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The Epidemiological Use of Hospital Data for Suicide Surveillance in Belgium

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Authors' contributions

This work was carried out in collaboration between all authors. Author CS designed the study, performed the literature search, performed the statistical analysis, and wrote the manuscript. Author AL and MD supervised all aspects of the study and revised the manuscript. Author MP provided the data and revised the manuscript. All authors read and approved the final manuscript.

Original Research Article

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ABSTRACT

Aims: Investigating the E codes related to suicide and self-inflicted injuries through the prevalence, the patient characteristics, the methods and means employed and the characteristics of the hospital stays; and compare them with the others E codes group.

Study Design: Retrospective hospital-based analytical study.

Place and Duration of Study: This study was based on the 2010 data of 13 Belgian hospitals.

Methodology: Based on 16406 cases of patients with a least an E code (ICD-9-CM); Pearson's chi-square tests, simple logistic regressions and Wilcoxon rank sum tests were used to assess the variations between distributions of the investigated factors according to the injury's groups.

Results: Among all the E codes, prevalence of suicide and self-inflicted injury was equal to 10.6%. The poisoning was the major reported diagnosis. There were significantly

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more discharges without consent in the suicide group than in the others. The length of stay was lowest in the suicide group compared to the others E codes group. The several median costs were always highest among the men, but, regarding the median percentage of the pharmaceutical products, the value was highest among the women.

Conclusion: The epidemiological use of hospital data is complementary to the use of both the population-based data and the death certificates; each data source participating to a better comprehension and a better surveillance of the complex continuum of suicidality.

Keywords: Hospital data; Injury prevention; Surveillance; Epidemiology.

1. INTRODUCTION

All over the World, suicide remains a social and public health problem. Estimated worldwide annual mortality rate is 14.5 deaths per 100,000 people, which equates to one death every 40 seconds [1]. Among all the European Union members, the 2010 standardized death rate was equal to 13.82 deaths per 100,000 people. As an example, neighboring countries of Belgium have lower standardized death rates than the European average: 8.62 deaths per 100,000 people in the Netherlands, 8.70 deaths per 100,000 people in Germany, 9.6 deaths per 100,000 people in the Luxembourg, 13.52 deaths per 100,000 people in France and 6.51 deaths per 100,000 people in the United Kingdom. But in Belgium, this standardized death rate was higher than the European average: 15.98 deaths per 100,000 people. Belgium is therefore in the top ten of the countries having a highest rate of suicide; with the highest standardized death rate observed in Lithuania (27.82 deaths per 100,000 people) and the lowest standardized death rate observed in Spain (5.02 deaths per 100,000 people) [2]. Since a number of years in Belgium, the suicide is the seventh cause of death among all ages. Within the 25-44 years, it is the first cause of death and within the 15-24 years, it is the second cause [3]. On the whole, suicide had, in 2010 in Belgium, a proportionality mortality ratio equal to 1.91% in the 15-24 years group and in the 25-44 years group, this proportionality mortality ratio is little higher than a fifth (23.76% and 22.74% respectively); and according to the gender, as it is clearly documented in the literature, men have a highest proportionality mortality ratio than women: (2.77% and 1.06% respectively).

As summarized by Maris, Berman and Silverman [4] in their Comprehensive Textbook of Suicidology, beside the completed suicides, there is a range of suicidal behaviors, with the attempted suicides and the suicidal ideations as the best-known; hence, suicide must be envisaged as a continuum of suicidality. Therefore, for having an overall epidemiological view of the suicidal problem, mortality estimation, based on the completed suicides, and morbidity measures, based on the suicide attempts, and also the ideations and the factors associated, should coexist. Worldwide, there are an estimated 10-20 million attempted suicides each year for one million of completed suicides [5]. The European Study on the Epidemiology of Mental Disorders (ESEMED) undertaken in six European countries (France, Germany, Italy, the Netherlands, Spain and Belgium) between 2001 and 2003 had reported lifetime prevalence of suicidal attempts equal to 1.3% and of suicidal ideation equal to 7.8% [6]. In Belgium, a study based on the Belgian sentinel surveillance network of general practitioners suggest that for each completed suicide almost five are attempted [7]. In the penultimate Belgian Health Interview Survey (HIS 2004), the lifetime and the past week suicidal ideation were equal to 14.0% and 4.0% respectively, whereas 4.7% of the 25-64 years old interviewed reported a lifetime experience of attempt and 0.5% declared having attempted suicide in the 12 previous months [7].

Regarding the associated factors, sociological, psychological, biological, psychiatric but also genetic factors have been demonstrated [8,9]. As a consequence, suicide is a complex problem for which no single approach is likely to contribute to a significant substantial decline [10]. Therefore, the suicide prevention strategy must be an integration of the three levels of prevention. The primary prevention aim is to prevent violence before it occurs, hence it will try to minimize the risk of resorting to suicide. This involves actions on the associated factors but also involves early and appropriate treatment of all those who are at risk. The secondary prevention, that focuses on the more immediate responses to violence, will include the treatment of those who have attempted to their lives, whereas tertiary prevention, that focuses on long-term care in the wake of violence, will both try to reduce the long-term disability associated with violence but also will take in charge the families and the relatives of those who have committed suicide [1,9]. Regarding this needed integrated approach in the suicide prevention strategy and according to the conceptual framework Public Health Action for the Prevention of Suicide edited by the World Health Organization [11] in 2012, an integrated data collection system, which serves to document the magnitude of the problem, but also to identify at-risk groups, individuals and situations, must be elaborated. In Belgium, some epidemiological information are available for surveillance through several types of datasets. It is the case, as example, of the deaths certificates to estimate suicide mortality, or the population-based studies to estimate the morbidity of the suicide attempts and/or the suicidal ideations (Fig. 1). Some of these potential data sources are underused regarding this aim of surveillance. It is the case of the hospitalizations data which, unlike the declared / auto-reported measures in the population-based studies, can bring observed measures of the morbidity with also some of its associated factors. This morbidity may be reported with the help of a standardized procedure, which is the International Classification of Diseases (ICD) [12]. The two main sources of hospital data are the emergency wards data and the data from the inpatients, but even if the data from the emergency were not to neglect, they are limited regarding the limited quantity of information they can give.

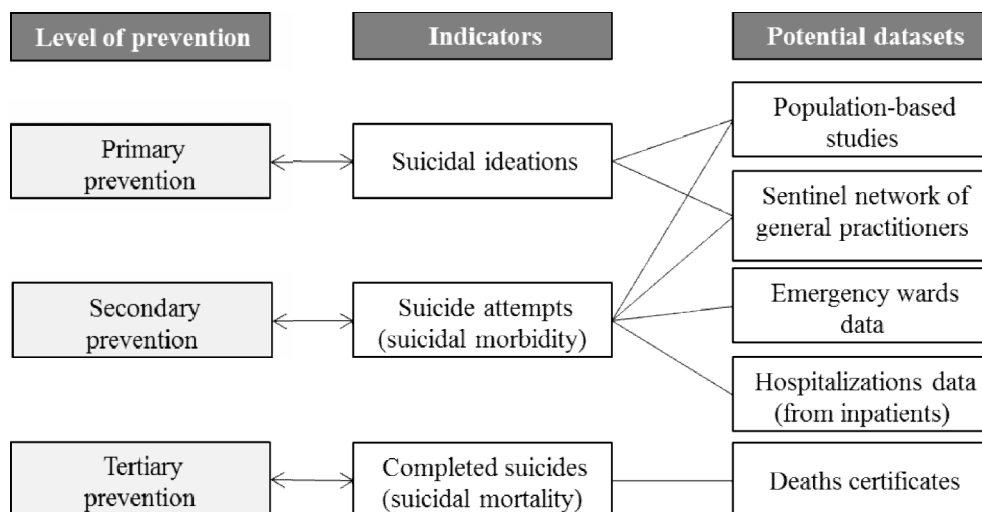


Fig. 1. Links between the prevention levels, the three quantitative indicators of the suicidal process and the potential sources of data

In Belgium, the Minimal Clinical Dataset is a standardized and concise summary of the patient's medical record that general hospitals are required to register since 1990. The registration has the objectives to identify needs for hospital equipment; to define the standards of qualitative and quantitative recognition of hospitals and their services; to organize the funding of hospitals; to determine policy on the exercise of the art of healing and to define epidemiological policy [13]. In the early 2000s, a published ministerial circular has strongly encouraged the registration of the codes E [14]. To our knowledge, no epidemiological studies have since investigated, in Belgium, the epidemiology of suicide and self-inflicted injuries from the E codes reported in the Minimal Clinical Dataset, nor patient characteristics, the methods and means employed, and even less the cost associated to these types of injuries. So the objectives of this study, based on the available more recent data, were, on one hand, to investigate the E codes related to suicide and self-inflicted injuries, in terms of prevalence, of patient characteristics, of methods and means employed and finally of the characteristics of the hospital stays; and, on the other hand, to compare the distributions of the investigated factors between this suicide and self-inflicted injuries group and all the others E codes reported in the hospital stays.

