicidality evaluation during the last personal contact with clinicians versus 37% (s = 26) of the outpatients (Fisher's exact test p <0.044 for the evaluation of suicide).

Comparison between genders

Table 4 shows the characteristics of female and male patients.

Female patients had more often been previously admitted into a psychiatric hospital (four or more hospitalisations for 61% of females, n = 31 versus 39%, n = 32 for males) (Fisher's exact test p <0.014 for the number of past hospitalisations (see table 5 for the logistic regressions: OR 0.773, 95% CI 0.623–0.959). They had a higher rate of past self-harm (more than three in 35%, n = 13 versus 17%, n = 12 for males) (Fisher's exact test p <0.046 for the previous suicide attempt). Females used hanging less often (17%, n = 7) than males (33%, n = 29) (Fisher's exact test p <0.91) (see table 6 for the logistic regressions) and significantly more often jumping from a height (34%, n = 14 versus 15%, n = 13 for males) (Fisher's exact test p <0.019) (see table 7 for the logistic regressions: OR 0.817, 95% CI 0.682–0.977). Main psychiatric diagnoses also showed a significant difference, with personality disorders being more frequent in females (26%, n = 13) than in males (8.5%, n = 8) (Fisher's exact test p <0.018 for the diagnosis).

Discussion

We will first compare the sample of in- and outpatients and compare our results with data on suicide in the general population [2], then examine gender differences and finally discuss suicidal risk assessment at the last contact before death.

Our study showed that psychiatric outpatients dying by suicide do not significantly differ from inpatients, suggest-

ing that suicide prevention should address these two populations in the same way. However, we also observed that 97.2% of the outpatients had at least one previous psychiatric hospitalisation and that about 50% of both in- and outpatients had four or more past hospitalisations. Moreover, a large proportion of our sample had a history of attempting suicide (85% of the outpatients and 74% of the inpatients). Both populations thus had a serious psychiatric history and had already received psychiatric care prior to suicide.

Among risk factors, we looked at significant recent events and found a high rate of change of treating physician/caregiver, twice as high in the outpatient setting as the inpatient setting (57% vs 21%) (see table 8 for the logistic regressions: OR 0.685, 95% CI 0.485–0.969). This is particularly relevant because of the high frequency of caregiver rotation, especially among residents in training in public psychiatry. Training requirements imply that patients have to change therapists regularly, at least once a year and sometimes every 6 months. We found that 46% of the outpatients with a change in caretaker who died by suicide did so 2 months or less after the institutional turnover. Michaud et al. found that those type of transitions may contribute to patients' feeling of "loneliness" and/or "abandonment", which may revive past experiences and increase suicide risks [21]. Our sample is too small to verify this hypothesis, but the data nevertheless suggest that teams should be especially cautious at times of changes of caregivers.

We also found a certain proportion of family conflicts (36.9%) among our population of patients who died by suicide, a factor that could be systematically investigated by clinicians (see table 9 for the logistic regressions).

Compared with the general population, our psychiatric population had higher rates of previous hospitalisations. Pirkis and Burgess found that 41% of people in the general population who died by suicide were hospitalised in the year before their death [32] and Brown et al. reported that 67% of outpatients who died by suicide had a history of psychiatric hospitalisation [16]. Parra-Uribe et al. observed that 60.4% of people died at their first attempt [33], which is a much higher proportion than in our sample (only about 15% of the outpatients and 26% of the inpatients). Powell et al. compared psychiatric inpatients who died by suicide with a general population who died by suicide and found that the rates of previous self-harm (not including acts leading to or during index admission) were 54% and 26%, respectively [8]. Although this high proportion of

Table 2:

Comparison between in- and outpatients.

