

The implementation and first insights of the French-speaking Swiss programme for monitoring self-harm

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Summary

AIMS OF THE STUDY: Self-harm is a major risk factor for suicide but remains poorly documented. No data on self-harm in French-speaking Switzerland exist. To address this deficiency, the Swiss Federal Office of Public Health commissioned a specific self-harm monitoring programme. We present and discuss its implementation and first findings.

METHODS: Every patient aged 18–65 years presenting for self-harm to the emergency departments of the Lausanne and Neuchâtel general hospitals were included in the monitoring programme over a 10-month period (December 2016 to September 2017). Clinicians collected anonymous sociodemographic and clinical data.

RESULTS: The sample included 490 patients (54.9% female and 45.1% male) for 554 episodes of self-harm, showing a higher proportion of patients aged 18–34 (49.2%) than older age groups (35–49, 33.7% and 50–65, 17.1%). Patients were mostly single (56.1%) and in problematic socioeconomic situations (65.7%). Self-poisoning was the most commonly used method (58.2%) and was preferred by women (71% of females and 42.5% of males, Fisher's exact test, $p < 0.001$) and the majority of patients (53.3%) had experienced at least one previous episode of self-harm. The self-harm rate was 220 per 100,000 inhabitants in Lausanne and 140 in Neuchâtel. Suicidal intent was clear for 50.6% of the overall sample, unclear for 25.1% and absent for 24.3%. It differed significantly between sites ($\chi^2(2) = 9.068$, $p = 0.011$) as Lausanne reported more incidents of unclear intent (27.7% versus 17.4% in Neuchâtel) and Neuchâtel more incidents with absence of intent (33.1% versus 21.3% in Lausanne). In Lausanne, patients more frequently resorted to methods such as jumping from a height (11.4%) and hanging (9%)

than in Neuchâtel (1.6% and 4.9%, Fisher's exact test, $p = 0.006$).

CONCLUSIONS: Our results are globally consistent with previous research on self-harm. We found significant inter-site differences in methods, suicidal intent and self-harm rates. Our findings highlight the importance of implementing local self-harm monitoring to identify specific at-risk groups and develop targeted preventive intervention.

Keywords: epidemiology, monitoring, self-harm, suicide, suicide attempt, suicide prevention

Introduction

Suicide is among the top 20 causes of death worldwide. According to the World Health Organization (WHO), nearly one million people die from suicide every year [1]. Self-harm is one of the strongest predictors of completed suicide [2–5]. Although high-quality data exist for completed suicide, self-harm remains poorly documented worldwide, and the WHO recommends monitoring self-harm in order to target prevention [1, 6, 7]. Emergency services are one of the best places to establish such monitoring systems, since the large majority of those who attempt suicide and people who conduct self-harm need medical care [8, 9].

Previous monitoring systems have been established in the United Kingdom (UK), first in Oxford [10–12] in the 1970s and later in Manchester and Leeds, allowing between-site comparisons [13, 14]. Ireland is one of the few countries with national registration [15, 16]. Numerous existing systems were introduced in Europe, following the WHO's international programmes (Multicentre Study on Suicidal Behaviour, MONitoring SUicidal Behaviour in Europe, Suicide Prevention – Multisite Intervention Study on Suicidal Behaviours) [17, 18], in, for example, some cities in France [19] and Italy [20].

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Results of these monitoring systems showed, for instance, that females [11, 13, 15, 17–22], young people [13, 17, 18, 21, 23], single persons (especially men) [17, 24–27], immigrants [27–29], and people with a low level of education [30] or unemployed [1, 30] are more at risk for self-harm. These systems also established remarkable gender differences [31, 32] regarding the selection of methods: self-poisoning appears to be more likely in females than in males, whereas ‘violent’ methods such as hanging or jumping from a height are more common among males [19, 31, 32]. Identifying specific risk factors enables the development of recommendations for public health strategies and the implementation of new interventions. In England, for example, offering specific support for alcohol misuse or relationship problems as issues surrounding self-harm has been identified as a relevant preventive measure [33]. Following self-harm monitoring in German-speaking Switzerland, recommendations were made to keep as low as possible the package size and dosage of specific drugs used by people who self-harm [29]. These monitoring systems and interventions are not only relevant for developing suicide prevention strategies, but also to prevent self-harm itself. As well as suffering, self-harmers are prone to endure stigma [34] which can lead to struggles with help-seeking [35]. Preventing self-harm also has an impact on public health costs. In Switzerland, costs related to hospitalisation due to self-harm approximate 200 million Swiss francs per year [36].

In Switzerland, although suicide is the fourth leading cause of early death [37] and more than 10,000 persons seek medical treatment after a suicide attempt every year [36], no systematic monitoring currently exists for self-harm at national level [36]; previous monitoring systems were conducted in small geographical areas by the multi-centred monitoring projects WHO/MONSUE in Bern (2004–2010 [26]) and Basel (2003–2006 [21]). In line with the above-mentioned WHO recommendation, the 2016 National Swiss Suicide Prevention Action Plan supports the collection of “relevant data, including self-harm, to guide and evaluate” prevention strategies [36].

To address the lack of self-harm systematic monitoring in Switzerland, the French-speaking Swiss system for monitoring self-harm was initiated in 2014. The objective of this study is to describe the implementation, methodology and first findings of this monitoring system.

Materials and methods

The project started under the lead of the Suicide Prevention Group in French-speaking Switzerland (GRPS; Groupe Romand Prévention Suicide), which includes various mental healthcare professionals active in the suicide prevention field. Several institutions are represented in this group including NGOs and local public health authorities. GRPS conducted an exploratory study of the feasibility, the acceptability and the effects of a multi-component intervention for those attempting suicide in Lausanne [38] and subsequently decided to gather more information on the population of self-harmers in several sites of French-speaking Switzerland by undertaking this observational study.

Procedure

Monitoring was first implemented in two sites, Lausanne and Neuchâtel (see “sample” section for site details), in December 2016, and was expanded to Valais (June 2017) and Geneva (mid-July 2017). At the included sites, each patient presenting with self-harm was evaluated by a resident in psychiatry or psychology or by a psychiatric nurse, under the supervision of a trained psychiatrist. Data collection was carried out using the information gathered during this clinical evaluation. One coordinator was designated to supervise and control the quality of the data collection process for each site. In addition, regularly scheduled research team meetings were planned in order to facilitate the implementation of the monitoring as well as the group training sessions for every caregiver collecting data. Considering staff turnover, these group sessions were planned every six months at each site. They included (i) information on the epidemiology of suicide and self-harm, (ii) a presentation about the monitoring project, and (iii) training sessions with feedback on the data collection procedure.