2. MATERIALS AND METHODS

2.1 Cases' Selection

These analyses were performed with the 2010 data from 13 Belgian hospitals, which are included in the PACHA project; a project focused on the analysis of stays and pathologies cost [15]. These hospitals are either private or public. In 2010, the total of inpatient stays from this sample represented 11.4 % of all Belgian inpatient stays. Data, related to diseases and health status, were encoded according to the ninth revision of the International Classification of Diseases, clinical modification (ICD-9-CM) [12]. On the 473,426 available stays (inpatient stays and day care stays), only hospital stays with at least one external cause (E codes) were selected. The several considered E codes were "transport injuries" [E800 - E848], "accidental poisoning by drugs, medicinal substances and biologicals" [E850 - E858], "accidental poisoning by other solid & liquid substances, gases and vapors" [E860 - E869], "accidental falls" [E880 - E888], "accidents caused by fire and flames" [E890 - E899], "accidents due to natural and environmental factors" [E900 - E909], "accidents caused by submersion, suffocation and foreign bodies" [E910 - E915], "other accidents" [E916 - E928], "suicide and self-inflicted injury" [E950 - E959], "homicide and injury purposely inflicted by other persons" [E960 - E969], "legal intervention" [E970 - E978], "injury undetermined whether accidentally or purposely inflicted" [E980 - E989], "injury resulting from operations of war" [E990 - E999], "terrorism" [E979] and "late effects of accidental injury" [E929]. As in the EURO COST project [16] - concerning the cost estimation of injury-related hospital admissions in European Countries - and as in the Meerding [17] and colleagues study on the costs of injuries in the Netherlands, we haven't considered the following E codes: "misadventures to patients during surgical and medical care" [E870-E876], "surgical and medical procedures as the cause of abnormal reaction of patient or later complication, without mention of misadventure at the time of procedure" [E878-E879] and "drugs, medicinal and biological substances causing adverse effects in therapeutic use" [E930-E949]. In the ICD-9-CM, causes and place of occurrence were found in the same chapter. Because of this absence of differentiation between place and cause, all the patients haven't both code for the cause and another one for the place despite the fact that there were sometimes up to 3 E codes for some case files. Therefore, we have first differentiated, in one hand, the causes and, on the other hand, the places of injuries. Besides that, for the management of the stays with more than one cause, we have created, for the extraction of a

“main” external cause, a decision algorithm based on the gravity's perception [18]. In this study, regarding our aim, if a patient had both a code for an accidental fall and one other, like transport injury [E800 - E848] or suicide and self-inflicted injury [E950 - E959], we have taken into account this last one. In other words, if a person attempts suicide with drugs and falls from his / her motorcycle on the street, after having ingested the drugs, it was the suicide attempt that was considered. Finally, a dichotomous variable was created with, on one hand, all the E codes included under the [E950-E959] code range; and, on the other hand, all the others E codes causes. Therefore, there were, among the 16,406 available cases, 1745 cases related to suicide and self-inflicted injuries and 14,661 cases related to others causes of injuries (Fig. 2.).

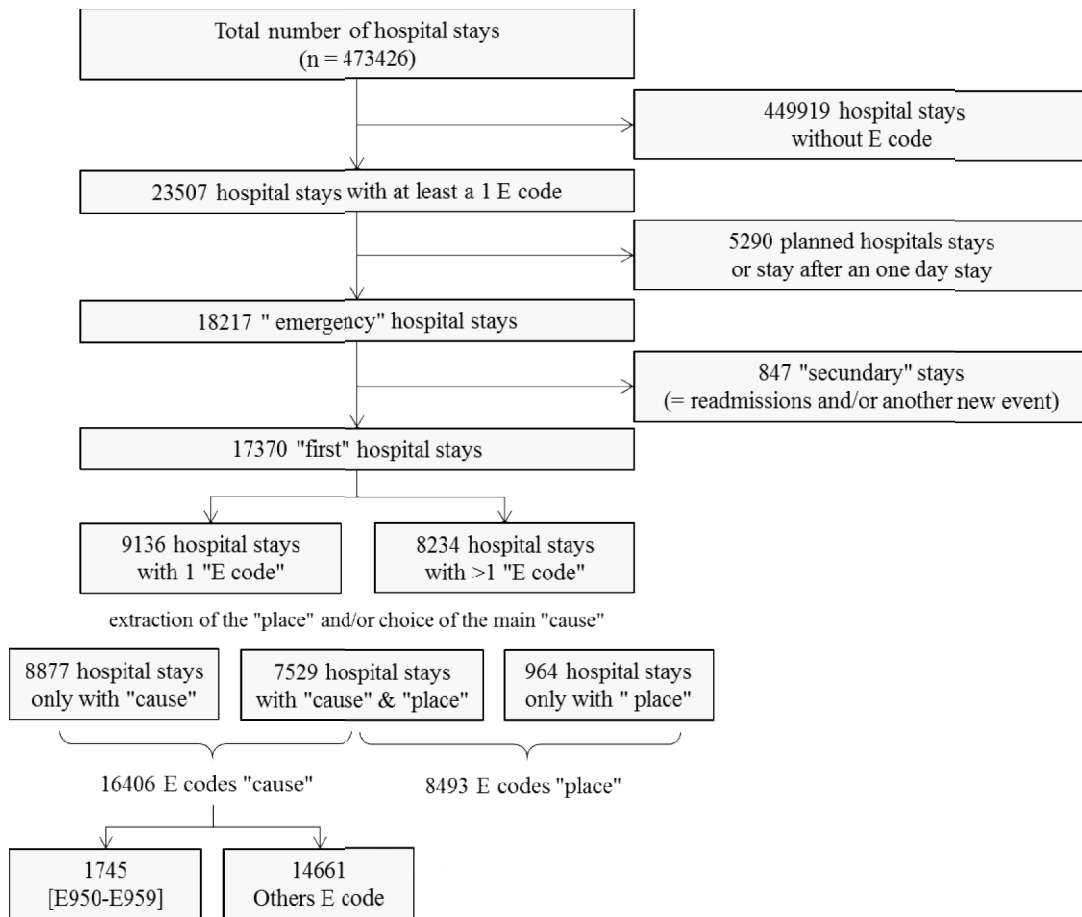


Fig. 2. Flow chart, from the total number of stays to the investigated stays

2.2 Associated Factors

The others variables taken into account have been chosen to try to follow the patient from its arrival to its discharge. The demographic characteristics of the patients were gender and age and we also have information about the moment (month and day), the type and the initiative of the hospital's admissions, the primary diagnosis that justifies the hospitalization, the stays description (in terms of care units), the type of discharge, the patient's destination, the cause

of death, the type and the length of stay and finally the cost incurred from the social security point of view.

2.2.1 Type of admission

Based on the pre-existing categories, we have regrouped the type of admissions in 4 categories that may already reflect a certain gravity of the injury: 1: admissions through the emergency department (ED) without ambulance; 2: admissions through the ED with an ambulance ; 3: admissions through the ED with an ambulance but also with the intervention of a MICU - mobile intensive care unit and/or a PIT - paramedic intervention unit; and finally 4: unplanned admission meaning emergency hospitalization not through the emergency department.

2.2.2 Primary diagnosis

It is defined as the affection which, upon medical examination, proved to be the main cause of patient's admission. This primary diagnosis was reported using the ICD-9-CM classification [12]. Because of the "injury and poisoning" [800-999] group was highly reported for the whole sample (74.6%), semi-detailed descriptions, among the two investigated injury groups, were done. Because, among the "injury and poisoning", the prevalence of the "poisoning by drugs, medicinal and biological substances" group [960-979] was the most reported (84.1%) for the "suicide and self-inflicted injury" group, detailed descriptions were done for this group. Despite the fact that the "mental disorders" [290-319] was not really frequent (3.3%) on the whole sample, semi-detailed descriptions were done for the suicide and self-inflicted injury group because these disorders were twice more prevalent in this group than in the others E codes group (7.2% vs. 2.9% respectively).