Characteristics	Overall (n = 141)	Outpatients (n = 72)	Inpatients (n = 69)	p-value [1]
Gender, n (%)				0.295
– Female	49 (35%)	22 (31%)	27 (39%)	
– Male	92 (65%)	50 (69%)"	42 (61%)	
Age, median (IQR)	43 (31–53)	41 (31–51)	45 (32–55)	0.254
Education				0.453
– Low/medium level	88 (82%)	46 (79%)	42 (86%)	
– High level	19 (18%)	12 (21%)	7 (14%)	
– Missing data	34	14	20	
Socioeconomic situation, n (%)				0.666
– Not problematic	32 (34%)	18 (37%)	14 (32%)	
– Problematic	61 (66%)	31 (63%)	30 (68%)	
– Missing data	48	23	25	
Marital status, n (%)				0.676
– Single	68 (49%)	39 (55%)	29 (43%)	
– Married/cohabiting	28 (20%)	12 (17%)	16 (24%)	
– Divorced	24 (17%)	11 (15%)	13 (19%)	
– Separated	13 (9.4%)	6 (8.5%)	7 (10%)	
– Widow	5 (3.6%)	3 (4.2%)	2 (3.0%)	
– Missing data	3	1	2	
Diagnosis, n (%)				0.624
– Mood disorders	54 (40%)	27 (39%)	27 (40%)	
– Schizophrenia spectrum and other psychotic disorders	42 (31%)	20 (29%)	22 (33%)	
– Personality disorders	21 (15%)	13 (19%)	8 (12%)	
– Substance-related and addictive disorders	11 (8.1%)	5 (7.2%)	6 (9.0%)	
– Anxiety disorders	6 (4.4%)	4 (5.8%)	2 (3.0%)	
– Feeding and eating disorders	2 (1.5%)	0 (0%)	2 (3.0%)	
– Missing data	5	3	2	
Previous suicide attempt, n (%)				0.556
– No	20 (20%)	7 (15%)	13 (26%)	
– One	30 (31%)	17 (35%)	13 (26%)	
– Two	12 (12%)	5 (10%)	7 (14%)	
– Three	11 (11%)	5 (10%)	6 (12%)	
– More than three	25 (26%)	14 (29%)	11 (22%)	
– Missing data	43	24	19	
Number of past hospitalisations, n (%)				0.857
– Fewer than 4	61 (50%)	28 (48%)	33 (51%)	
– Four or more	62 (50%)	30 (52%)	32 (49%)	
– Missing data	18	14	4	
Last contact, n (%)				<0.001
– More than one week	22 (16%)	19 (28%)	3 (4.4%)	
– Less than one week	36 (26%)	30 (44%)	6 (8.8%)	
– Less than 24 hours	78 (57%)	19 (28%)	59 (87%)	
– Missing data	5	4	1	
Evaluation of suicide, n (%)				0.044
– No	21 (17%)	14 (20%)	7 (12%)	
– Yes, formalised	60 (47%)	26 (37%)	34 (60%)	
– Yes, not formalised	46 (36%)	30 (43%)	16 (28%)	
– Missing data	14	2	12	
Suicidal ideas at last contact, n (%)				0.577
– No	42 (32%)	21 (30%)	21 (35%)	
– Yes	88 (68%)	49 (70%)	39 (65%)	
– Missing data	11	2	9	
Suicide method, n (%)				0.012
– Hanging	33 (27%)	16 (28%)	17 (27%)	>0.999
– Jumping from a height	25 (21%)	12 (21%)	13 (20%)	>0.999
– By transportation (train, car, etc.)	19 (16%)	6 (11%)	13 (20%)	0.210
– Intoxication with medication	12 (9.9%)	11 (19%)	1 (1.6%)	0.001
– Other intoxication	5 (4.1%)	3 (5.3%)	2 (3.1%)	0.666
– Other	27 (22%)	9 (16%)	18 (28%)	
– Missing data	20	15	5	
Recent significant event[2]				

Family conflict, n (%)				0.005
– No	79 (64%)	48 (76%)	31 (52%)	
– Yes	44 (36%)	15 (24%)	29 (48%)	
– Missing data	18	9	9	
Change/transition of treating physician/caregiver, n (%)				0.011
– No	36 (64%)	10 (43%)	26 (79%)	
– Yes	20 (36%)	13 (57%)	7 (21%)	
– Missing data	85	49	36	
Recent move, n (%)				>0.999
– No	39 (87%)	13 (87%)	26 (87%)	
– Yes	6 (13%)	2 (13%)	4 (13%)	
Missing data	96	57	39	
School or professional breakdown, n (%)				0.722
– No	32 (73%)	10 (67%)	22 (76%)	
– Yes	12 (27%)	5 (33%)	7 (24%)	
– Missing data	97	57	40	
Asked for or were refused a disability insurance, n (%)				0.468
– No	33 (75%)	10 (67%)	23 (79%)	
– Yes	11 (25%)	5 (33%)	6 (21%)	
– Missing data	97	57	40	
Intimate partner relationship conflict, n (%)				0.681
– No	95 (75%)	47 (73%)	48 (77%)	
– Yes	31 (25%)	17 (27%)	14 (23%)	
– Missing data	15	8	7	