Sample

Every patient presenting for self-harm in the selected emergency departments (see below) was included. Self-harm was defined as “all non-fatal intentional acts of self-poisoning or self-injury, irrespective of degree of suicidal intent or other types of motivation” [10], thus including both DSM 5 non-suicidal self-injury [39] and other acts of self-harm with various suicidal intents, following a dimensional rather than categorical approach to the phenomenon [6, 12]. Suicidal intent was nonetheless recorded in order to distinguish between non-suicidal self-injury and suicidal behaviour disorder.

Four sites representing four regions that encompassed urban and rural areas as well as all patient ages were selected: Lausanne, Neuchâtel, Valais and Geneva (table 1); catchment areas were those of the corresponding general hospital. Selecting such a wide variety of sites with different characteristics followed the WHO’s recommendation of collecting “high-quality data from several representative locations, rather than poor quality data covering the entire country” [1]. In addition, logistics, accessibility and language differences were considered in the decision-making process for site selection. Priority was given to French-speaking areas as language was considered a barrier to standardisation in implementing the intervention and organising the data collection. Selecting French-speaking sites made sense from a scientific standpoint as a way to develop research in this area of Switzerland where no information about self-harm was available, and because it simplified standardisation and communication.

In this paper, we present data from patients aged 18–65 years in Lausanne city (hereafter Lausanne) and in the county of Neuchâtel (hereafter Neuchâtel) because they included (i) sufficient participants as recruitment started earlier and (ii) a comparable adult population. Data available over a 10-month period (December 2016 to September 2017) provided an adequate critical mass to discuss first findings. As the site in Lausanne only included patients aged 18–65, 16 patients in Neuchâtel who did not fall into that range were excluded from the sample.

Measures

The choice of recorded data was based on existing self-harm monitoring systems [21, 40], the WHO's dedicated document [6], the clinical experience of the research team, and feasibility and acceptability. The fill-in form followed an iterative development process through which several versions were tested and adapted according to end users' feedback. The form included sociodemographic characteristics (e.g., age, gender, nationality, socioeconomic situation, migration in the past 10 years, civil status) and clinical information (e.g., first diagnosis, past history of self-harm, suicidal intent, method of self-harm and severity of the self-harm episode, protective and precipitating factors). It was completed by the mental healthcare professional in charge of the psychiatric evaluation right after the interview, who evaluated suicidal intent based on all available information (e.g., patient's discourse, information on circumstances from others, psychiatric evaluation). Psychiatric diagnoses were recorded according to the International Classification of Diseases (ICD-10); collectors could mention up to three diagnoses by order of importance. Event-related (i.e., "episode-based") self-harm rates and person-related self-harm rates were established by dividing the number of episodes of self-harm and persons who engaged in self-harm by the number of people aged 18–65 living in the respective catchment areas, then multiplying the result by 100,000 and extrapolating it to 12 months.

Ethical considerations

This study was conducted without the explicit consent of patients. This issue was given full consideration and the relevant cantonal ethic committees on human research approved the project. We argued that requesting consent would have introduced a selection bias [38]. Furthermore, the collected data already belonged to the information gathered in the usual clinical evaluation and only anonymous data were recorded. The procedure of anonymisation was based on four parameters considered constant by the Swiss Federal Statistical Office (FSO) such as name, surname, gender and birth date. These four parameters were recorded, then merged into one string and subjected to an MD5 cryptographic hash [41]. Only this 128-bit digital signature was stored in the database, a result that met three main objectives: ensuring patient anonymity, identifying potential multiple attempters and tracing shifts from one site to another. It was therefore possible to identify attempts made by the same individuals at different locations and times.

Statistical analysis

Comparisons across sites were performed with independent t-tests for continuous variables, Mann-Whitney's U test for ordinal variables and Pearson's chi-square test (or Fisher's exact test) for categorical variables. Analyses were conducted on all available data. Because of the descriptive nature of our analysis, the study size was not predetermined. All statistical analyses were performed with IBM SPSS version 23. All statistical tests were two-tailed and significance was determined at the 0.05 level.

Results

Implementation process

During the starting phase of the monitoring presented in this paper (10 months, from December 2016 until September 2017), five research team meetings were held. Fourteen group training sessions were conducted with the caregivers in charge of filling out the data collection forms, led by the project manager and the respective site coordinators. More than 60 psychiatric residents and nurses (due to shifts in staffing) were involved in data collection at the four sites. Several barriers to implementation were identified (e.g., fading out, reluctance to filling out the forms, reliability issues) and addressed through specific strategies (table 2).

Self-harm rates

Among 490 individuals, 554 episodes of self-harm were recorded over a 10-month period (table 3). Rates of self-harm related to event/to individual were 140 per 100,000/131 in Neuchâtel and 220/191 in Lausanne. (For ease of reading, all of the following self-harm rates lack the "per 100,000 denominator".) Rates of self-harm related to event/to individual were higher at both sites for females in similar proportions. Multiple episodes were excluded for further analysis. The final sample only included the first recorded self-harm episodes from the sites of Lausanne and Neuchâtel (table 3).

Sociodemographic characteristics of the sample

Table 4 reports the sociodemographic characteristics of the sample. Overall, the percentages of female (54.9%), mean age (36.2; SD = 12.2) and age distribution did not significantly differ between sites. The majority of the patients were single (56.1%) and no significant differences existed between sites regarding civil status and, likewise, between socioeconomic situation (overall 65.7% with social or economic issues). The proportion of Swiss self-harmers was higher in Neuchâtel (56.9%) than in Lausanne (44.4%, χ^2

Table 1: Characteristics of the four sites.