2.2.3 Stays description

The different services encountered were the emergency unit, the one day unit, the intensive care unit, the burn unit, the diagnostic and surgical care unit, the diagnostic and medical care unit, the geriatric unit, the pediatric unit, the neuropsychiatric unit and the specialized unit for the treatment and rehabilitation (with cardiopulmonary affections, musculoskeletal affections, neurological diseases, palliative care, poly chronic diseases and psycho geriatric affections). During the stays, patients could change, one or more times, of department according to the evolution of their health status. We therefore have investigated up to three consecutive services, with, for the suicide and self-inflicted injury group, a focus on the passages by the intensive care; because a stay in an intensive ward may reflect certain gravity of the health status.

2.2.4 Type of discharge, patient's destination and cause of death

Based on the pre-existing categories, we have regrouped the type of discharge in 4 categories. Two categories were related to the hospital's discharge with or without medical consent. The two others were related to a transfer to another place: the first for specialized care, and the second for reeducation. The patient's destination was taken into account because this variable contains relevant information in terms of patient's redirecting to psychiatric homes / hospitals. The other variable's categories were the domicile, an elderly home or another hospital. By the way of these two variables it was also possible to know if the patient was dead, as a result of his injuries, during its stay. The cause of death was reported in one of the fields of the patient file. It is important to note that the reported cause

of death was the one that appears on the death certificate and that this cause is, for the non-natural deaths, the circumstances of the injury (or the place of injuries if no type of injuries were reported) unless there was a morbid condition underlying (e.g. the neoplasms and the circulatory diagnoses). In other words, if a patient with cardiac pathology takes an overdose of his usually prescribed drugs and died, at the hospital from a heart arrest, it will be the heart failure that will be reported in the death certificate.

2.2.5 Type, length and costs of stays

The type of stays can provide first information about the gravity, because a patient who only stays for a day hospitalization is probably less affected than a patient who stays as an inpatient. Furthermore, patients in the case of the day hospitalization, days surgery or outpatient emergency have a length of stay equal to one day; so they are not taken into account when it is question of the estimation of mean or median length of stay (reported in days). The estimation of the median costs, borne by social security (reported in euros) was also only based on the inpatient stays. Among these total costs borne by social security, the costs resulting, one hand, from medical procedures and, on the other hand, from pharmaceutical products were reported. The percentages of each of these 2 specific costs in relation to the whole cost was also calculated.

2.3 Statistical Analyses

All categorical variables were described with both absolute and relative frequencies. The variations between these distributions among, on one hand, the suicide and self-inflicted injury group; and, on the other hand, all the others E code causes were assessed using Pearson's chi-square test in accordance with the Cochran guidelines cited by Altman [19], namely that 80% of the cells in the table should have expected frequencies greater than 5 and all cells should have expected frequencies greater than one. To estimate the strengths of the associations, the odds ratios (OR), derived from simple logistic regressions, were presented with their 95% confidence intervals (95%CI). The same approach was applied for investigate the variations of the factors according to the gender, among the suicide and self-inflicted injury group. Because of the skewness of the quantitative variables, the median and both the 25th and the 75th percentiles were reported. The Wilcoxon rank sum test was used to assess the variation between the distributions of these variables, on one hand, according to the two groups of injuries (suicide and self-inflicted group vs. the others E code) and, on the other hand, according to the gender, within the suicide and self-inflicted injury group. The significance level for all tests was 0.05 and all statistical analyses were performed using Stata/SE 12.0 for Windows (TX: StataCorp LP).

3. RESULTS

3.1 Prevalence of Suicide and Self-inflicted Injury and Place of Occurrence

Among the 16,406 stays with an E code related to the cause, 1745 stays were in the [E950-E959] group, therefore the prevalence of suicide and self-inflicted injury in our sample was equal to 10.6%. The information related to the place of the attempt was only available for 325 cases. The home [E849.0] was the place predominantly reported (81.5% of the cases); and attempts on the street and the highway [E849.5] were reported in 5.9% of the cases (Data not shown). Regarding the methods used, Table 2 shown that suicide and self-inflicted poisoning by solid or liquid substances was the most reported method (87.5%), with the

tranquilizers and other psychotropic agents as mean in a little more than half of the cases (848/1527). The two other most prevalent methods were, suicide and self-inflicted injury by cutting and piercing instrument, on one hand, and suicide and self-inflicted injury by hanging, strangulation, and suffocation on the other hand; but in a much lesser extent (5.6% and 2.2% respectively) (Table 1).

Table 1. The several methods observed among the suicide and self-inflicted injury group [E950-E959]

n = 1745	[E950-E959] Suicide and self-inflicted injury
1527 (87.5%)	[E950] Suicide and self-inflicted poisoning by solid or liquid substances
	159 [E950.0] Analgesics, antipyretics, and antirheumatics
	5 [E950.1] Barbiturates
	99 [E950.2] Other sedatives and hypnotics
	848 [E950.3] Tranquilizers and other psychotropic agents
	191 [E950.4] Other specified drugs and medicinal substances
	91 [E950.5] Unspecified drug or medicinal substance
	3 [E950.6] Agricultural and horticultural chemical and pharmaceutical preparations
	10 [E950.7] Corrosive and caustic substances
	121 [E950.9] Other and unspecified solid and liquid substances
3 (0.2%)	[E951] Suicide and self-inflicted poisoning by gases in domestic use
13 (0.7%)	[E952] Suicide and self-inflicted poisoning by other gases and vapors
38 (2.2%)	[E953] Suicide and self-inflicted injury by hanging, strangulation, and suffocation
	32 [E953.0] Hanging
	5 [E953.8] Other specified means
	1 [E953.9] Unspecified means
6 (0.3%)	[E954] Suicide and self-inflicted injury by submersion [drowning]
11 (0.6%)	[E955] Suicide and self-inflicted injury by firearms, air guns and explosives
97 (5.6%)	[E956] Suicide and self-inflicted injury by cutting and piercing instrument
13 (0.7%)	[E957] Suicide and self-inflicted injuries by jumping from high place
30 (1.7%)	[E958] Suicide and self-inflicted injury by other and unspecified means
	3 [E958.0] Jumping or lying before moving object
	14 [E958.5] Crashing of motor vehicle
	1 [E958.7] Caustic substances, except poisoning
	9 [E958.8] Other specified means
	3 [E958.9] Unspecified means
7 (0.4%)	[E959] Late effects of self-inflicted injury

Data are n (%)

3.2 Demographic Characteristics of the Patients

The gender ratio (M/F) was equal to 0.9 in the whole sample; with nearly two thirds of women in the suicide and self-inflicted injury group (63.0%) compare to a little more than the half in the others E code group (51.2%). The median age was statistically significantly lower in the suicide and self-inflicted injury group (41 years) than the one observed in the others E code group (61 years) (Table 2). Among the suicide and self-inflicted injury group, the proportions of the several age groups were not the same for women and for men. There

was, on one hand, a little more of older women than older men (27.1% vs. 22.6% of 50 years or more respectively) and, on the other hand, a little less of middle-aged women than middle-aged men (45.9% vs. 49.9% of between 30-50 years respectively) (Fig. 3).

Table 2. Gender and age of the patients, for all injuries and according to injury's group

	All injuries	[E950-E959]	Others E code	OR (95%CI)	P value
<i>Gender</i>	<i>n = 16406</i>	<i>n = 1745</i>	<i>n = 14661</i>		<0.001
Male	7806 (47.6)	645 (37.0)	7161 (48.8)	1.00	
Female	8600 (52.4)	1100 (63.0)	7500 (51.2)	1.63 (1.47-1.80)	
<i>Age (years)</i>	<i>n = 16406</i>	<i>n = 1745</i>	<i>n = 14661</i>		<0.001
<20	57 (32 - 79)	41 (28 - 50)	61 (33 - 81)	1.00	
[20-30[	2513 (15.3)	203 (11.6)	2310 (15.8)	3.00 (2.47-3.64)	
[30-40[	1319 (8.0)	275 (15.8)	1044 (7.1)	3.73 (3.08-4.50)	
[40-50[	1362 (8.3)	336 (19.3)	1026 (7.0)	4.37 (3.66-5.22)	
[50-60[	1756 (10.7)	487 (27.9)	1269 (8.7)	2.00 (1.65-2.44)	
≥60	1760 (10.7)	264 (15.1)	1496 (10.2)	0.27 (0.22-0.33)	

Data are n (%) and Med (25-75)