IQR: interquartile range

[1] Wilcoxon rank sum test; Fisher's exact test

[2] Data available only between 2016 and 2019

past suicide attempts among psychiatric patients is obviously partly related to the fact that attempting suicide leads to being treated, clinicians should bear in mind that suicide seems strongly connected with past suicide attempts in psychiatric patients and that patients without a suicide attempt history rarely die by suicide.

Several descriptive findings deserve attention. Hanging, jumping from a height and suicide by transportation were the most frequent methods, as reported in the literature for inpatients [6, 11, 13, 34]. In the Swiss population (2017), hanging and jumping from a height were also the most frequent methods [2], with suicide by firearm coming third (19%) [2]. In our sample only 5.3% of the patients used the latter method. To understand this discrepancy between suicide in the general population and our sample it is useful to look at the context of firearms in Switzerland. Switzerland has an army consisting of a militia and soldiers store their gun at home. Consequently, Swiss strategies for preventing suicide systematically address the issue of access to firearms at home [35]. This example shows the importance of restricting access to lethal means, as Sabe et al. observed [36], as well as the importance of continuing to raise awareness about these issues among caregivers. In our sample, this point was also highlighted by the fact that rates of intoxication by medication were 11 times higher in outpatients than in inpatients and that restricting access to medication seems to work in inpatient settings and could probably be improved in the outpatient setting (e.g., daily or weekly pharmacy-controlled allocation).

Comparison between genders showed a male/female ratio of 1.9 in our sample. This ratio is in line with existing data of psychiatric patients [8, 9, 19, 37, 38], but notably differs

Table 3:
Logistic regressions on the response: "Last contact = in less than 24 hours".

	(1)	(2)	(3)
Age (in decades)	1.008	1.027	1.045
	(0.958, 1.062)	(0.961, 1.097)	(0.990, 1.103)
Male	1.083	1.107	1.141
	(0.913, 1.285)	(0.896, 1.367)	(0.958, 1.359)
Socioeconomic situation: Problematic		1.009	1.007
		(0.809, 1.259)	(0.840, 1.206)
Inpatient			1.843***
			(1.564, 2.170)
Constant	1.607***	1.446	0.994
	(1.243, 2.078)	(0.975, 2.147)	(0.712, 1.388)
Observations	144	97	89
Log likelihood	−103.880	−69.889	−41.317
Akaike information criterion	213.761	147.778	92.634

p <0.05*; p <0.01**; p <0.001***

Odds ratios (95% confidence interval)

Table 4:

Comparison between genders.