	Lausanne	Neuchâtel	Valais	Geneva
Geographic unit	City of Lausanne, centre	Canton of Neuchâtel	Central Valais, centre part of the canton	Canton of Geneva
Age	18–65 years	18+ years	18+ years	All ages included
Time period	Since December 2016	Since December 2016	Since June 2017	Since mid-July 2017
Type of population	Urban	Mixed	Mixed	Urban
Catchment area in 2016	230,000*	145,000†	130,000‡	450,000§

* CHUV – central sector Lausanne, Vaud, population 18–65 years old † Canton of Neuchâtel, population over 18 years old ‡ Canton of Valais – central Valais, population over 18 years old § Canton of Geneva, all ages included

[1] = 5.768, $p = 0.016$). More self-harmers were migrants in Lausanne (32.9%) than in Neuchâtel (25.5%, χ^2 [2] = 8.118, $p = .017$) and they had more frequently experienced forced migration (13.8% of the total sample in Lausanne versus 3.2% in Neuchâtel).

Diagnosis

Affective disorders were the most frequent first diagnosis (29.0%), followed by anxious and adjustment disorders (27.5%) and personality disorders (21.7%) (table 4). Diagnosis differed between sites ($p = 0.012$), with more personality disorders in Lausanne (23.9% versus 14.4% in Neuchâtel) and more adjustment and anxiety disorders in Neuchâtel (36.9% versus 24.5% in Lausanne). In Neuchâtel, in addition to the first diagnosis, 5.4% of patients suffered from an alcohol or drug disorder as a co-morbidity, while 8.1% suffered from a personality disorder as a secondary diagnosis. In Lausanne, 13.0% of patients also suffered from an alcohol or drug disorder, while 9.6% were affected by a personality disorder.

Past self-harm history and suicidal intent

The majority (53.3%) of patients had a past self-harm history, as 32.6% had reported one to three past episodes and 20.8% more than three episodes (table 4). No difference was found between sites. Suicidal intent was clear for

50.6% of the overall sample, unclear for 25.1% and absent for 24.3%. It differed significantly between sites (χ^2 [2] = 9.068, $p = 0.011$), with Lausanne reporting more incidents of unclear intent (27.7% versus 17.4% in Neuchâtel) and Neuchâtel more incidents with an absence of intent (33.1% versus 21.3% in Lausanne).

Methods and severity of self-harm by site and by gender

Self-poisoning was the most commonly used method (58.2%, Fisher's exact test, $p = 0.006$; table 5). The second most represented method was cutting, which involved 13.7% of patients with a similar distribution for both sites. The other two most common methods were jumping from a height (11.4% in Lausanne versus 1.6% in Neuchâtel) and hanging or asphyxiation (9% in Lausanne versus 4.9% in Neuchâtel), for which the prevalence differed significantly (Fisher's exact test, $p = 0.006$) across sites. Overall, 11.4% of patients made a serious suicide attempt; no significant inter-sites differences were observed (table 5). A significantly greater proportion of self-poisoning (Fisher's exact test, $p < 0.001$) involved females (71%) than males (42.5%), while other methods of self-injury were more frequently used by males such as cutting (16.7%) and hanging (13.6%) (table 5). No significant gender differences were observed regarding the proportion of serious suicide

Table 2: List of identified barriers related to implementation.

Barriers	Addressing strategies
Fading out (decrease in inclusions with time)	Planning more regular feedback on the research process and its purpose as well as on new findings, with the goal to increase motivation. Highlighting the fact that the systematic use of questionnaires may improve clinical skills and awareness of otherwise under-addressed topics.
Reluctance on part of staff to fill out the data collection form (considered time-consuming)	Using group sessions with staff to collaboratively improve site-specific logistical and clinical organisation in order to minimise the time spent collecting data (e.g., allowing collectors to complete the form with a short delay rather than immediately after the interview). Informing staff about epidemiology of suicide and public health issues related to this problem.
Reliability issues	Systematising the data collection process by incorporating verification steps in the daily routine (e.g., adding a verification mark to the ED chart, bringing it as a compulsory topic in staff meetings). Using coordinators to supervise and control the process.
Language	Selecting French-speaking regions to avoid language bias.
Site organisation	Creating specific rules and guidelines adapted to every service and structure.
Specific population	Inclusion criteria were adapted to the specific population of children and adolescents (Geneva).
Organisational and clinical differences between sites	Adapting the abovementioned strategies in each site.

Table 3: Overall and gender-specific self-harm rates by site^{*}.

		Total	Neuchâtel	Lausanne	p-value [†]
Recorded episodes of self-harm	Total	554	132	422	0.567
	Male % (n)	44.6 (247)	42.6 (56)	45.3 (191)	
	Female % (n)	55.4 (307)	57.6 (76)	54.7 (231)	
Event-related self-harm rate	Total	194/100,000	140/100,000	220/100,000	
	Male	177/100,000	119/100,000	206/100,000	
	Female	210/100,000	162/100,000	233/100,000	
Recorded individuals	Total	490	123	367	0.604
	Male % (n)	45.1 (221)	43.1 (53)	45.8 (168)	
	Female % (n)	54.9 (269)	56.9 (70)	54.2 (199)	
	One episode	445	113	332	
	Two episodes	36 [‡]	9 [‡]	26 [‡]	
	Three episodes	6	0	6	
	More than three	3	0	3	
Person-related self-harm rate	Total	171/100,000	131/100,000	191/100,000	
	Male	158/100,000	114/100,000	182/100,000	
	Female	185/100,000	150/100,000	201/100,000	

^{*} According to the site and catchment area characteristics (table 1), approx. per 100,000 inhabitants [†] Comparisons between Neuchâtel and Lausanne [‡] One individual recorded the first time in Neuchâtel and the second time in Lausanne

attempts, although it was slightly higher in males (13.0% versus 10.1% in females).

Discussion

We aimed to establish a programme for monitoring self-harm in French-speaking Switzerland and now present its implementation and the first results with adults aged 18–65 in two sites (Lausanne and Neuchâtel).

Implementation process

The first months of monitoring highlighted several important barriers to overcome when implementing such a programme. Specific strategies were required for each barrier and differed between sites. The research coordinator had to work closely with the local coordinators to envisage relevant solutions as well as be highly flexible and present on both sites to increase the efficiency of data collection process. This type of monitoring is indeed time consuming and other similar programmes were shown to be at risk of fading out [18]. Our experience shows that future monitoring should include the sites' specificities when designing a monitoring programme and avoid a "one size fits all" approach, which is consistent with the WHO's recommendations for maintaining sustainability over time [6, 7].