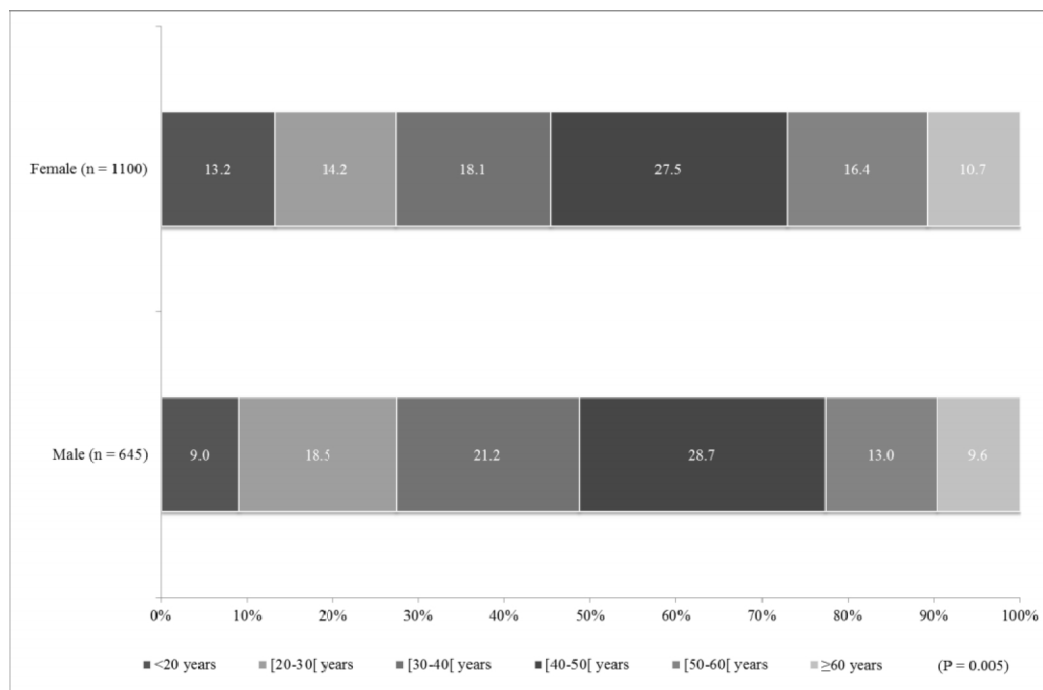


Fig. 3. Age of the patients according to the gender

3.3 Moment, Type and Initiative of the Hospital's Admissions

There was no variation of the suicide and self-inflicted injuries according to the several months of the year. The median number of admissions for these attempts was equal to 143

cases, with a minimum of 128 cases, observed in November, and a maximum of 167 cases, observed in January (Data not shown). Fig. 4 shows that there were, on the whole, more suicide and self-inflicted injuries on Sundays (16.9%) and Mondays (16.2%). When the variation was observed across the whole year, according to the weekdays inside all the months, a repeated cycle, with almost always higher rate on Sundays and Mondays, may be observed (Fig. 5). The proportions of the several types of admission varied statistically significantly ($P < 0.001$) between the two injuries groups. Indeed, the proportion of admission with the intervention of a mobile intensive care unit and/or a paramedic intervention unit was higher in the suicide and self-inflicted injuries group than in the others E code group (23.5% vs. 14.3% respectively); and the proportion of admission without ambulance was higher in the others E codes group than in the suicide and self-inflicted injuries group (45.0% vs. 34.9% respectively) (Table 3). According to gender, the proportion of admissions with the intervention of a mobile intensive care unit and/or a paramedic intervention unit was statistically significantly ($P < 0.001$) higher among men than among women (29.2% vs. 20.2%) (Table 3). The persons at the initiative of the admissions were statistically significantly ($P < 0.001$) more often a third party for the suicide and self-inflicted injuries cases (43.3% vs. 30.3% in the others E code group), whereas admission at the initiative of the patient's general practitioner was more observed in the others E codes group than in the suicide and self-inflicted injuries (17.5% vs. 7.0%). Among the suicide and self-inflicted injuries cases, there were no significant ($P = 0.437$) differences between the persons at the initiative of the admission according to the gender (Table 4).

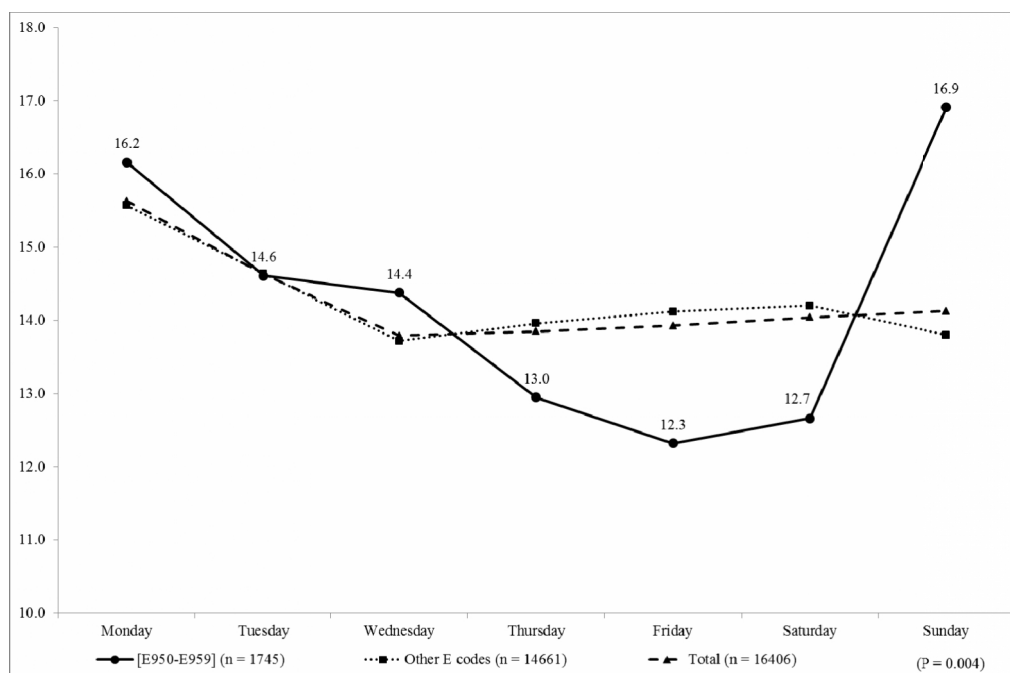


Fig. 4. Variation of the proportions of all injuries, of suicide and self-inflicted injuries, and of others E codes, according to the weekdays

3.4 Primary Diagnosis that Justifies the Hospitalization

Table 5 shows, for the whole sample, that in a little more than three quarters of cases (77.5%), it was a diagnosis related to injury and poisoning [800-999] which was made. Both the proportions of diagnosis related to injury and poisoning [800-999] and of mental disorders [290-319] were statistically significantly ($P < 0.001$) higher in the suicide and self-inflicted injury group than in the other group (90.0% vs 76.0% and 7.2% vs. 2.9% respectively) (Table 5). Regarding the injury and poisoning group, the poisoning by drugs, medicinal and biological substances [960-979] was the major reported (84.1%) diagnosis in the suicide and self-inflicted injury group (Table 6). In 64.4% of the cases it was a poisoning by psychotropic agents, predominantly by benzodiazepine-based tranquilizers (562/851), or by analgesics, antipyretics, and antirheumatics (11.7%), mostly by aromatic analgesics, like paracetamol (69/154) (Table 7). Among the mental disorders observed in the suicide and self-inflicted injuries group, the neurotic disorders, personality disorders, and other nonpsychotic mental disorders were reported for 86.5% of the situations, with nearly a fifth of alcohol dependence syndrome (20/109) and another fifth of anxiety, dissociative and somatoform disorders (21/109) (Table 8).