Characteristics	Overall (n = 152)	Females (n = 53)	Males (n = 99)	p-value [1]
Age, median (IQR)	44 (32–53)	44 (32–51)	43 (31–54)	0.665
Education, n (%)				0.618
– Low/medium level	93 (82%)	32 (80%)	61 (84%)	
– High level	20 (18%)	8 (20%)	12 (16%)	
– Missing data	39	13	26	
Socioeconomic situation, n (%)				0.282
– Not problematic	36 (35%)	10 (27%)	26 (39%)	
– Problematic	67 (65%)	27 (73%)	40 (61%)	
– Missing data	49	16	33	
Marital status, n (%)				0.875
– Single	71 (48%)	24 (47%)	47 (48%)	
– Married/cohabiting	30 (20%)	11 (22%)	19 (20%)	
– Divorced	27 (18%)	11 (22%)	16 (16%)	
– Separated	15 (10%)	4 (7.8%)	11 (11%)	
– Widow	5 (3.4%)	1 (2.0%)	4 (4.1%)	
– Missing data	4	2	2	
Inpatient, n (%)	69 (49%)	27 (55%)	42 (46%)	0.295
– Missing data	11	4	7	
Diagnosis, n (%)				0.018
– Mood disorders	56 (39%)	19 (38%)	37 (39%)	
– Feeding and eating disorders	2 (1.4%)	2 (4.0%)	0 (0%)	
– Schizophrenia spectrum and other psychotic disorders	46 (32%)	12 (24%)	34 (36%)	
– Personality disorders	21 (15%)	13 (26%)	8 (8.5%)	
– Substance-related and addictive disorders	12 (8.3%)	3 (6.0%)	9 (9.6%)	
– Anxiety disorders	7 (4.9%)	1 (2.0%)	6 (6.4%)	
– Missing data	8	3	5	
Previous suicide attempt, n (%)				0.046
– No	25 (24%)	6 (16%)	19 (28%)	
– One	31 (29%)	7 (19%)	24 (35%)	
– Two	14 (13%)	8 (22%)	6 (8.7%)	
– Three	11 (10%)	3 (8.1%)	8 (12%)	
– More than three	25 (24%)	13 (35%)	12 (17%)	
– Missing data	46	16	30	
Number of past hospitalisations, n (%)				0.014
– Fewer than 4	71 (53%)	20 (39%)	51 (61%)	
– Four or more	63 (47%)	31 (61%)	32 (39%)	
– Missing data	18	2	16	
Last contact, n (%)				0.041
– More than one week	24 (17%)	14 (27%)	10 (11%)	
– Less than one week	39 (27%)	11 (22%)	28 (30%)	
– Less than 24 hours	81 (56%)	26 (51%)	55 (59%)	
– Missing data	8	2	6	
Evaluation of suicide, n (%)				0.047
– No	23 (17%)	4 (8.5%)	19 (22%)	
– Yes, formalised	62 (47%)	28 (60%)	34 (40%)	
– Yes, not formalised	48 (36%)	15 (32%)	33 (38%)	
– Missing data	19	6	13	
Suicidal ideas at last contact, n (%)				0.575
– No	47 (34%)	15 (30%)	32 (36%)	
– Yes	91 (66%)	35 (70%)	56 (64%)	
– Missing data	14	3	11	
Suicide method, n (%)				0.006
– Hanging	36 (28%)	7 (17%)	29 (33%)	0.091
– Jumping from a height	27 (21%)	14 (34%)	13 (15%)	0.019
– By transportation (train, car, etc.)	20 (15%)	8 (20%)	12 (13%)	0.435
– Intoxication with medication	13 (10%)	7 (17%)	6 (6.7%)	0.111
– Other intoxication	6 (4.6%)	0 (0%)	6 (6.7%)	0.176
– Other	28 (22%)	5 (12%)	23 (26%)	
– Missing data	22	12	10	
Recent significant event[2]				
Family conflict, n (%)				0.45

– No	82 (63%)	27 (59%)	55 (65%)	
– Yes	48 (37%)	19 (41%)	29 (35%)	
– Missing data	22	7	15	
Change/transition of treating physician/caregiver, n (%)				0.242
– No	39 (64%)	14 (78%)	25 (58%)	
– Yes	22 (36%)	4 (22%)	18 (42%)	
– Missing data	91	35	56	
Recent move, n (%)				0.157
– No	42 (88%)	15 (100%)	27 (82%)	
– Yes	6 (12%)	0 (0%)	6 (18%)	
– Missing data	104	38	66	
School or professional breakdown, n (%)				0.209
– No	35 (70%)	14 (82%)	21 (64%)	
– Yes	15 (30%)	3 (18%)	12 (36%)	
– Missing data	102	36	66	
Asked for or were refused a disability insurance, n (%)				0.746
– No	36 (72%)	13 (76%)	23 (70%)	
– Yes	14 (28%)	4 (24%)	10 (30%)	
– Missing data	102	36	66	
Intimate partner relationship conflict, n (%)				0.837
– No	98 (74%)	34 (76%)	64 (74%)	
– Yes	34 (26%)	11 (24%)	23 (26%)	
– Missing data	20	8	12	