Self-harm rates

Interestingly, the event-related self-harm rate per 100,000 inhabitants differed between the sites, with the rate being much higher in Lausanne (220) than in Neuchâtel (140). The Lausanne University Hospital catchment area is more urban and cosmopolitan than Neuchâtel, and self-harm

rates have been shown to be higher in urban [42] and international [21, 29, 43] populations. It also has a relatively young population [44] that is at greater risk for self-harm [13, 17, 18, 21, 23]. Finally, Lausanne is a tertiary university hospital and thus is the reference centre for several prisons outside its catchment areas and for highly complex somatic situations, which could have increased the self-harm rate. Of interest is the fact that the most recent available suicides rates (2014) are very similar in Lausanne (12.9/100,000) and Neuchâtel (13.2/100,000) [45]; thus, Lausanne has a 17/1 self-harm/suicide ratio, while Neuchâtel has a 9.5/1 ratio. This suggests that self-harm and suicide rates are independent of each other. Factors such as urbanisation, indeed, seem to act in different ways for suicide rates than what was just mentioned for self-harm rates [23, 42]; for instance, one recent study showed higher suicide rates in rural and non-urban regions [46]. Comparison with other Swiss and international data on self-harm rates warrant some caution since age ranges and suicidal behaviour definitions varied between studies [6, 10, 12, 47]. In Switzerland, previous data showed a self-harm rate of 105 in Bern (2004–2010) [26] and of 164 in Basel (2003–2006) for a population over age 15 [21]. International data from the WHO/EURO Multicentre Study on Suicidal Behaviour showed the self-harm rate ranging from 46 to 327 for males and from 72 to 542 for females [17], while more recent data from France showed a self-harm rate at 158 in 2012 [19] and at 206 in Ireland in 2016 [15]. Finally, although our monitoring system shares a common definition of self-harm with existing systems in the UK, our self-harm rates were substantially lower than those in Oxford (285 for males and 342 for females), Manchester (460/587)

Table 4: Characteristics of the sample* and variable description by site.

			Total (n = 490)	Neuchâtel (n = 123)	Lausanne (n = 367)	p-value†
Gender (% Female)		% (n)	54.9 (269)	56.9 (70)	54.2 (199)	0.604
Age	Total	M (SD)	36.2 (12.2)	37.3 (12.6)	35.8 (12.1)	0.466
	18–34 years		49.2 (241)	41.5 (51)	51.8 (190)	0.066
	35–49 years		33.7 (165)	39.0 (48)	31.9 (117)	0.066
	50–65 years		17.1 (84)	19.5 (24)	16.3 (60)	0.066
Swiss nationality (% yes)		% (n)	47.6 (233)	56.9 (70)	44.4 (163)	0.016
Problematic socioeconomic situation (% yes)		% (n)	65.7 (268)	67.6 (71)	65.0 (197)	0.628
Migration in the last ten years (% yes)	Total	% (n)	31.1 (124)	25.5 (24)	32.9 (100)	0.017
	Forced migration		11.3 (45)	3.2 (3)	13.8 (42)	
Civil status single (% yes)		% (n)	56.1 (263)	54.6 (65)	56.6 (198)	0.986
First diagnosis	Depression (F3-D)	% (n)	29.0 (135)	31.5 (35)	28.2 (100)	0.012
	Adjustment and anxiety disorder (F4)		27.5 (128)	36.9 (41)	24.5 (87)	
	Personality disorder (F6)		21.7 (101)	14.4 (16)	23.9 (85)	
Co-morbidity with drug and alcohol disorder diagnosis (for all first diagnoses)		% (n)	11.2 (52)	5.4 (6)	13.0 (46)	
Co-morbidity with personality disorder diagnosis (for all first diagnoses)		% (n)	9.2 (43)	8.1 (9)	9.6 (34)	
Past history of self-harm (self-reported)	None	% (n)	46.7 (202)	50.9 (54)	45.3 (148)	0.550
	Between one and three		32.6 (141)	31.1 (33)	33.0 (108)	
	More than three		20.8 (90)	17.9 (19)	21.7 (71)	
Suicidal intent	Clear (%)	% (n)	50.6 (242)	49.6 (60)	51.0 (182)	0.011
	Unclear (%)		25.1 (120)	17.4 (21)	27.7 (99)	
	No suicidal intent (%)		24.3 (116)	33.1 (40)	21.3 (76)	

M = mean; SD = standard deviation
 * Total sample including individuals and their first-recorded attempt, n = 490
 † Comparisons between Neuchâtel and Lausanne, tests were performed for each variable

and Leeds (291/374), a finding that deserves further research.

Although females were overrepresented in our sample, the difference was not significant. Conversely, the existing literature provides strong evidence of self-harm being more frequent in females [11, 13, 15, 17–22]. This finding deserves further research because previous data from other cities in Switzerland showed contrasting results; for example, in Bern, the self-harm rate showed no difference between gender [26], unlike in Basel, where the self-harm rate was higher in females [21].

The self-harm rates showed a decrease with age, which is consonant with the higher self-harm rates observed in young people [13, 17, 18, 21, 23]. Interestingly, this rate shows an inverse distribution from the suicide rate in Switzerland, confirming a previous observation that young people are at higher risk for self-harm and lower risk for suicide, with the reverse being true for older people.

In our sample, 65% had financial and economic difficulties. Although we did not identify any data on this exact variable for the general population, this proportion is much higher than the poverty rate in Switzerland, which was 7% in 2015 [48]. Socioeconomic status seems, therefore, to be an important factor for suicidal behaviour, as already stud-

ied [49]. Non-Swiss citizens make up 56% of our sample in Lausanne and 43% in Neuchâtel, slightly over the known proportion of foreign citizens in Lausanne (43% [44]) and Neuchâtel (25% [50]). This finding accounts for an increased risk of self-harm among foreigners, a finding also observed in other studies [21, 29, 43].