3.5 Stays Description, Type of Discharge, Patient's Destination and Cause of Death

The first encountered services among the 16,406 patients were predominantly a diagnostic and medical care unit [D] (35.7%) or a diagnostic and surgical care unit [C] (34.8%). The others encountered services were, in a less extent, a pediatric unit [E] (7.6%), a one day unit [Z] (6.6%), a geriatric unit [G] (6.4%) or an intensive care unit [I] (3.9%) (Data not shown). For 8.5% of the suicide and self-inflicted injuries group, the first ward had been the intensive care unit; and for nearly three quarters (72.4%), the ward was a diagnostic and medical care unit [D]. Among these patients in a D unit, 3.5% have continued their hospital stay in an intensive care unit [I]. (Fig. 6). Four percent of the patients have lost life at hospital, with a proportion of death, statistically significantly ($P < 0.001$) lower in the suicide and self-inflicted injury group compared to the others E code group (1.3% vs. 4.3% respectively). Among the suicide and self-inflicted injury group, the proportion of death was statistically significantly ($P = 0.030$) twice higher among men than among women (Table 9). Among the 22 deaths in the suicide and self-inflicted injury group, 12 were related to the suicidal act (5 were labelled with a [E950-E959] code and 7 with a [800-999] code). Five others were labelled as "symptoms, signs and ill-defined conditions" [780-799], 1 was related to a disease of the circulatory system, one other was related to a disease of the nervous system and sense organs, and one other was related to a neoplasm. Finally, 5 were labelled as "unreported cause" (Data not shown). Regarding the type of discharge, there were statistically significantly ($P < 0.001$) more discharges without consent in the suicide and self-inflicted injuries group than in the others E codes group (8.1% vs. 1.2% respectively); and there was also more transfer for specialized care (5.8% vs. 2.3% respectively). Among the suicide and self-inflicted injuries group, no significant differences were observed according to the gender (Table 10). The destination after the hospital stay varied statistically significantly ($P < 0.001$) between the two investigated groups of injuries. There was 5.8% of the suicide and self-inflicted injuries group which went to a psychiatric structure; against 0.6% in the others E codes group; and there was no difference according the gender in the suicide and self-inflicted injuries group (Table 11).

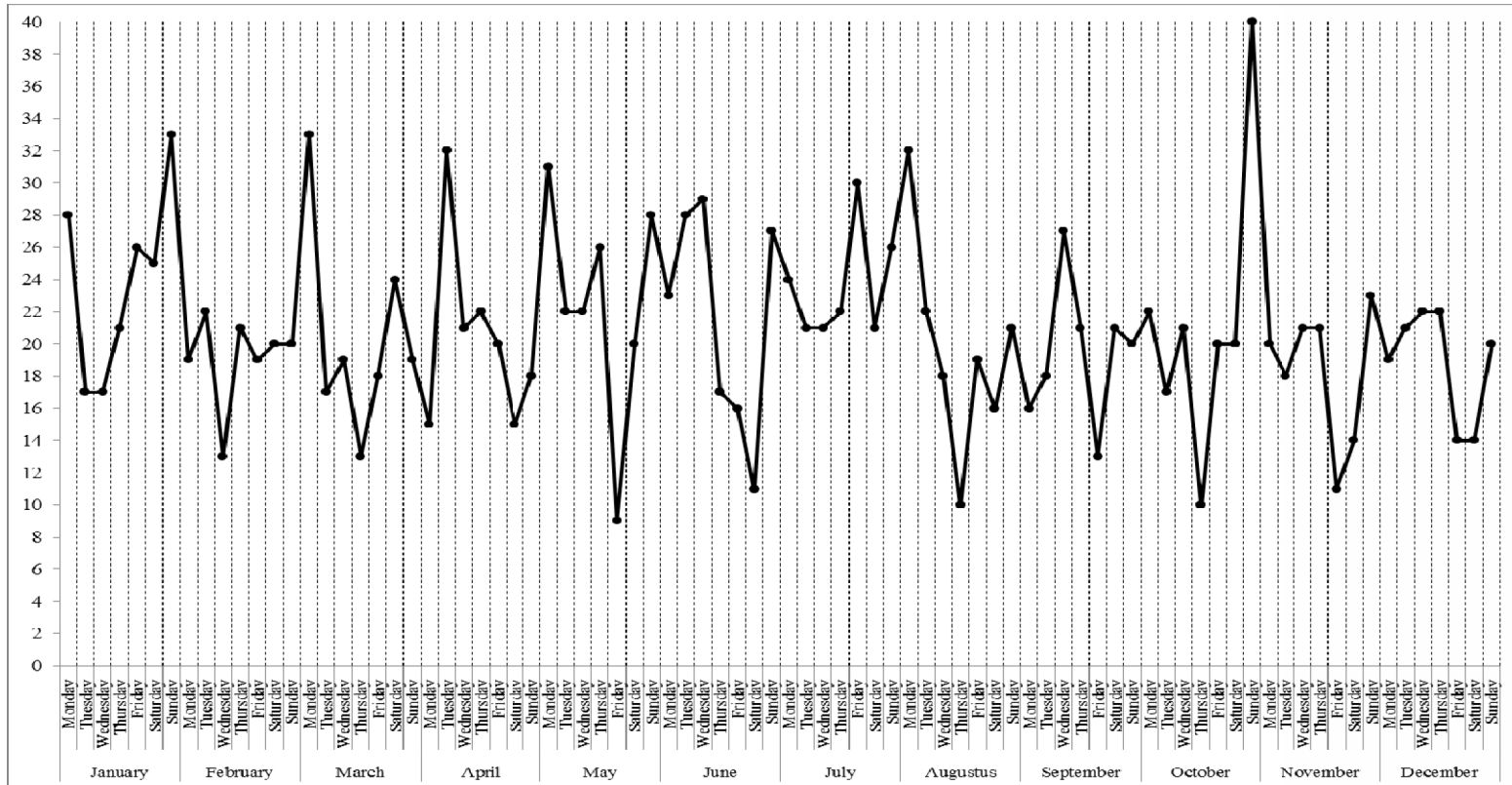


Fig. 5. Variation of the proportions of suicide and self-inflicted injuries according to the week days of the 2010 year

Table 3. Information about the type of admission, for all injuries, according to injury's group and according to the gender among the suicide and self-inflicted injury group [E950-E959]

Whole sample	All injuries	[E950-E959]	Others E code	OR (95%CI)	P value
<i>Type of admission, through</i>	<i>n = 16406</i>	<i>n= 1745</i>	<i>n = 14661</i>		<0.001
ED, without ambulance	7202 (43.9)	609 (34.9)	6593 (45.0)	1.00	
ED, with ambulance	6428 (39.2)	715 (41.0)	5713 (39.0)	1.35 (1.21-1.52)	
ED, with ambulance and MICU and/or PIT	2514 (15.3)	410 (23.5)	2104 (14.3)	2.11 (1.84-2.41)	
Emergency hospitalization	262 (1.6)	11 (0.6)	251 (1.7)	0.47 (0.26-0.87)	
Among the [E950-E959]	Male		Female	OR (95%CI)	P value
<i>Type of admission, through</i>	<i>n = 645</i>		<i>n= 1100</i>		<0.001
ED, without ambulance	186 (28.8)		423 (38.5)	1.00	
ED, with ambulance	267 (41.4)		448 (40.7)	1.36 (1.08-1.71)	
ED, with ambulance and MICU and/or PIT	188 (29.2)		222 (20.2)	1.93 (1.49-2.50)	
Emergency hospitalization	7 (0.6)		7 (0.6)	1.30 (0.38-4.49)	

Data are n (%). ED: Emergency Department, MICU: Mobile Intensive Care Unit, PIT: Paramedic Intervention Unit

Table 4. Information on the persons at the initiative of the admission, for all injuries, according to injury's group and according to the gender among the suicide and self-inflicted injury group [E950-E959]

Whole sample	All injuries	[E950-E959]	Others E code	OR (95%CI)	P value
<i>At the initiative of</i>	<i>n = 16376</i>	<i>n= 1743</i>	<i>n = 14633</i>		<0.001
His /her own initiative	6907 (42.2)	791 (45.4)	6116 (41.8)	1.00	
A specialist	1024 (6.3)	40 (2.3)	984 (6.7)	0.31 (0.23-0.44)	
His /her insurer	22 (0.1)	5 (0.3)	17 (0.1)	2.27 (0.84-6.18)	
A third party	5191 (31.7)	754 (43.3)	4437 (30.3)	1.31 (1.18-1.46)	
His /her general practitioner	2686 (16.4)	122 (7.0)	2564 (17.5)	0.37 (0.30-0.45)	
A doctor on call	546 (3.3)	31 (1.8)	515 (3.5)	0.47 (0.32-0.67)	
Among the [E950-E959]	Male		Female	OR (95%CI)	P value
<i>At the initiative of</i>	<i>n= 644</i>		<i>n = 1099</i>		0.44
His /her own initiative	295 (45.8)		496 (45.1)	1.00	
A specialist	18 (2.8)		22 (2.0)	1.38 (0.73-2.61)	
His /her insurer	1 (0.2)		4 (0.4)	0.42 (0.05-3.78)	
A third party	283 (43.9)		471 (42.9)	1.01 (0.82-1.24)	
His /her general practitioner	39 (6.1)		83 (7.6)	0.79 (0.53-1.19)	
A doctor on call	8 (1.2)		23 (2.1)	0.58 (0.26-1.32)	