IQR: interquartile range

[1] Wilcoxon rank sum test; Fisher's exact test

[2] Data available only between 2016 and 2019

from the one found in the Swiss general population, i.e., 3 [2]. Martelli et al. also found this discrepancy in their literature review [13], as did Frei et al. [39], but neither of them commented on it. A first hypothesis could be that females are overrepresented in psychiatric patients. Indeed, more males than females fail to obtain care [40, 41], because they may "deny illness, suppress negative feelings and refuse to admit depressive symptoms or delay seeking help" [17]. For males, perceiving and accepting a need for help can be interpreted as infringing traditional role expectations [42]; females, on the other hand, are more inclined to seek help and to be treated [43]. These gender differences highlight the need for developing preventive interventions targeting males, such as the sharing of experiences among suicide survivors [44], and environmental and educational approaches to help males express their feelings [17]. Nevertheless, the proportion of female pa-

tients in our department over the last 11 years ranged from 49% to 52% in inpatients and from 45% to 47% in outpatients. This hypothesis may thus be valid for the general but not for our psychiatric population. The fact that we have a male/female ratio close to 1 in the overall psychiatric patient population of our department, which is similar to the ratio that Ostertag et al. found in patients who attempt suicide [24], whereas the ratio is close to 2 in our sample of patients who died by suicide could be explained by the fact that males choose more fatal methods than females [41].

A second hypothesis could be that females are less adequately or differently cared for compared with males and therefore more at risk of suicide once they enter the healthcare system. In our sample, females had a higher rate of past hospitalisations (four or more: 61% vs 39% for males) (see table 5 for the logistic regressions). This seems consis-

Table 5:

Logistic regressions on the response : "Number of past hospitalisations = 4 or more".

	(1)	(2)	(3)
Age (in decades)	0.978	1.011	1.011
	(0.927, 1.032)	(0.945, 1.082)	(0.941, 1.087)
Male	0.804[*]	0.771[*]	0.773[*]
	(0.677, 0.955)	(0.631, 0.941)	(0.623, 0.959)
Socioeconomic situation: Problematic		1.334[*]	1.331[*]
		(1.074, 1.656)	(1.053, 1.683)
Inpatient			1.074
			(0.871, 1.325)
Constant	2.014[***]	1.431	1.433
	(1.552, 2.615)	(0.972, 2.106)	(0.933, 2.199)
Observations	134	90	80
Log likelihood	−94.472	−58.752	−52.760
Akaike information criterion	194.945	125.503	115.519

p <0.05*; p <0.01**; p <0.001***

Odds ratios (95% confidence interval)

tent with evidence showing that repeated admission correlate with an increased suicide risk, even more significantly in females [20]. Clinicians should thus pay close attention to female patients with repeated psychiatric hospitalisations. Furthermore, gender differences in allocated care exist in other areas [45] and should be studied for suicidal patients. Indeed, the expression of mental illness can show gender differences for certain psychiatric disorders such as depression [46].

A third hypothesis would be that this discrepancy is explained by differences between the general and the psychiatric populations in the prevalence of certain risk factors,

Table 6:

Logistic regressions on the response : "Suicide method = Hanging".

	(1)	(2)	(3)
Age (in decades)	0.994	0.984	0.970
	(0.948, 1.043)	(0.923, 1.048)	(0.907, 1.037)
Male	1.169	1.168	1.116
	(0.991, 1.380)	(0.951, 1.434)	(0.892, 1.396)
Socioeconomic situation: Problematic		0.944	0.963
		(0.769, 1.160)	(0.773, 1.200)
Inpatient			1.006
			(0.821, 1.232)
Constant	1.216	1.329	1.424
	(0.954, 1.549)	(0.920, 1.920)	(0.952, 2.128)
Observations	130	89	80
Log likelihood	−79.187	−54.809	−49.202
Akaike information criterion	164.374	117.619	108.405

p <0.05*; p <0.01**; p <0.001***

Odds ratios (95% confidence interval)

Table 7:

Logistic regressions on the response : "Suicide method = Jump from a height".

