Factors associated with serious intent to die among suicide attempters in Hungary

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ABSTRACT: As suicide attempts pose major risk for future suicide death, understanding the underlying factors of suicide attempts and suicidal behaviour is an important mental health imperative. The aim of this study was to examine suicide attempts with a special focus on the intention. A total of 2540 discharge summaries were collected between 2009 and 2011 in Miskolc, Hungary, and a content analysis was conducted. Data regarding the method, the reason for suicide attempts, the amount, and the type of the medication taken were examined. Deliberate self-poisoning was the most frequent method (73.8%) committed with more than 200 different types of drugs. 40.5% of the patients attempted suicide with an intent to die, whilst 35.6% of the patients wanted to escape from an unbearable situation. Older age groups, greater amount of taken pills, and affective disorders were associated with self-reported serious intention to die. Our findings should be taken into consideration when monitoring drugs for older patients with depressive disorders.

KEY WORDS: deliberate self-poisoning, depression, serious intent to die, suicide, suicide attempt.

INTRODUCTION

Suicide is not only a major economic problem in terms of medical costs and lost productivity, but it also has serious social and emotional effects (Comans et al. 2013). Despite the high rate of deliberate self-poisoning among patients, who have attempted suicide, there is a very limited data on the types, source, and amount of taken medications. Drug poisoning must be handled differently depending on the exact type, amount, and a patient’s tolerance to medication; therefore, studies are needed for helping the emergency units to treat often unconscious patients. In our study, we are focusing on these factors and their relationship with serious intent to die by deliberate drug overdose in patients.

BACKGROUND

There are ~2000 lethal suicides per year in Hungary; in 2014, the rate was 19.4/100 000, higher than the EU average 11.3/100 000 (Eurostat 2017). The suicide rate in Borsod-Abaúj-Zemplén County is one of the highest in Hungary (28.2/100 000 in 2010; Hungarian Central Statistical Office 2008). Although there are no exact statistics, suicide attempts are evaluated to be at least 10-20 times more common than lethal suicides (Diekstra, 1989; European Pact for Mental Health & Well-Being, 2008; World Health Organization, 2014). In the present study, we define suicide attempt as presented by Hawton et al. (1998) for the ICD-10: ‘an act with non-fatal outcome, in which an individual deliberately...
initiates a non-habitual behavior that, without intervention from others, will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognized therapeutic dosage, and which is aimed at realizing changes which the subject desired via the actual or expected physical consequences.

The prevalence of comorbid mental illnesses among patients, who have attempted suicide, is overall high (Balázs et al. 2000; Balázs et al. 2003; Henriksson et al. 1993; Rihmer et al. 2009; Suominen et al. 1996), but is less common among patients with nonlethal suicide attempts (Fekete & Osváth 2004). Self-poisoning is the most frequent method of suicide attempts in both genders (Hegerl et al. 2008). The gender paradox is also represented in Hungary (Fekete et al. 2005), more women attempt suicide, but more men die by suicide (Canetto, & Sakinofsky 1998). Suicide attempts are more common in adolescent and middle-aged population in both genders (Fekete et al. 2005).

In the WHO/EURO multicenter study, 50% of women and 64% of men used self-poisoning as a suicidal method (Schmidtke et al. 1996). According to Jones et al. (2013), opioid, benzodiazepines, and antidepressants are the three most common medications leading to overdose deaths in the United States. In an Italian study, 58.7% of the patients took at least one type of benzodiazepine (BZD) by self-poisoning (Mauri et al. 2005). The WHO/EURO multicenter study revealed comparable numbers in Hungary: 58% of men and 42% of women use BZDs (Fekete et al. 2005). The drug choice does not show any gender differences within the same country (Värnik et al. 2011).

In a cross-national study by Freeman et al. (2017), 5212 nonlethal suicide attempts have been investigated regarding their method and intent. 49% of those who committed intentional self-poisoning by drug overdose (N = 3542) had a serious intent to die (53.5% by males and 47.7% by females). In a recent Hungarian quantitative study of deliberate self-poisoners (N = 150), the rate of serious intent to die was found in 35.5% of the cases (Tóth et al. 2018).

The number of taken drugs is one of the most important pieces of information required for emergency and toxicology teams. Nevertheless, we found only two studies (Hori & Kinoshita 2016; Yasuda & Kobayashi 2018) about the number of taken pills connected to suicide attempts. In the study of Yasuda and Kobayashi (2018), 98 patient’s data were analysed. They found that the average amount was 84.4 ± 95.5 pills/attempt. Hori and Kinoshita (2016) examined 277 patients with a focus on the number of psychotropic pills taken, and they found that if a patient takes more than 60 tablets, he/she should be considered a high-risk patient for the intensive care unit.