Clinical variables

We found affective disorders to be the most common psychiatric disorders, followed by adjustment/anxiety disorders and personality disorders. A recent systematic review examining psychiatric disorders in self-harm [51] showed mood and depressive disorders to be the most frequent diagnosis clusters. As in other studies [18, 21, 26], more than half of individuals had a prior history of self-harm in our sample. Previous research has established repeated self-harm to be a major risk factor for future self-harm and suicide [2, 5, 52], with a high number of repetitions increasing the risk [53]. Specific interventions should be developed and tested for these groups [18, 54] and more research needs to be conducted to identify, at the time of the first episode, which patients are at greater risk for repeating this behaviour. Finally, our results regarding suicidal intent demonstrated the difficulty for the clinician of evaluating this information: the proportion between unclear sui-

Table 5: Method and severity by sites and gender

		Total	Neuchâtel	Lausanne	p-value*
Method by site % (n)		100 (490)	100 (123)	100 (367)	0.006
Self-poisoning	Total	58.2 (285)	65.9 (81)	55.6 (204)	0.829
	Medication	53.1 (260)	60.2 (74)	50.7 (186)	
	Other substance	5.1 (25)	5.7 (7)	4.9 (18)	
Self-injury	Total	38.8 (190)	30.9 (38)	41.4 (152)	
	Cutting	13.7 (67)	13.8 (17)	13.6 (50)	
	Jumping from a height	9.0 (44)	1.6 (2)	11.4 (42)	
	Hanging or asphyxiation	8.0 (39)	4.9 (6)	9.0 (33)	
	Jumping/lying in front of a moving object	4.7 (23)	4.1 (5)	4.9 (18)	
	Head-banging	1.4 (7)	2.4 (3)	1.1 (4)	
	Burning and immolation	1.2 (6)	2.4 (3)	0.8 (3)	
	Drowning	0.4 (2)	0.0 (0)	0.5 (2)	
	Firearm	0.2 (1)	0.8 (1)	0.0 (0)	
	Ingestion of a foreign object	0.2 (1)	0.2 (1)	0.0 (0)	
Multiple methods	2.4 (12)	2.4 (3)	2.5 (9)		
Others	0.6 (3)	0.8 (1)	0.5 (2)		
Serious suicide attempt by site % (n)		11.4 (54)	12.0 (14)	11.2 (40)	0.829
		Total	Female	Male	p-value
Method by gender % (n)		100 (490)	100 (269)	100 (221)	<0.001
Self-poisoning	Total	58.2 (285)	71.0 (191)	42.5 (94)	0.384
	Medication	53.1 (260)	66.9 (180)	36.2 (80)	
	Other substance	5.1 (25)	4.1 (11)	6.3 (14)	
Self-injury	Total	38.8 (190)	26.1 (70)	54.5 (120)	
	Cutting	13.7 (67)	11.2 (30)	16.7 (37)	
	Jumping from a height	9.0 (44)	8.2 (22)	10.0 (22)	
	Hanging or asphyxiation	8.0 (39)	3.3 (9)	13.6 (30)	
	Jumping/lying in front of a moving object	4.7 (23)	2.2 (6)	7.7 (17)	
	Head-banging	1.4 (7)	0.0 (0)	3.2 (7)	
	Burning and immolation	1.2 (6)	0.4 (1)	2.3 (5)	
	Drowning	0.4 (2)	0.4 (1)	0.5 (1)	
	Firearm	0.2 (1)	0.0 (0)	0.5 (1)	
	Ingestion of a foreign object	0.2 (1)	0.4 (1)	0.0 (0)	
Multiple methods	2.4 (12)	2.2 (6)	2.7 (6)		
Others	0.6 (3)	0.7 (2)	0.5 (1)		
Serious suicide attempt by gender % (n)		11.4 (54)	10.1 (26)	13.0 (28)	0.384

* Comparisons between Neuchâtel and Lausanne, tests were performed for each variable

cidal intent and no suicidal intent were significantly different between the two sites. Although this could also be related to inter-rater differences between sites (see limitations), it shows a potential different pattern in the way patients share their suicidal intent with clinicians. This finding should be further explored.

Methods of self-harm

That self-poisoning was the most frequent method found in our study was expected, considering previous findings [15, 21, 26, 47], as was the gender distribution in methods for which self-poisoning was more likely in females than in males and violent methods such as hanging or jumping or lying in front of a moving object were more common among males [19]. As for the major difference observed between the two sites regarding the frequency of jumping from a height, several high bridges exist in Lausanne and fewer in Neuchâtel; this highlights the importance of geographic and urban factors for self-harm. Such factors should be considered in local preventive actions. It must be noted that these differences may also account for a more inclusive recruitment policy in Lausanne; indeed, although inclusion criteria were standardised (see methods), there were some borderline situations that could have been interpreted differently in the two sites. We found no gender distribution in the frequency of serious suicide attempts. Previous data showed suicide completers and serious attempters to share a common profile [55], and we would thus have expected to note more serious suicide attempts in males. For the abovementioned unexpected similar self-harm rates in males and females, this finding warrants further investigation.

We intend to deepen our analyses with results from the newly included sites, which will allow discussion of other age group findings. Ultimately, we aim to sustain our monitoring in order to use it as a surveillance tool and a local guide to specific preventive interventions and recommendations in public healthcare policies, as was done before by targeting specific at-risk populations [29], adapting medical care [38] or formulating empirical and evidence-based recommendations [15, 29, 33]. Working with self-harm rates also allows to locally prevent self-harm, work on destigmatisation and upgrade accessibility to adapted help [35]. This will finally enable us to conduct prospective research on repeaters and to evaluate how the risk of self-harm is associated with different variables (e.g., co-morbidities, past history of self-harm, forced migration history).

Limitations

As for the majority of existing self-harm monitoring [10–16], our sample was limited to patients admitted to general hospitals. Data were restricted to ages 18–65; younger and older subgroups deserve further attention and will be evaluated in future studies. Selecting French-speaking sites is a way to develop research in an area of Switzerland lacking information on self-harm; for that matter, the monitoring is not representative of the entire country. We did not adjust our self-harm rates by including self-harm in the community [17, 18, 21], considering that this issue should be specifically investigated [56–58]. In relation to data collection, as the data were based on information gathered through clinical evaluation, the validity of the diag-

nosis information is not ideal and was not formally tested for inter-rater reliability, nor was the evaluation of suicidal intent. This reality accounts for the fact that for several items, missing data were frequent. Some self-harm situations may not have been reported by the emergency physician in charge, and we did not account for people who eventually died by suicide after a recorded attempt.