	(1)	(2)	(3)
Age (in decades)	1.020	1.024	1.037
	(0.977, 1.064)	(0.973, 1.078)	(0.982, 1.094)
Male	0.819**	0.789**	0.817*
	(0.706, 0.949)	(0.668, 0.931)	(0.682, 0.977)
Socioeconomic situation: Problematic		0.981	1.051
		(0.831, 1.158)	(0.881, 1.254)
Inpatient			0.984
			(0.836, 1.158)
Constant	1.297*	1.268	1.131
	(1.045, 1.611)	(0.943, 1.706)	(0.819, 1.562)
Observations	130	89	80
Log likelihood	−64.424	−35.724	−31.655
Akaike information criterion	134.848	79.448	73.310

p <0.05*; p <0.01**; p <0.001***

Odds ratios (95% confidence interval)

Table 8:

Logistic regressions on the response: "Recent significant event = Change/transition of treating physician/caregiver".

	(1)	(2)	(3)
Age (in decades)	0.971	0.967	0.998
	(0.895, 1.053)	(0.869, 1.075)	(0.889, 1.120)
Male	1.233	1.162	1.105
	(0.944, 1.612)	(0.818, 1.649)	(0.763, 1.600)
Socioeconomic situation: problematic		0.945	0.995
		(0.671, 1.331)	(0.685, 1.444)
Inpatient			0.685*
			(0.485, 0.969)
Constant	1.405	1.659	1.778
	(0.948, 2.083)	(0.915, 3.007)	(0.961, 3.289)
Observations	61	42	37
Log likelihood	−41.463	−30.495	−24.132
Akaike information criterion	88.927	68.990	58.263

p <0.05*; p <0.01**; p <0.001***

Odds ratios (95% confidence interval)

unequally distributed between males and females (e.g., level of education [37]).

Our study also revealed gender differences with regard to suicide methods. Females used jumping from a height twice as often as males, which contrasts with the Swiss population (where 29.6% of females used jumping versus 25.2% in males). Earle et al. found a similar ratio in an outpatient sample (45.2% of the females versus 25.9% of the males jumped from a height) but did not comment on it. On the other hand, data on suicide attempts in French-speaking Swiss regions showed no significant difference in methods [24]. Moreover, in our sample, hanging was used twice as often by males than females, which also differs from the Swiss population, in which the ratio is around 1:1 (31.1% and 34.3%) [2]. Hanging and jumping from a height therefore show more gender differences in the psychiatric population than in the general population, a finding which should be further investigated.

Finally, our results provide insights on suicide risk assessment. We found a high rate of suicidal ideation reported during the last clinical contact in our population (65% of the inpatients and 70% of the outpatients). These percentages are higher than those reported in the literature. Earle et al. observed that 27% of their cohort of outpatients who died by suicide had expressed suicidal ideation at the last interview [15]; Bush et al. reported 22% for inpatients [47]. Healthcare system characteristics might explain these differences. It is possible that the possibility to set up frequent consultations for outpatients in our region helps patients to establish a trusting relationship with their therapist. This hypothesis is confirmed by the observation that 72% of the outpatients had a last contact less than a week before suicide, almost 40% of these in the last 24 hours (28% of the outpatients). Other studies found longer delays between suicide and last clinical contact. Laanani et al. found that 94% of the outpatients who died by suicide consulted in the year before suicide death (including all types of medical consultations and emergency room visits), one third of them in the last week and 8.5% on the last day [48]. Appleby et al. obtained similar results in community patients with 32.2% of suicides occurring less than a week after a last contact with mental health services and 8.1% within 24 hours [38]. Earle et al. found that 76% of the outpatients had a last contact within the past two weeks [15]

and John et al. observed that 2.9% of the hospital outpatients had contact within the last week [49]. Our psychiatric patients had thus a closer contact with mental health care than people who died by suicide in the general population. In comparison with these other studies, our care system may be different in terms of resources with the possibility, for example, of more intensive follow-up and shorter time between consultations, which could explain this difference. However, this finding also demonstrates that mental health caregivers are able to identify people at risk for suicide and establish a closer follow-up or refer them to psychiatric inpatient care. The fact that a high proportion of our sample (almost 100%) had a history of hospitalisation also supports this hypothesis. Unfortunately, close follow-up and the opportunity to express suicidal ideation, although important to prevent suicide [36], is not always successful. Furthermore, our results show that therapists should not be falsely reassured by a very recent contact with a patient.

