



## Suicides following inpatient psychiatric hospitalization: A nationwide case control study



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### ABSTRACT

**Background:** Research shows the elevated risk of suicide associated with current or recent inpatient psychiatric hospitalization. However, it is unclear whether this applies in the area of post-communist Central and Eastern Europe where mental health care has not been deinstitutionalized yet. The present study aims to examine the rates of suicides among psychiatric patients during and shortly after discharge from inpatient hospitalization in the Czech Republic.

**Methods:** All inpatient psychiatric hospitalizations and all suicides committed between 2008 and 2012 have been merged on an individual data basis. The time horizon between the admission and two months after the discharge from inpatient psychiatric facility was utilized and multiple logistic regression was performed to calculate the odds of committing suicide.

**Results:** A total of 137,290 inpatients were hospitalized in Czech psychiatric facilities between 2008 and 2012, and 402 of the inpatients committed suicide during the hospitalization or within the 2 months after the discharge. Highly elevated risks of suicides were found to be associated with being a male, having a history of multiple hospitalizations, and having a diagnosis of affective, anxiety, or personality disorder.

**Limitations:** Limitations are related to the design of the study, and its reliance on routinely collected data. Also, it was not possible to assess the odds of suicide associated with inpatient psychiatric hospitalization against the odds of suicide in general population.

**Conclusions:** During psychiatric treatment and recovery, suicidal behavior and idealization is increased. In psychiatry, hospitalization may be a risky period for suicide behavior. Suicide rates during and soon after the psychiatric hospitalization identified in this study from Central and Eastern Europe are similar to the findings from Western Europe. Preventive strategies should be tailored accordingly.

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### 1. Background

For several years, decreasing suicides amongst psychiatric patients have been a primary objective of European governmental programmes (Dennehy et al., 1996; Hadlaczky et al., 2012). The Swedish government, for instance, enforced a national suicide preventive program which considers the systematical analyses of all suicides occurring during and shortly after hospitalization as one of the key preventative strategies (Hadlaczky et al., 2012). Such a prioritization is widely supported by research, which shows that suicides are frequently committed in association with

inpatient psychiatric hospitalization (Goldacre et al., 1993; Mortensen et al., 2000; Reutfors et al., 2010). The risks are especially elevated in the first few weeks after discharge (Dennehy et al., 1996; Lee and Lin, 2009; Madsen and Nordentoft, 2013; Qin et al., 2002; Reutfors et al., 2010).

In addition, the findings of highly elevated risks of suicide in the first few weeks after discharge triggered the scientific investigation into both, risk and protective factors associated with suicides occurring during and shortly after psychiatric hospitalization (Lin et al., 2014). Moreover, qualities of instruments designed to predict suicide were tested, and the predictivity of MINI Suicidal Scale, for example, seems to be acceptable, especially for those with a recognized history of suicidal and selfharm experiences (Roaldset et al., 2012). Also, preventive programmes were tailored for those leaving mental health care facilities. Implementations of such programmes have brought about inconclusive results

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(Gunnell et al., 2012; Pitman and Caine, 2012), but it seems that follow-up contact after psychiatric hospitalization might be a good strategy to pursue (Luxton et al., 2013).

The Czech Republic, despite of being a high-income country, is among the European countries that do not have a national suicide prevention strategy. In fact, a national strategy for suicide prevention is not even under development, and no setting-specific program for those discharged from psychiatric facilities exists. Also, it is unclear to what extent suicides occur among those who are, or have recently been hospitalized for psychiatric reasons and whether there are elevated risks for some of the subgroups of these patients. A dearth of research on suicide among psychiatric patients is generalizable for the vast majority of post-communist Central and Eastern European countries. This gap in suicide research imposes a question: to what extent are findings from other regions valid in the context of Central and East Europe? This study aims to assess the rates of suicides among current and recently discharged psychiatric inpatients in the Czech Republic and to identify those who are at the highest risk of suicide. Researchers anticipate this information will make it possible to demonstrate the extent of a problem to stakeholders and to develop an effective plan to prevent suicides after hospitalization for psychiatric reasons in the Czech Republic.

## 2. Methods

### 2.1. Data and subjects

In the Czech Republic, every deceased person is examined by a physician who issues a *Death Certificate* and it is sent to the national Register Office. Based on this, the Register Office issues an official *Notification of death* which is then submitted to the Czech Statistical Office [CZSO] that maintains a database entitled, *Death* containing data on suicide since 1876. Every inpatient health facility is obliged to report all finished hospitalizations, which are collected and processed by the Institute for Health Information and Statistics.