METHODS

All admissions due to suicide attempts between 1 January 2009 and 31 December 2011 to the Borsod-Abaúj-Zemplén County Hospital, Departments of Toxicology, Neurology and Psychiatry, were reviewed in this retrospective study. There are not any other hospitals in the proximity where people with suicidal behaviour might present; this hospital covers an area with about 700 000 inhabitants. Data were collected in the context of the Optimizing Suicide Prevention Programs and their Implementation in Europe (OSPI-Europe) project (Hegerl et al. 2009).

Methods of suicidal acts were assessed according to the ICD-10 diagnosis for suicidal attempts (X60 to X84). Of the selected 2540 cases, 2503 were considered evaluable. Duplicate cases were screened using date of birth and date of hospitalization. Suicide attempts included in this research were nonfatal. The following information was registered: physical and mental comorbidities, circumstances of the actual suicidal event such as method (e.g. sharp object, and drugs), and number and type of ingested pills (and occasionally their sources). The description of the suicide was an obligatory information for inclusion. Cases with too much missing data have been excluded, such as the absence of gender and age. We analysed partially complete files, where, for example, comorbidities, source of medication, or marital status was missing.

The suicidal intent was self-reported by the patients and was recorded during hospital admission. A systematic screening with a special focus on physical and psychological comorbidities has not been performed; all data collected were part of a routine clinical admission. The first and second authors received the electronic charts directly from the Borsod-Abaúj-Zemplén County Hospital and conducted an independent review of each 2540 charts and assessed the suicidal intent. The cases were discussed, and mutual agreement was reached between the reviewers.

For our analysis of intent, the categories developed for the OSPI project were used based on the criteria from Feuerlein (1971). All selected cases were classified as (i) deliberate self-harm (nonhabitual), which does not include the habitual deliberate self-harm, (ii) parasuicide pause/temporary rest (if the person wanted to escape from the situation/problems only, a wish to
interrupt a situation which is considered to be not supportable), (iii) parasuicide gesture (a suicidal act apppellative or manipulative without suicidal intent), and (iv) serious intent to die. The categories 2 and 4 were easy to differentiate in most cases. If the patients described an acute familiar situation (e.g. big fight) and did not want to die at time of admission, we categorized the suicide attempt as ‘parasuicide pause’; if they had a long-term problem (e.g. divorce for years) and still wanted to die when they arrived to the hospital, we assessed the suicide attempt as ‘serious intent to die’.

Descriptive statistics were used to describe the method of suicide attempts, the type of drugs used, the accessibility to drugs, and the intent of suicide. Independent samples t-test was conducted to explore the disparity among genders and number of ingested pills. Pearson’s chi-square test was used to compare the correlation between the type of pills, the methods, and intent of suicide attempts among males and females. Binary logistic regression analyses have been performed to identify potential risk factors for intent to die. A P-value of 0.05 or less was considered as statistically significant. The statistical software used for all analyses was SPSS, version 20.0 (IBM-SPSS Inc., Armonk, NY, USA). The study protocol was approved by the Regional and Institutional Committee of Science and Research Ethics at Semmelweis University (ref. TUKEB 149/2009).

RESULTS

The characteristics of the sample are illustrated in Table 1. The marital status was not recorded consistently. As hypothesized, deliberate self-poisoning by drugs (X60-X64) was the most frequent method (73.8%) in our sample. 59.4% of men and 85.2% of women used this method ($\chi^2 = 211.383, P = 0.000$). The prevalence of self-harm with sharp object (X78-X79) was 17.4% in the sample, 25.5% among men and 10.9% among women ($\chi^2 = 47.939, P = 0.000$). Self-poisoning by chemicals (X68-X69) happened in 4.6% of the cases, with a ratio of 6.3% by men and 3.3% by women ($\chi^2 = 12.864, P = 0.000$). 2% of the sample attempted self-strangulation (X70H0) out of which 3.8% were men and 0.6% women ($\chi^2 = 32.719, P = 0.000$). Other methods (X84H0) occurred in 2.3% of the sample, 4.1% of men and 0.9% of women ($\chi^2 = 37.014, P = 0.000$). 514 patients (20.5%) consumed alcohol during the act, 26.9% of men and 15.5% of women ($\chi^2 = 51.233, P = 0.000$).

Data on type of drugs used for self-poisoning were available in 1,682 cases. More than 200 different types of drugs were used for self-poisoning in our sample. The most common categories are presented in Table 2. 39.5% of men and 60.5% of women used benzodiazepines, followed by different cardiovascular drugs (6.1% of men and 10.4% of women). Less than 5% of the sample used antiepileptics, other sedative hypnotics and anxioitics, antipsychotics and neuroleptics, or antidepressants.