Limits of the study and future directions

Regarding the limitations of our study, underreporting of deaths by suicide in our department cannot be excluded, which may have led to a possible bias. In addition, data were collected by means of medical files, which may have contained wrong or incomplete information (e.g., lack of documentation on suicide risk assessment). A weakness of our study is the fact that our retrospective and observational design did not allow measurement of some important factors regarding suicide risk in psychiatric patients. Indeed, several models underline the importance of taking into account vulnerability traits or the association of other factors that can lead to suicide. Examples include the "Narrative crisis model" [50], which explores several stages leading to suicide with initially the presence of vulnerability traits (history, impulsivity, perfectionism...) and then in the context of stress, the emergence of "suicidal narratives" (such as unrealistic life goals or the perception of no future), which lead to the "suicidal crisis" (entrapment, affective disturbance, loss of cognitive control, hyper-arousal). There is also the "interpersonal-psychological theory of suicide" model [51], which describes suicidal ideation as the result of the concurrence of the notions of "thwarted belongingness" (perception to be alone) and

Table 9:

Logistic regressions on the response: "Recent significant event = Family conflict".

	(1)	(2)	(3)
Age (in decades)	0.958	0.945	0.926*
	(0.910, 1.009)	(0.884, 1.011)	(0.866, 0.990)
Male	0.952	1.041	1.042
	(0.799, 1.133)	(0.838, 1.294)	(0.838, 1.295)
Socioeconomic situation: Problematic		1.066	1.026
		(0.852, 1.332)	(0.824, 1.276)
Inpatient			1.284*
			(1.051, 1.570)
Constant	1.804***	1.764**	1.722**
	(1.397, 2.329)	(1.189, 2.616)	(1.163, 2.551)
Observations	130	89	83
Log likelihood	−89.129	−60.957	−52.157
Akaike Inf. Crit.	184.258	129.914	114.314

p <0.05*; p <0.01**; p <0.001***

Odds ratios (95% confidence interval)

"perceived burdensomeness" (perception to be a burden). Furthermore, personality traits (for example, neuroticism) have been also investigated for their association with suicide [52], as well as the study of the effect of affective temperaments, mediated by other variables (such as hopelessness, depressive symptoms, mentalisation…) on suicide risk [53]. Finally, the potential impact of the caregiver on suicidal patients is also of importance, for example with the concept of adverse countertransference (e.g., disinterest, anxiety, overwhelming, rejection, helplessness or distress) [54]. Future studies assessing and comparing attempted and completed suicides could be most important to gain more knowledge of the suicidal process. Given the training course in our department on suicidal risk assessment, a new study could easily focus on this issue. However, to apply comprehensive models, such as those mentioned, might be difficult to realise given that a prospective study design is difficult to impose in these very delicate clinical situations, in which patients and caregivers are much preoccupied by the clinical situation and its evolution. Meanwhile, retrospective studies are a way to build up tendencies and to identify those factors, such as the change in staff we observed in this study, which can already be clinically addressed, for example by the simple heightened awareness of staff during these periods and a closer monitoring of patients.

Conclusions

This study of psychiatric in- and outpatients dying by suicide reveals most of the time a serious psychiatric history, and – compared to the general population – a higher rate of previous suicide attempts and past psychiatric hospitalisations. Surprisingly, almost every outpatient had at least one past psychiatric hospitalisation. This might explain why we did not find significant differences in characteristics between the in- and outpatients, indicating that they should not be addressed differently with regard to preventive interventions. Regarding gender, we found marked differences compared with the general population and between genders. More research is needed to explain those findings, which could help design preventive interventions and identify treatment modalities. Lastly, the high percentage of last contact in the 24 hours before death of outpatients suggests that patients at risk of suicide are efficiently identified, but that there might be room for improvement in the development of targeted preventive interventions.

Clinical points

– Clinicians should bear in mind that suicide seems to be strongly connected with past suicide attempts in particular in psychiatric patients and that patients without a previous suicide attempt history rarely die by suicide.

– Talking about suicidal ideation with patients is necessary, but not sufficient to prevent suicide.

– Clinicians should pay close attention to female patients with repeated psychiatric hospitalisations.

– Therapists should not be falsely reassured by a very recent contact with patients with suicidal ideation.

– Caregivers' rotations are high-risk times and clinicians should carefully monitor suicidal risk in these periods.

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