Conclusions

Although our results are globally consistent with previous research on self-harm (self-harm rates, gender and age repartition, selected method by gender), we showed substantial and interesting differences between two sites in French-speaking Switzerland on self-harm rates, suicidal intent and methods of self-harm. Those differences highlight the importance of developing self-harm monitoring in different places and of not relying solely on suicide rates in order to prevent self-harm and suicide with strategies adapted to the specificities of the local population. We believe that such a system, one that relies on the treating physician or nurse, is realistic and feasible at moderate costs, and we hope that other monitoring programmes in different countries will be developed on this basis.

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Potential competing interests

No potential conflict of interest relevant to this article was reported.

References

- World Health Organization. Preventing suicide: a global imperative. Geneva: World Health Organization; 2014; Available from: http://apps.who.int/iris/bitstream/handle/10665/131056/9789241564779_eng.pdf?sequence=1.
- Owens D, Horrocks J, House A. Fatal and non-fatal repetition of self-harm. Systematic review. *Br J Psychiatry*. 2002;181(03):193–9. doi: <http://dx.doi.org/10.1192/bjp.181.3.193>. PubMed.
- Suokas J, Suominen K, Isometsä E, Ostamo A, Lönnqvist J. Long-term risk factors for suicide mortality after attempted suicide—findings of a 14-year follow-up study. *Acta Psychiatr Scand*. 2001;104(2):117–21. doi: <http://dx.doi.org/10.1034/j.1600-0447.2001.00243.x>. PubMed.
- Suominen K, Isometsä E, Suokas J, Haukka J, Achte K, Lönnqvist J. Completed suicide after a suicide attempt: a 37-year follow-up study. *Am J Psychiatry*. 2004;161(3):562–3. doi: <http://dx.doi.org/10.1176/appi.ajp.161.3.562>. PubMed.
- Christiansen E, Jensen BF. Risk of repetition of suicide attempt, suicide or all deaths after an episode of attempted suicide: a register-based survival analysis. *Aust N Z J Psychiatry*. 2007;41(3):257–65. doi: <http://dx.doi.org/10.1080/00048670601172749>. PubMed.
- World Health Organization. Practice manual for establishing and maintaining surveillance systems for suicide attempts and self-harm. Geneva: World Health Organization; 2016; Available from: http://apps.who.int/iris/bitstream/handle/10665/208895/9789241549578_eng.pdf?sessionid=DB9894D3EC5DD66BE3521E9D66E8022C?sequence=1.
- World Health Organization. Preventing suicide: a resource for non-fatal suicidal behaviour case registration. Geneva: World Health Organization; 2014; Available from: http://apps.who.int/iris/bitstream/handle/10665/44757/9789241502665_eng.pdf?sequence=1.