Data are n (%)

Table 5. The different primary diagnosis, for all injuries, according to injury's group [E950-E959] and according to the others E code group

	All injuries	[E950-E959]	Others E code	OR (95%CI)	P value
<i>Diagnosis</i>	<i>n = 16406</i>	<i>n = 1745</i>	<i>n = 14661</i>		<0.001
[290-319] Mental disorders	548 (3.3)	126 (7.2)	422 (2.9)	8.88 (6.66-11.83)	
[800-999] Injury and poisoning	12720 (77.5%)	1570 (90.0)	11150 (76.0)	18.82 (13.33-26.59)	
Others	3138 (19.1)	49 (2.8)	3089 (21.1)	1.00	

Data are n (%)

Table 6. The different injury and poisoning diagnosis [800-999], for all injuries, according to injury's group [E950-E959] and according to the others E code group

	All injuries	[E950-E959]	Others E code
<i>Injury and poisoning</i>	<i>n = 12720</i>	<i>n = 1570</i>	<i>n = 11150</i>
[800-804] Fracture of skull	424 (3.3)	9 (0.6)	415 (3.7)
[805-809] Fracture of neck and trunk	1054 (8.3)	2 (0.1)	1052 (9.4)
[810-819] Fracture of upper limb	2139 (16.8)	2 (0.1)	2137 (19.2)
[820-829] Fracture of lower limb	2915 (22.9)	6 (0.4)	2909 (26.1)
[830-839] Dislocation	287 (2.3)	2 (0.1)	285 (2.6)
[840-848] Sprains and strains of joints and adjacent muscles	201 (1.6)	0 (0.0)	201 (1.8)
[850-854] Intracranial injury, excluding those with skull fracture	1176 (9.3)	5 (0.3)	1171 (10.5)
[860-869] Internal injury of thorax, abdomen and pelvis	240 (1.9)	7 (0.5)	233 (2.1)
[870-879] Open wounds of head, neck and trunk	311 (2.4)	11 (0.7)	300 (2.7)
[880-887] Open wounds of upper limb	583 (4.6)	53 (3.4)	530 (4.8)
[890-897] Open wounds of lower limb	125 (1.0)	1 (<0.1)	124 (1.1)
[900-904] Injury to blood vessels	18 (0.1)	7 (0.5)	11 (0.10)
[905-909] Late effects of injuries, poisonings, toxics effects	3 (<0.1)	0 (0.0)	3 (<0.1)
[910-919] Superficial injury	38 (0.3)	2 (0.1)	36 (0.3)
[920-924] Contusion with intact skin surface	522 (4.1)	7 (0.5)	515 (4.6)
[925-929] Crushing injury	32 (0.3)	0 (0.0)	32 (0.3)
[930-939] Effects of foreign body entering through orifice	64 (0.5)	0 (0.0)	64 (0.6)
[940-949] Burns	173 (1.4)	3 (0.2)	170 (1.5)
[950-957] Injury to nerves and spinal cord	41 (0.3)	4 (0.3)	37 (0.3)
[958-959] Certain traumatic complications and unspecified injuries	196 (1.5)	8 (0.5)	188 (1.7)
[960-979] Poisoning by drugs, medicinal and biological substances	1642 (12.9)	1321 (84.1)	321 (2.9)
[980-989] Toxic effects of substances chiefly nonmedicinal as a source	309 (2.4)	108 (6.9)	201 (1.8)
[990-995] Other and unspecified effects of external causes	121 (1.0)	12 (0.8)	109 (1.0)
[996-999] Complications of surgical and medical care, not elsewhere classified	106 (0.8)	0 (0.0)	106 (1.0)

Data are n (%)

Table 7. The poisoning by drugs, medicinal and biological substances [960-979] group observed in the suicide and self-inflicted injury group [E950-E959]

n = 1321	Poisoning by drugs, medicinal and biological substances
1 (<0.1%)	[960] Poisoning by antibiotics
5 (0.4%)	[961] Poisoning by other anti-infectives
39 (3.0%)	[962] Poisoning by hormones and synthetic substitutes
	29 [962.3] Insulins and antidiabetic agents
	10 Others [962]
12 (0.9%)	[963] Poisoning by primarily systemic agents
5 (0.4%)	[964] Poisoning by agents primarily affecting blood constituents
154 (11.7%)	[965] Poisoning by analgesics, antipyretics, and antirheumatics
	14 [965.02] poisoning methadone
	20 [965.09] poisoning codeine, meperidine or morphine
	69 [965.4] Aromatic analgesics (acetanilid, paracetamol, phenylbutazone)
	14 [965.9] Unspecified analgesic and antipyretic
	37 Others [965]
17 (1.3%)	[966] Poisoning by anticonvulsants and anti-Parkinsonism drugs
85 (6.4%)	[967] Poisoning by sedatives and hypnotics
	29 [967.8] Other sedatives and hypnotics
	51 [967.9] Unspecified sedative or hypnotic
	5 Others [967]
851 (64.4%)	[969] Poisoning by psychotropic agents
	190 [969.0] Antidepressants
	70 [969.3] Other antipsychotics, neuroleptics, and major tranquilizers
	562 [969.4] Benzodiazepine-based tranquilizers
	29 Others [969]
2 (0.2%)	[970] Poisoning by central nervous system stimulants
10 (0.8%)	[971] Poisoning by drugs primarily affecting the autonomic nervous system
45 (3.4%)	[972] Poisoning by agents primarily affecting the cardiovascular system
	13 [972.0] Cardiac rhythm regulators
	25 [972.6] Other antihypertensive agents
	7 Others [972]
2 (0.2%)	[973] Poisoning by agents primarily affecting the gastrointestinal system
2 (0.2%)	[974] Poisoning by water, mineral, and uric acid metabolism drugs
4 (0.3%)	[975] Poisoning by agents primarily acting on the smooth and skeletal muscles and respiratory system
4 (0.3%)	[976] Poisoning by agents primarily affecting skin and mucous membrane
83 (6.3%)	[977] Poisoning by other and unspecified drugs and medicinal substances

Table 7 Continue.....

15	[977.8] Other specified drugs and medicinal substances
66	[977.9] Unspecified drug or medicinal substance
2	Others [977]

Data are n(%)

Table 8. Mental disorders [290-319] group observed in the suicide and self-inflicted injury group [E950-E959]

n = 126	Mental disorders
17 (13.5%)	[290-299] Psychoses
	1 [290] Dementias
	1 [292] Drug-induced mental disorders
	11 [296] Episodic mood disorders
	3 [298] Other nonorganic psychoses
	1 [299] Pervasive developmental disorders
109 (86.5%)	[300-316] Neurotic disorders, personality disorders, and other nonpsychotic mental disorders
	21 [300] Anxiety, dissociative and somatoform disorders
	20 [303] Alcohol dependence syndrome
	1 [304] Drug dependence
	23 [305] Nondependent abuse of drugs
	2 [308] Acute reaction to stress
	9 [309] Adjustment reaction
	33 [311] Depressive disorder, not elsewhere classified

Data are n (%)

Table 9. Vital status for all injuries, according to injury's group and according to the gender among the suicide and self-inflicted injury group [E950-E959]

Whole sample	All injuries	[E950-E959]	Others E code	OR (95%CI)	P value
<i>Vital status</i>	<i>n = 16386</i>	<i>n = 1741</i>	<i>n = 14645</i>		<0.001
Alive	15728 (96.0)	1719 (98.7)	14009 (95.7)	1.00	
Death	658 (4.0)	22 (1.3)	636 (4.3)	0.28 (0.18-0.43)	
Among the [E950-E959]	Male		Female	OR (95%CI)	P value
<i>Vital status</i>	<i>n = 643</i>		<i>n = 1098</i>		0.03
Alive	630 (98.0)		1089 (99.2)	1.00	
Death	13 (2.0)		9 (0.8)	2.50 (1.06-5.87)	

Data are n (%)

Table 10. Types of discharge, for all injuries, according to injury's group and according to the gender among the suicide and self-inflicted injury group [E950-E959]