The source of the taken drugs is not known in many cases, these data only appear in 21.5% of the discharge summaries ($N = 362$); however, there is a trend in our sample. The patients acquired the drugs from six main sources: own medication ($N = 262, 72.4%$), medication of a family member ($N = 63, 17.4%$), medication of a friend ($N = 14, 3.9%$), stole ($N = 6, 1.7%$), bought on black market ($N = 9, 2.5%$), or found ($N = 8, 2.2%$). The distribution differs between two age groups: Underage people (less than 18 years old) rather use medication of a family member and buy it on the black market (underage males more often than underage females and adults).

After the analysis of the suicidal cases, the following distribution of different intents emerged: Serious intent to die ($N = 1032, 41.23%$); parasuicide pause/temporary rest ($N = 592, 35.64%$); deliberate self-harm (non-habitual, $N = 274, 10.95%$); and parasuicide gesture ($N = 113, 4.50%$). A total of 192 cases remained unknown (5.99%). Serious intent to die and parasuicide pause were found as the most frequent categories in our study. The rate of ‘serious intent to die’ is statistically equivalent in the two gender subgroups, 41.9% and 40.7%, respectively ($\chi^2 = 0.384, P = 0.536$). Significantly more women than men attempted suicide with

| TABLE 1: Characteristics of the patient sample |
|-----------------------------------------------|
| Total | Male | Female |
|-------|------|--------|
| Age (mean) | | |
| 18-34 | 296 (12.1) | 120 (11.1) | 176 (12.9) |
| 35-49 | 661 (27.0) | 348 (32.1) | 313 (22.9) |
| 50-65 | 847 (34.6) | 375 (34.6) | 472 (33.6) |
| >65 | 504 (20.6) | 185 (17.1) | 319 (23.4) |
| Marital status | | |
| Never married | 298 (11.9) | 118 (10.6) | 180 (12.9) |
| Married | 534 (21.3) | 252 (22.7) | 282 (20.2) |
| Separated/divorced | 105 (4.2) | 42 (3.8) | 63 (4.5) |
| Widowed | 57 (2.3) | 34 (3.1) | 23 (0.9) |
the intent to escape from an unbearable situation (41.8% vs 27.8%, \( \chi^2 = 52.840, P = 0.000 \)); on the other hand, significantly more men harmed themselves deliberately (19.5% vs 9.8, \( P = 0.000 \)). Figure 1 represents the differences between the rates of these categories in the certain age groups. A positive correlation can be seen between the rate of serious intent to die and older age, whilst there is a negative correlation between older age and the rate of parasuicide pause. 72.5% of the patients above 66 years attempted suicide with a serious intent to die.

The average number of taken pills was 37.9 (SD: 41.6, range: 1–360). Figure 2 shows the number of drugs taken in different age groups. The number of taken pills in different subgroups is presented in Table 3. Patients with a serious intent to die took the most tablets (mean: 55.08, SD: 53.01). Adults took on average 41.4 (SD: 43.5) pills. Underage patients took 18.6 (SD: 20.3) pills, significantly fewer ((\( t_{(df)} = 5.911 \)) (1055), \( P = 0.000 \)) than adults in all types of attempts of both genders.

Binary logistic regression analyses were performed to identify potential risk factors of serious intent to die. Of the potential factors examined (gender, age, number of taken pills, affective disorder, physical diseases, alcohol dependency, taking own medication), older age (OR = 1.03, \( P = 0.000 \), 95% CI: 1.02–1.04), greater number of taken pills (OR = 1.01, \( P = 0.000 \), 95% CI: 1.01–1.02), and affective disorders (OR = 2.37, \( P = 0.000 \), 95% CI: 1.5–3.7) were found as significant risk factors. The results are shown in Table 4.

**DISCUSSION**

A thorough assessment of motives involved in suicide attempts is an important aspect of adequate intervention. In the EURO/WHO study, Hjelmeland et al. (2002) identified based on 1664 parasuicide acts four types of intentions involved in suicidal acts: care seeking, influencing others, temporary rest/escape, and intent to die/final exit. In a British study, patients rated intent underlying their recent suicide attempts. 36.5% wanted to die by their attempt, whilst 17.7% did not want to (Velamoor & Cernovsky 1992). Freeman et al. (2017) investigated 5212 suicide attempts from Europe; in this study, 52.1% of the patients had serious intent to die. According to our data, serious intent to die was the most prevalent motivation to attempt suicide (41.23%). This value is in the same range (about average) as that of the other two European studies; therefore, our results contribute to the identification of motives of suicide attempts in Europe.