- 8 Van Heeringen C, Jannes S, Buylaert W, Henderick H, De Bacquer D, Van Remoortel J. The management of non-compliance with referral to out-patient after-care among attempted suicide patients: a controlled intervention study. *Psychol Med.* 1995;25(5):963–70. doi: <http://dx.doi.org/10.1017/S0033291700037454>. PubMed.
- 9 Da Cruz D, Pearson A, Saini P, Miles C, While D, Swinson N, et al. Emergency department contact prior to suicide in mental health patients. *Emerg Med J.* 2011;28(6):467–71. doi: <http://dx.doi.org/10.1136/emj.2009.081869>. PubMed.
- 10 Hawton K, Witt KG, Taylor Salisbury TL, Arensman E, Gunnell D, Hazell P, et al. Psychosocial interventions for self-harm in adults. *Cochrane Database Syst Rev.* 2016;5(5):. PubMed.
- 11 Hawton K, Casey D, Bale E, Ryall J, Brand F, Geulayov G. Self-harm in Oxford. Oxford: Centre for Suicide Research, Department of Psychiatry, Warneford Hospital & Emergency Department Psychiatric Service (Barnes Unit), John Radcliffe Hospital, 2014.
- 12 Hawton K, Bale L, Casey D, Shepherd A, Simkin S, Harriss L. Monitoring deliberate self-harm presentations to general hospitals. *Crisis.* 2006;27(4):157–63. doi: <http://dx.doi.org/10.1027/0227-5910.27.4.157>. PubMed.
- 13 Hawton K, Bergen H, Casey D, Simkin S, Palmer B, Cooper J, et al. Self-harm in England: a tale of three cities. Multicentre study of self-harm. *Soc Psychiatry Psychiatr Epidemiol.* 2007;42(7):513–21. doi: <http://dx.doi.org/10.1007/s00127-007-0199-7>. PubMed.
- 14 Geulayov G, Kapur N, Turnbull P, Clements C, Waters K, Ness J, et al. Epidemiology and trends in non-fatal self-harm in three centres in England, 2000–2012: findings from the Multicentre Study of Self-harm in England. *BMJ Open.* 2016;6(4):. doi: <http://dx.doi.org/10.1136/bmjopen-2015-010538>. PubMed.
- 15 Griffin E, Dillion CB, Arensman E, Corcoran P, Williamson E, Perry JJ. National self-harm registry Ireland: annual report 2016. Cork: National Suicide Research Foundation; 2017.
- 16 Perry JJ, Corcoran P, Fitzgerald AP, Keeley HS, Reulbach U, Arensman E. The incidence and repetition of hospital-treated deliberate self harm: findings from the world's first national registry. *PLoS One.* 2012;7(2):. doi: <http://dx.doi.org/10.1371/journal.pone.0031663>. PubMed.
- 17 Schmidtko A, Bille-Brahe U, DeLeo D, Kerkhof A, Weinaecker B, Löhr C. Sociodemographic characteristics of suicide attempters in Europe. In: Schmidtko A, Bille-Brahe U, DeLeo D, Kerkhof A, editors. *Suicidal Behaviour in Europe: results from the Who/Euro Multicentre Study on Suicidal Behaviour*. 1st ed. Göttingen: Hogrefe & Huber; 2004. p. 29–43.
- 18 Schmidtko A, Bille-Brahe U, DeLeo D, Kerkhof A, Bjerke T, Crepet P, 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):327–38. doi: <http://dx.doi.org/10.1111/j.1600-0447.1996.tb10656.x>. PubMed.
- 19 Chan Chee C, Paget LM. Le Recueil d'information médicalisé en psychiatrie (RIM-P) : un outil nécessaire pour la surveillance des hospitalisations suite à une tentative de suicide [The psychiatric hospital discharge database (RIM-P): An essential tool for the surveillance of hospitalization after a suicide attempt]. *Rev Epidemiol Sante Publique.* 2017;65(5):349–59. doi: <http://dx.doi.org/10.1016/j.respe.2017.05.006>. PubMed.
- 20 Kölves K, Vecchiato T, Pivetti M, Barbero G, Cimitan A, Tosato F, et al. Non-fatal suicidal behaviour in Padua, Italy, in two different periods: 1992–1996 and 2002–2006. *Soc Psychiatry Psychiatr Epidemiol.* 2011;46(9):805–11. doi: <http://dx.doi.org/10.1007/s00127-010-0251-x>. PubMed.
- 21 Muheim F, Eichhorn M, Berger P, Czernin S, Stoppe G, Keck M, et al. Suicide attempts in the county of Basel: results from the WHO/EURO Multicentre Study on Suicidal Behaviour. *Swiss Med Wkly.* 2013;143:.. doi: <http://dx.doi.org/10.4414/smw.2013.13759>. PubMed.
- 22 Caldera T, Herrera A, Renberg ES, Kullgren G. Parasuicide in a low-income country: results from three-year hospital surveillance in Nicaragua. *Scand J Public Health.* 2004;32(5):349–55. doi: <http://dx.doi.org/10.1080/14034940410029496>. PubMed.
- 23 Evans JG. Deliberate self-poisoning in the Oxford area. *Br J Prev Soc Med.* 1967;21(3):97–107. PubMed.
- 24 Nock MK, Borges G, Bromet EJ, Alonso J, Angermeyer M, Beautrais A, et al. Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *Br J Psychiatry.* 2008;192(2):98–105. doi: <http://dx.doi.org/10.1192/bjp.bp.107.040113>. PubMed.
- 25 Weissman MM, Bland RC, Canino GJ, Greenwald S, Hwu HG, Joyce PR, et al. Prevalence of suicide ideation and suicide attempts in nine countries. *Psychol Med.* 1999;29(1):9–17. doi: <http://dx.doi.org/10.1017/S0033291798007867>. PubMed.
- 26 Steffen T, Maillard A, Michel K, Reisch T. Monitoring des suizidalen Verhaltens in der Agglomeration Bern der Jahre 2004 bis 2010 im Rahmen der WHO/Monsue Multicenter Study on Suicidal Behaviour. Bern: Bundesamt für Gesundheit & Berner Bündnisses gegen Depressionen, 2011. German.
- 27 Muheim F, Eichhorn M, Berger P, Czernin S, Stoppe G, Keck M, et al. Suicide attempts in the county of Basel: results from the WHO/EURO Multicentre Study on Suicidal Behaviour. *Swiss Med Wkly.* 2013;143:.. doi: <http://dx.doi.org/10.4414/smw.2013.13759>. PubMed.
- 28 Bursztein Lipsicas C, Mäkinen IH, Apter A, De Leo D, Kerkhof A, Lönnqvist J, et al. Attempted suicide among immigrants in European countries: an international perspective. *Soc Psychiatry Psychiatr Epidemiol.* 2012;47(2):241–51. doi: <http://dx.doi.org/10.1007/s00127-010-0336-6>. PubMed.
- 29 Brückner B, Muheim F, Berger P, Riecher-Rössler A. Charakteristika von Suizidversuchen türkischer Migranten im Kanton Basel-Stadt: Resultate der WHO/EURO-Multizenterstudie. *Nervenheilkunde.* 2011;30(7):517–22. doi: [German.]. <http://dx.doi.org/10.1055/s-0038-1628389>.
- 30 Taylor R, Page A, Morrell S, Carter G, Harrison J. Socio-economic differentials in mental disorders and suicide attempts in Australia. *Br J Psychiatry.* 2004;185(06):486–93. doi: <http://dx.doi.org/10.1192/bjp.185.6.486>. PubMed.
- 31 Schrijvers DL, Bollen J, Sabbe BGC. The gender paradox in suicidal behavior and its impact on the suicidal process. *J Affect Disord.* 2012;138(1-2):19–26. doi: <http://dx.doi.org/10.1016/j.jad.2011.03.050>. PubMed.
- 32 Kupferschmid S, Gysin-Maillart A, Bühler SK, Steffen T, Michel K, Schimmelmann BG, et al. Gender differences in methods of suicide attempts and prevalence of previous suicide attempts. *Z Kinder Jugendpsychiatr Psychother.* 2013;41(6):401–5. doi: <http://dx.doi.org/10.1024/1422-4917/a000256>. PubMed.
- 33 Townsend E, Ness J, Waters K, Kapur N, Turnbull P, Cooper J, et al. Self-harm and life problems: findings from the Multicentre Study of Self-harm in England. *Soc Psychiatry Psychiatr Epidemiol.* 2016;51(2):183–92. doi: <http://dx.doi.org/10.1007/s00127-015-1136-9>. PubMed.
- 34 Cvinar JG. Do suicide survivors suffer social stigma: a review of the literature. *Perspect Psychiatr Care.* 2005;41(1):14–21. doi: <http://dx.doi.org/10.1111/j.0031-5990.2005.00004.x>. PubMed.
- 35 Han J, Batterham PJ, Calear AL, Randall R. Factors influencing professional help-seeking for suicidality. *Crisis.* 2018;39(3):175–96. doi: <http://dx.doi.org/10.1027/0227-5910/a000485>. PubMed.
- 36 Swiss Federal Office of Public Health. National action plan: preventing suicide in Switzerland. Bern: Swiss Federal Office of Public Health; 2016; Available from: https://www.bag.admin.ch/dam/bag/en/dokumente/psychische-gesundheit/politische-auftraege/motion-ingold/bericht_suizidpr%C3%A4vention.pdf.download.pdf/Report%20Suicide%20prevention%20in%20Switzerland.pdf.
- 37 Swiss Federal Statistical Office. Specific causes of death. Neuchâtel: Swiss Federal Statistical Office; 2017; Available from: <https://www.bfs.admin.ch/bfs/en/home/statistics/health/state-health/mortality-causes-death/specific.html>.
- 38 Brovelli S, Dorogi Y, Feiner AS, Golay P, Stiefel F, Bonsack C, et al. Multicomponent intervention for patients admitted to an emergency unit for suicide attempt: an exploratory study. *Front Psychiatry.* 2017;8:188. doi: <http://dx.doi.org/10.3389/fpsy.2017.00188>. PubMed.
- 39 American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th ed. Washington DC: American Psychiatric Association; 2013.
- 40 Hawton K, Bergen H, Cooper J, Turnbull P, Waters K, Ness J, et al. Suicide following self-harm: findings from the Multicentre Study of self-harm in England, 2000–2012. *J Affect Disord.* 2015;175:147–51. doi: <http://dx.doi.org/10.1016/j.jad.2014.12.062>. PubMed.
- 41 Rivest R. *The MD5 Message-Digest Algorithm*. United States: RFC Editor; 1992.
- 42 Bancroft JH, Skrimshire AM, Reynolds F, Simkin S, Smith J. Self-poisoning and self-injury in the Oxford area. Epidemiological aspects 1969–73. *Br J Prev Soc Med.* 1975;29(3):170–7. doi: <http://dx.doi.org/10.1136/jech.29.3.170>. PubMed.
- 43 Bursztein Lipsicas C, Mäkinen IH, Apter A, De Leo D, Kerkhof A, Lönnqvist J, et al. Attempted suicide among immigrants in European countries: an international perspective. *Soc Psychiatry Psychiatr Epidemiol.* 2012;47(2):241–51. doi: <http://dx.doi.org/10.1007/s00127-010-0336-6>. PubMed.
- 44 Ville de Lausanne. Portail statistique 2017. Lausanne: Office d'appui statistique et économique; 2017; Available from: http://www.lausanne.ch/lausanne-officielle/statistique/portrait-lausanne/mainArea/01/links/0/linkBinary/Lausanne%20-%20Portrait%20statistique_2017.pdf. French.