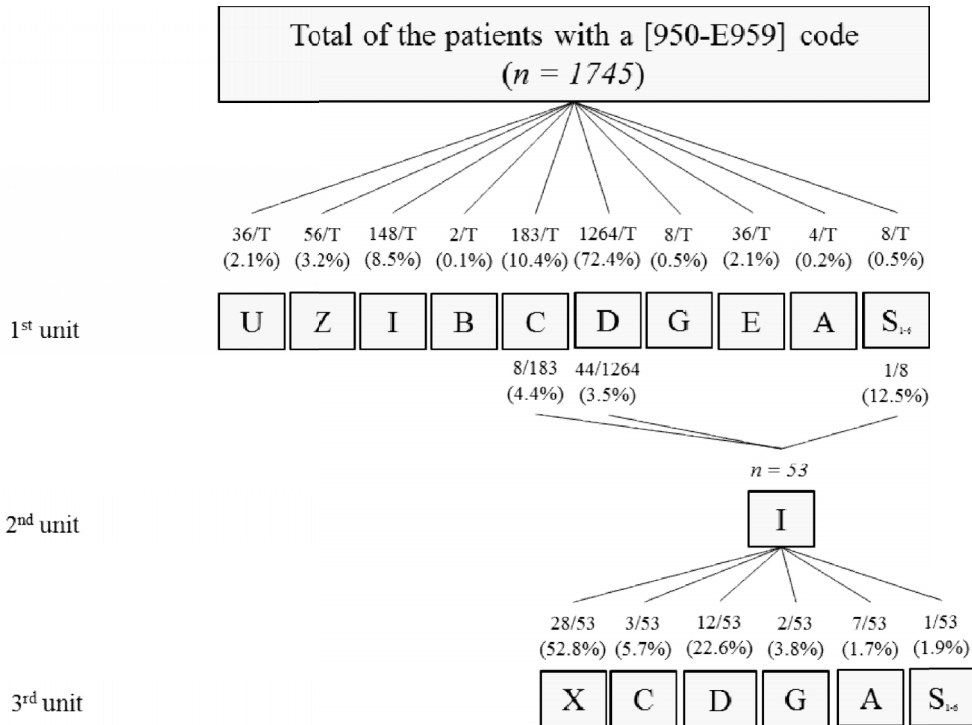
Whole sample	All injuries	[E950-E959]		Others E code	OR (95%CI)	P value
<i>Type of discharge</i>	<i>n = 15699</i>	<i>n = 1719</i>		<i>n = 14009</i>		<0.001
On medical advice	14803 (94.3)	1469 (85.6)		13334 (95.4)	1.00	
Without consent	304 (2.0)	138 (8.1)		166 (1.2)	7.55 (5.98-9.52)	
Transfer for specialized care	428 (2.7)	100 (5.8)		328 (2.3)	2.77 (2.20-3.48)	
Transfer for reeducation	164 (1.0)	9 (0.5)		155 (1.1)	0.53 (0.27-1.03)	
Among the [E950-E959]		Male	Female		OR (95%CI)	P value
<i>Type of discharge</i>		<i>n = 630</i>	<i>n = 1089</i>			0.29
On medical advice		527 (83.9)	942 (86.6)		1.00	
Without consent		57 (9.1)	81 (7.5)		1.26 (0.88-1.79)	
Transfer for specialized care		42 (6.7)	58 (5.3)		1.29 (0.86-1.95)	
Transfer for reeducation		2 (0.3)	7 (0.6)		0.51 (0.11-2.47)	

Data are n (%)

Table 11. Types of destination, for all injuries, according to injury's group and according to the gender among the suicide and self-inflicted injury group [E950-E959]

Whole sample	All injuries	[E950-E959]		Others E code	OR (95%CI)	P value
<i>Type of destination</i>	<i>n = 15572</i>	<i>n = 1697</i>		<i>n = 13875</i>		<0.001
Domicile	13501 (86.7)	1555 (91.6)		11946 (86.1)	1.00	
Another hospital	510 (3.3)	32 (1.9)		478 (3.5)	0.51 (0.36-0.74)	
Elderly homes	1374 (8.8)	12 (0.7)		1362 (9.8)	0.07 (0.04-0.12)	
Psychiatric homes / hospitals	187 (1.2)	98 (5.8)		89 (0.6)	8.46 (6.32-11.33)	
Among the [E950-E959]		Male	Female		OR (95%CI)	P value
<i>Type of destination</i>		<i>n = 615</i>	<i>n = 1082</i>			0.63
Domicile		560 (91.1)	995 (92.0)		1.00	
Another hospital		14 (2.3)	18 (1.7)		1.38 (0.68-2.80)	
Elderly homes		3 (0.4)	9 (0.8)		0.59 (1.16-2.20)	
Psychiatric homes / hospitals		38 (6.2)	60 (5.5)		1.13 (0.74-1.71)	

Data are n (%)



U: Emergency unit , Z: One day unit, I: Intensive care unit, B: Burn unit , C: Diagnostic unit & surgical treatment, D: Diagnostic unit & medical treatment, G: Geriatric unit, E: Pediatric unit, A: Neuropsychiatric unit, S: Specialized unit for the treatment and rehabilitation, X: Exit.

Fig. 6.Stays description with a focus on the intensive care unit as the second unit

3.6 Type, Length of Stay and Cost Incurred.

The lowest proportions of day surgery and day hospitalization were observed in the suicide and self-inflicted injuries group (0.3% and 4.8% vs. 3.6% and 6.7% respectively, $P < 0.001$); and, there was no significant variation according to the gender for the suicide and self-inflicted injuries group (Table 12). The length of stay but also the total costs, as well as the costs related to medical and pharmaceutical procedures were statistically significantly lower in the suicide and self-inflicted injuries group. According to the gender among the suicide and self-inflicted injuries group, the difference in the length of stay was borderline significant ($P = 0.053$). The several median costs were always the highest among the men, but, regarding the median percentage of total cost for the pharmaceutical products, the value was the highest among the women (Table 13).

Table 12. Type of stays, for all injuries, according to injury's group and according to the gender among the suicide and self-inflicted injury group [E950-E959]

Whole sample	All injuries	[E950-E959]	Others E code	OR (95%CI)	P value
<i>Type of stay</i>	<i>n</i> = 16290	<i>n</i> = 1743	<i>n</i> = 14547		<0.001
Inpatient	14703 (90.3)	1653 (94.8)	13050 (89.7)	1.00	
Day surgery	522 (3.2)	6 (0.3)	516 (3.6)	0.09 (0.04-0.21)	
Day hospitalisation	1065 (6.5)	84 (4.8)	981 (6.7)	0.68 (0.54-0.85)	
Among the [E950-E959]	Male		Female	OR (95%CI)	P value
<i>Type of stay</i>	<i>n</i> = 645		<i>n</i> = 1098		0.12
Inpatient	604 (93.6)		1049 (95.5)	1.00	
Day surgery	4 (0.6)		2 (0.2)	3.47 (0.63-19.02)	
Day hospitalisation	37 (5.7)		47 (4.3)	1.37 (0.88-2.13)	

Data are n (%)

Table 13. Length and cost of stays, for all injuries, according to injury's group and according to the gender among the suicide and self-inflicted injury group [E950-E959]

Whole sample	All injuries	[E950-E959]	Others E code	P value
<i>Length of stay*</i>	<i>n</i> = 14702	<i>n</i> = 1653	<i>n</i> = 13049	<0.001
Stay (days)	6 (2-15)	2 (2-5)	7 (2-16)	
<i>Cost (euros)*</i>	<i>n</i> = 14293	<i>n</i> = 1616	<i>n</i> = 12677	
Total cost	1356.7 (743.4-2551.4)	669.5 (564.3-1031.9)	1490.5 (830.6-2722.5)	<0.001
Medical procedures	933.5 (444.9-1684.1)	382.3 (298.4-685.9)	1022.5 (519.4-1770.7)	<0.001
Pharmaceutical products	149.22 (128.9-196.9)	130.0 (120.6-150.2)	153.4 (130.1-204.5)	<0.001
<i>Percentages of the total cost*</i>	<i>n</i> = 14293	<i>n</i> = 1616	<i>n</i> = 12677	
Medical procedures	66.1 (55.4-74.7)	58.0 (52.0-67.3)	67.0 (56.3-75.1)	<0.001
Pharmaceutical products	12.4 (7.9-19.1)	19.5 (13.9-23.3)	11.7 (7.6-17.9)	<0.001
Among the [E950-E959]	Males	Females	P value	
<i>Length of stay*</i>	<i>n</i> = 604	<i>n</i> = 1049	0.053	
Stay (days)	2 (2-5)	2 (2-4)		
<i>Cost (euros)*</i>	<i>n</i> = 591	<i>n</i> = 1025		
Total cost	701 (573.0-1242.5)	653.8 (560.4-898.1)	<0.001	
Medical procedures	414.3 (311.1-856.6)	365.7 (290.8-598.6)	<0.001	
Pharmaceutical products	130.3 (120.6-162.0)	129.5 (120.6-144.6)	0.03	
<i>Percentages of the total cost*</i>	<i>n</i> = 591	<i>n</i> = 1025		
Medical procedures	59.9 (53.2-71.0)	57.2 (51.4-65.5)	<0.001	
Pharmaceutical products	18.4 (12.8-22.8)	20.1 (15.0-23.5)	<0.001	

* Only for the inpatients. Data are n (%) and median (p25-p75).