The Czech database of all inpatient hospitalizations was utilized to extract all records of adult [above 18 years of age] hospitalizations in inpatient psychiatric facilities, i.e. psychiatric hospitals and psychiatric wards in other inpatient facilities, in the Czech Republic between the 1 January 2006 and 31 October 2012. The first date was used in order to allow for calculation of the overall number of inpatient psychiatric hospitalizations in two years preceding the last (index) hospitalization. The latter date was used in order to allow a period of 2 months between discharge from inpatient psychiatric facility and possible suicide to all of the subjects. The *Death* database was used to extract all records of suicides that occurred between 1 January 2008 and 31 December 2012. Then, both records were merged together on an individual level data basis.

Those who were hospitalized in a Czech inpatient psychiatric facility between 1 January 2008 and 31 October 2012 and committed suicide during hospitalization or within two months after hospitalization were defined as “cases”. Those who were hospitalized in a Czech inpatient psychiatric facility between 1 January 2008 and 31 October 2012 and did not commit suicide during hospitalization or within two months after hospitalization were defined as “controls”. Primary psychiatric diagnosis at the index hospitalization was categorized according to ICD-10: organic mental disorders [F00–F09], addictions [F10, F11–F19], psychosis [F20–F29], affective disorders [F30–F39], anxiety disorders [F40–F48], behavioral syndromes associated with physiological disturbances and physical factors [F50–F59], personality disorders [F60–F63, F68–F69] and other mental disorders [F64–F66, F70–F99].

### 2.2. Measures

#### 2.2.1. Statistical analysis

Descriptive statistics were conducted in order to characterize the sample in terms of age, gender, marital status, homelessness, occupation, type of the inpatient facility for the index hospitalization, length of the index hospitalization, number of hospitalizations in a two year period before the termination of the index hospitalization, and psychiatric diagnosis. Chi square tests were performed in order to assess the significance of differences in categories related to the above mentioned variables.

Multiple logistic regression analysis was utilized to assess odds of committing suicide for the categories where there were significant differences in distributions identified. The category related to subjects' employment status was transformed and subjects were divided into two groups, employed and unemployed. We did not include the type of the inpatient psychiatric facility and the length of stay of the index hospitalization into the regression model, as there were no significant differences in their distributions identified. We also did not include the category of homelessness as the results of descriptive statistics suggest that the data in this category are very likely unreliable. Statistical analysis were performed in SPSS.

## 3. Results

### 3.1. Participants

402 suicides during or within 2 months after hospitalization occurred among 137,290 adults hospitalized in the Czech inpatient psychiatric facilities between 1 January 2008 and 31 October 2012. Sociodemographics of both, cases and controls are described and *p*-Values of chi square tests for differences between the given categories are presented in [Table 1](#).

### 3.2. Outcomes

Significant differences in distributions in the following categories were identified via chi square tests on significance level 0.006 (Šidák correction of alfa level 0.05 for multiple comparisons was used): age, gender, marital status, occupation, number of hospitalizations in a two year period before the termination of the subject's index hospitalization, and psychiatric diagnosis [[Table 1](#)].

Thirty of all suicides [7.5%] occurred within the hospitalization, 36 [9%] occurred on the day of the discharge, 52 [12.9%] occurred within first three days after the discharge, 43 [10.7%], 44 [10.9%], 83 [20.6%] and 114 [28.4%] suicides followed between the 4th and 7th, 8th and 14th, 15th and 30th, and 30th and 60th day after the discharged from inpatient psychiatric facilities respectively. Chi square tests did not identify significant differences between those who committed suicide during the hospitalization and those who committed suicide within two months after the discharge.

Eleven [16.7%] of those who committed suicide either, during the hospitalization or on the day of discharge, died at home, 12 [18.2%] at hospital, 18 [27.3%] in other medical institution, 16 [24.2%] in a public place, 1 [1.5%] during transportation and 8 [12.1%] in another places. There were 83 suicides among those with affective disorders, and 46 [55.4%] of these were committed by those with major depressive disorder, single episode [F32]. Within the cohort of psychiatric inpatients hospitalized between 2008 and 2012 in the Czech Republic, at least two times elevated odds ratios of committing suicide during or shortly after psychiatric hospitalization has been found for males, those who have a history of multiple psychiatric inpatient hospitalizations, and

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