- 45 Observatoire Suisse de la Santé (OBSAN). Taux de suicide et taux de suicide assisté. Bern: OBSAN; 2014; Available from: <https://www.obsan.admin.ch/fr/indicateurs/suicide>. French.
- 46 Ivey-Stephenson AZ, Crosby AE, Jack SPD, Haileyesus T, Kresnow-Sedacca MJ. Suicide trends among and within urbanization levels by sex, race/ethnicity, age group, and mechanism of death, United States, 2001-2015. *MMWR Surveill Summ*. 2017;66(18):1–16. doi: <http://dx.doi.org/10.15585/mmwr.ss6618a1>. PubMed.
- 47 Hawton K, Zahl D, Weatherall R. Suicide following deliberate self-harm: long-term follow-up of patients who presented to a general hospital. *Br J Psychiatry*. 2003;182(06):537–42. doi: <http://dx.doi.org/10.1192/bjp.182.6.537>. PubMed.
- 48 Swiss Federal Office Of Public Health. Income and living conditions (SILC): poverty in Switzerland. Bern: Swiss Federal Office Of Public Health; 2015; Available from: <https://www.bfs.admin.ch/bfs/en/home/statistics/catalogues-databases/press-releases.assetdetail.2460202.html>.
- 49 Hawton K, Harriss L, Hodder K, Simkin S, Gunnell D. The influence of the economic and social environment on deliberate self-harm and suicide: an ecological and person-based study. *Psychol Med*. 2001;31(5):827–36. doi: <http://dx.doi.org/10.1017/S0033291701003993>. PubMed.
- 50 Etat de Neuchâtel. Atlas statistique du canton de Neuchâtel. Neuchâtel: Etat de Neuchâtel; 2018; Available from: <https://sitn.ne.ch/geoclip6v3/index.php?indics=popstruct.partresidetr&indics2=popstruct.popetr&view=map8&lang=fr#i2=popstruct.popetr;l=fr;i=popstruct.partreside-tr;v=map8;s=2017;s2=2017;z=2474993,1255261,121873,87897>. French.
- 51 Hawton K, Saunders K, Topiwala A, Haw C. Psychiatric disorders in patients presenting to hospital following self-harm: a systematic review. *J Affect Disord*. 2013;151(3):821–30. doi: <http://dx.doi.org/10.1016/j.jad.2013.08.020>. PubMed.
- 52 Gibb SJ, Beautrais AL, Fergusson DM. Mortality and further suicidal behaviour after an index suicide attempt: a 10-year study. *Aust N Z J Psychiatry*. 2005;39(1-2):95–100. doi: <http://dx.doi.org/10.1080/j.1440-1614.2005.01514.x>. PubMed.
- 53 Sher L, Grunebaum MF, Burke AK, Chaudhury S, Mann JJ, Oquendo MA. Depressed multiple-suicide-attempters: a high-risk phenotype. *Crisis*. 2017;38(6):367–75. doi: <http://dx.doi.org/10.1027/0227-5910/a000475>. PubMed.
- 54 Daigle MS, Pouliot L, Chagnon F, Greenfield B, Mishara B. Suicide attempts: prevention of repetition. *Can J Psychiatry*. 2011;56(10):621–9. doi: <http://dx.doi.org/10.1177/070674371105601008>. PubMed.
- 55 Levi-Belz Y, Beautrais A. Serious suicide attempts: toward an integration of trends and definitions. *Crisis*. 2016;37(4):299–309. doi: <http://dx.doi.org/10.1027/0227-5910/a000386>. PubMed.
- 56 Arensman E, Corcoran P, McMahon E. The iceberg model of self-harm: new evidence and insights. *Lancet Psychiatry*. 2018;5(2):100–1. doi: [http://dx.doi.org/10.1016/S2215-0366\(17\)30477-7](http://dx.doi.org/10.1016/S2215-0366(17)30477-7). PubMed.
- 57 Geulayov G, Casey D, McDonald KC, Foster P, Pritchard K, Wells C, et al. Incidence of suicide, hospital-presenting non-fatal self-harm, and community-occurring non-fatal self-harm in adolescents in England (the iceberg model of self-harm): a retrospective study. *Lancet Psychiatry*. 2018;5(2):167–74. doi: [http://dx.doi.org/10.1016/S2215-0366\(17\)30478-9](http://dx.doi.org/10.1016/S2215-0366(17)30478-9). PubMed.
- 58 Hawton K, Rodham K, Evans E, Weatherall R. Deliberate self harm in adolescents: self report survey in schools in England. *BMJ*. 2002;325(7374):1207–11. doi: <http://dx.doi.org/10.1136/bmj.325.7374.1207>. PubMed.