4. DISCUSSION

This study, based on a sample of hospital stays with at least one external cause (E codes), aimed to investigate the suicide and self-inflicted injuries, in terms of prevalence, of patient characteristics, of methods and means employed and finally of the characteristics of the hospital stays. Another aim was to compare the distributions of the investigated factors between this suicide and self-inflicted injuries group and all the others E codes reported in the hospital stays.

In this study, among all the external causes, the prevalence of attempted suicide and self-inflicted injury was equal to 10.6%. Gisle and Van Oyen [7] have found, in Belgium, based on the 2004 National Health Interview Survey, a reported lifetime experience of attempt equal to 4.7%. In her paper, Moscicki [20] reported, based on her review of the literature, a range of lifetime prevalence of attempts in adults from 1.1 to 4.6%. Bernal [6] and colleague reported, always through a literature review, a range from 1.1% to 5.9%, with a proportion of 1.3% observed in their own study. Our prevalence was highest than these reported from the population-based surveys, the explanation is that we have only patients with a history of injuries and not all the hospital stays. First analyses of all these E codes stays have shown that the proportion of the suicide and self-inflicted injuries [E950-E959] was nearly the same that this for the transport injuries [E800-E848], with the falls [E880-E888] as the highest type of injuries observed [18]. Despite this impossibility to compare the obtained prevalence with others publications dedicated to the non-completed suicides, our results even so give, on one hand, some detailed descriptions of the suicidal events and its associated factors at the hospital level; and, on the other hand, our results have also joined the major findings reported in the theoretical literature. Regarding the methods used, poisoning was the most reported method (with mostly tranquilizers and other psychotropic agents), followed by the self-inflicted injury by cutting, and self-inflicted injury by hanging. Drugs overdose are common in most countries, reported up to 70% of the attempts [9,20]. These observations call into question the important notion of access to the means, because when a person is contemplating suicide, access to specific methods might be the factor that leads to translation of suicidal thoughts into action [6,10].

There were more women in the suicide and self-inflicted injury group compared to the others E code group. This observation is largely reported [4,7,8,9,20]. There were more women among the suicide attempters than in the suicide completers because men tend to choose more violent and lethal means (e.g. hanging, firearms) than women who tend to choose less violent methods which lead fewer to death [4,8,9]. The same argument could be formulated for the age of the cases. The median age was lower in the suicide and self-inflicted injury group (41 years) than the one observed in the others E code group (61 years). It is in agreement with the fact that elderly, of both gender, completed more suicide than the middle-aged man or the young people [4,8,9,20].

There were, on the whole, more suicide and self-inflicted injuries on Sundays and Mondays. It was the same trend as that reported in the studies of Beauchamp [21] and colleagues, Colman [22] and colleagues or in the International Handbook of Suicide and Attempted Suicide of Hawton and van Heeringen [9]. The higher proportion of admissions, with the intervention of a mobile intensive care unit and/or a paramedic intervention unit, found for men, among the suicide and self-inflicted injuries group could be explain by the fact, as cited above, that the men used more violent means and were therefore more seriously injured [4,8,9].

Regarding the primary diagnosis, the proportions of diagnosis related to injury and poisoning were higher in the suicide and self-inflicted injury. This was in agreement with the fact that there were more women in the suicide and self-inflicted injury group, women who have more often chosen the poisoning as the means to commit suicide. In the suicide and self-inflicted injury group, the proportion of mental disorders was also higher than in the others E code group. In the literature, the presence of psychiatric disorders is reported among both the attempters and the completers. These disorders were almost always considered as the major associated factors of suicidal behaviors [4,6,8,9,10,20]. They are present in about 90% of people who kill themselves and contribute to 47-74% of population risk of suicide [6,10,20]. This presence of mental disorders could explain the proportion of poisoning by psychotropic agents, predominantly by benzodiazepine-based tranquilizers observed in this study. This finding highlights the duality of the prevention: on one hand, patients with mental disorders are in need of treatment and on the other hand, due to their medications, they have easily access to drugs.

On the whole, four percent of the patients have lost life at hospital, with a lower proportion of death in the suicide and self-inflicted injury group compared to the others E code group. These observations may be explained by the fact that patients in the others E codes group were older [18]. Another explanation could be related to the lethality of the suicidal act, as explain by Maris, Berman and Silverman [4] in their Comprehensive Textbook of Suicidology. Lethality refers to the probability or medical certainty that an action, method or condition will lead to a fatal outcome. Some experts in suicidology have even developed measurement scales of lethality. As example, in the Smith's Suicide Attempt Lethality scale, at the level 0, for which death is an impossible result of the suicidal behavior, were indexed the light cutting, that do not break the skin, and the ingestion of drugs in a limited number of pills. On the opposite, at the level 10, were indexed, as examples, the high-caliber handgun shot to the brainstem, the multiple severe cuts involving severe blood loss and jumping in front of car on a freeway [4]. The most violent methods are frequently the most lethal, so, as might be expected, a twice higher proportion of death among men than among women was observed within the suicide and self-inflicted injury group. Also, it is important to note that a large proportion of the fatal events have no contact with the hospitals, because, for a completed suicide, the death certificate will be established, with a professional opinion regarding the cause of death, by a medical doctor, on the place of the suicidal act [23].

Regarding the type of discharge, there were more discharges without consent in the suicide and self-inflicted injuries group than in the others E codes group and there was also more transfer to a psychiatric structure. This duality is, in all likelihood, the expression of a same intent. A suicide attempt is not an innocent act and it is important to take the suicide attempters in charge, through a psychiatric point of view, to prevent recurrences. This secondary prevention approach could explain the number of cases referred to a psychiatric institution; but also the important proportion of discharge without consent. On one hand, the caregivers want offer treatment and take into in charge the attempters, but on the other hand, all the patients who have intentionally injured themselves were not on demand of a treatment and even some of them maintain their persistent wish to die. Therefore, the adoption of a treatment, the treatment compliance and the collaborative relationship with caregivers are often difficult [4].

The discharge without consent or the transfer to a psychiatric structure could maybe explain that the length of stay but also the total costs, as well as the costs related to medical and pharmaceutical procedures were lowest in the suicide and self-inflicted injuries group. Added to this, in the others E code group, there were, as example, an important number of falls

cases among older women with comorbidities; events which led to longer stays. [18]. According to the gender, the several median costs were always the highest among the men, but, regarding the median percentage of the total cost for the pharmaceutical products, the value was higher among the women. These observations were directly correlated with the more frequent use of poisoning by women and the use of more violent means by the men. Therefore the stays of men require more interventions of medical procedures.

We have chosen not to take into account the readmissions. Nevertheless, the study of the patients with more than one admission during a year must be really interesting in terms of understanding, on an overall point of view, the repetitive injuries, in terms of investigations of complications / disabilities correlated to the initial injury but also in terms of incurred costs [24]. In the particular case of suicide, this take into account should even be more important because, in most studies of risk factors for suicide, a history of self-harm or suicide attempts is the strongest associated factor; and in prospective studies of individuals who present to hospital after non-fatal self-poisoning or self-injury, 1-6% die by suicide in the first year [10].

Finally, as we have reported in a previous paper [18], although there is, in Belgium, a ministerial circular that strongly encourages the registration of the codes E when they were present; we have observed that there were shortcomings regarding the encoded information. Added to this specific problem encountered among the reporting of the external codes, in the particular case of suicide, arises in addition, the problem of intentionality. As reported by Moscicki, [20] there is a real methodological challenge in the reporting of some events. For example, how to determine the intentionality of a potential suicidal act during a road traffic injury? This question could not be resolved by the epidemiologists or by the statisticians. But, from our place, we can participate to the establishment and to the efficient working of an integrated data collection system dedicated to the injury surveillance.

4. CONCLUSION

Our results show that the epidemiological use of hospital data is complementary to the use of both the population-based data and the death certificates; each data source participating to a better comprehension and a better surveillance of the complex continuum of suicidality. Regarding this need of an integrated data collection system, which serves to document the magnitude of the problem, but also to identify at-risk groups, individuals and situations, an integrated data collection system dedicated to the injury surveillance should be planned in Belgium.

CONSENT

Not applicable.

ETHICAL APPROVAL

Not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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