In our examination, the percentage of serious acts increased with age. As the Eurostat statistics also show

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**TABLE 2: Drugs used by deliberate self-poisoning**

| Type of drugs                          | Male N (%) | Male N (%) | \( \chi^2 \) |
|----------------------------------------|------------|------------|-------------|
| Benzodiazepines                        | 437 (39.5) | 845 (60.5) | 109.537***  |
| Cardiovascular drugs                   | 68 (6.1)   | 145 (10.4) | 14.287***   |
| Antiepileptics                         | 50 (4.5)   | 65 (4.7)   | 0.027       |
| Other sedatohypnotics and anxiolytics  | 44 (4.0)   | 55 (3.9)   | 0.002       |
| Antipsychotics and neuroleptics        | 36 (3.3)   | 49 (3.5)   | 0.125       |
| Antidepressants                        | 18 (1.6)   | 44 (3.2)   | 5.951*      |

***P < 0.001.
*P < 0.05.
similar results (Eurostat 2019), it suggests that healthcare professionals have to pay more attention to the psychiatric well-being of their older patients. Even more attention is needed, if they report significant changes in mood or show signs of any kind of depression (Suominen et al. 2004).

In a Hungarian study, the authors suggested that availability of the drugs is obviously a major factor and it would be another important area for further studies (Fekete et al. 2004). More than 50% of the patients use their own medication according to the literature (De Leo & Pavan 1999), and we found that this number was higher in our sample.

In our study, more taken pills represent a more serious intent to die. The restriction of the accessibility of potentially dangerous medication could be an important element of prevention programmes, because it can significantly change the outcome of an attempt be considered as an evidence-based suicide prevention strategy (Zalsman et al. 2016). However, fatalities have been reported, even if the prescribed drugs are relatively safe (Vignali et al. 2017). After the UK government reduced the quantity of pills included in each package sold to patients, the morbidity rate of paracetamol and salicylates (on their own, not combined with other drugs) and the number of patients hospitalized due to hepatotoxic conclusions decreased (Hawton 2001). Thus, we suggest that elderly depressed patients should have access to smaller amounts of medication (prescribing smaller/the smallest packages).

Our study has some limitations. Our findings are based on a local hospital and might not be representative for all of Hungary. In a few cases, patients reported they took a handful of pills, which equates to ~30 average-sized pills. The reported data are based on the number of ingested pills as per the patients’ own admission or alternatively as reported by paramedics. Therefore, it is feasible the reported numbers are not 100% reflective of the actual quantity taken. Still, based on cross-references with the toxicological/psychiatric or neurological examination reports, it is unlikely that variances would be statistically significant. Another limitation of the study is that the specific toxicities of the different drugs were not further analysed. The same number of pills can either be lethal or can cause only mild symptoms, depending on the type of medicine.

Suicide is characterized with diverse background factors and can be manifested in wide variety of behaviours. Thus, the classification of suicide attempts has always been a challenging topic (Andriessen 2006; Silverman et al. 2007). Currently, there is no internationally agreed-upon nomenclature and classification system; therefore, our results might not be directly comparable with other studies. Standardized terminologies are required for future research and surveillance purposes (Silverman & De Leo 2016).

We must emphasize that a possible relationship between the number of taken pills and the seriousness of the intent of suicide should not downplay the seriousness of any suicide event: every suicide attempt, even with only a few pills, must be taken equally seriously and requires the utmost attention.

**TABLE 3: Number of taken pills in different subgroups**

| Category              | Mean | SD    | Std. error mean |
|----------------------|------|-------|-----------------|
| Deliberate self-harm | 12.83| 10.7  | 4.37            |
| Parasuicide gesture  | 25.59| 20.90 | 2.63            |
| Parasuicide pause    | 29.25| 29.85 | 1.29            |
| Serious intent to die| 55.08| 53.01 | 2.68            |

**TABLE 4: Risk factors of a serious attempt: Binary logistic regression analysis**

| Dependent variable | Independent variables | B coefficients | 95% confidence intervals | Odds ratio |
|--------------------|-----------------------|----------------|--------------------------|------------|
| Serious intent to die | Constant              | 0.030          | 1.02–1.04                | 1.03***    |
|                     | Age                   | 0.017          | 1.01–1.02                | 1.02***    |
|                     | Nr. of taken pills    | 0.017          | 1.01–1.02                | 1.02***    |
|                     | Affective disorders   | 0.566          | 1.52–3.70                | 2.38***    |

***P < 0.001.
and the most appropriate medical, psychological, and social management.

CONCLUSION

Based on our results, a relationship could be hypothesized between the number of taken pills, severity of suicide attempt, and other risk factors of suicide as age and concomitant mental illness. This study adds to our understanding of suicidal behaviour that older age, greater number of taken pills, and affective disorders were found to be significant risk factors for serious intent to die.

RELEVANCE FOR CLINICAL PRACTICE

Health professionals have to pay more attention to the psychiatric well-being of older patients, especially if they show significant changes in mood or any signs of depression, or if they ask for more medication, even if the prescribed drug should be relatively safe.

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DATA AVAILABILITY STATEMENT

The data sets used and/or analysed during the current study are available from the corresponding author on request.

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