

DOCTORAL THESIS

A large-scale survey of inpatient suicides: comparison
between medical and psychiatric settings

(病院内の自殺事故の大規模調査：一般病床と精神科病床
との比較)

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A large-scale survey of inpatient suicides: comparison between medical and psychiatric settings



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ABSTRACT

Suicide is one of the common severe accidents occurring in hospitals. This study aimed to investigate inpatient suicides simultaneously in medical and psychiatric settings in a large number of hospitals and to examine the prevalence of common suicide risk factors, related symptoms in inpatients who had died by suicide and the differences in inpatient suicides between both settings. We conducted a survey of hospitals in Japan that belonged to the nationwide standard-setting and accrediting body. The questionnaire covered the: 1) presence or absence of inpatient suicides in each hospital from 2012 to 2015; 2) number of inpatient suicides; 3) method, location, and timing of inpatient suicides; and 4) characteristics of inpatients who died by suicide. In total, 529 hospitals reported 262 inpatient suicides during the 3-year period: 131 were in medical settings and 131 were in psychiatric settings. The prevalence of common suicide risk factors was frequent in inpatient suicides. Inpatients had characteristics and suicide risk factors specific to those settings such as worsening of physical health in medical settings. Therefore, recognizing common suicide risk factors and understanding differences in inpatient suicides between both settings are important to prevent inpatient suicides.

1. Introduction

Suicide has been listed as a common severe accident in hospitals, and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), which is the health care standard-setting and accrediting body in the United States, has announced alerts ([The Joint Commission, 2016](#)).

There have been many investigations of inpatient suicides ([Ballard et al., 2008](#); [Bowers et al., 2010](#); [Cheng et al., 2009](#); [Ho and Tay, 2004](#); [Hung et al., 2000](#); [Large et al., 2011](#); [Madsen et al., 2012](#); [Minami et al., 2007](#); [Proulx et al., 1997](#); [Sakinofsky, 2014](#); [Suominen et al., 2002](#); [The Joint Commission, 2016](#); [Tishler and Reiss, 2009](#); [Tseng et al., 2011](#)). However, most surveys of inpatient suicides have been conducted in psychiatric settings and there are few studies on inpatient suicides in medical settings. [Ballard et al. \(2008\)](#) performed a systematic review of inpatient suicides in medical settings (12 primary studies reported from 1 to 173 inpatient suicides; 335 suicides in total).

Each primary study reported from 1 to 173 inpatient suicides. In addition, 5 of the 12 studies had been performed in Veterans Affairs hospitals, and patients were almost entirely men. They found that 1) the most common suicide method was jumping from a height, followed by hanging; 2) more suicides tended to occur within hospital sites compared with inpatient suicides in psychiatric settings; 3) the most common physical illness was cancer; and 4) only 16% of inpatients received a psychiatric consultation before suicide. In Japan, the Patient Safety Promotion Committee (PSP) of the [Japan Council for Quality Health Care \(2014\)](#) (JCQHC; the JCAHO's counterpart in Japan) conducted a survey of general hospitals without psychiatric wards in 2005. Thirty percent (170/575) of the participating hospitals reported inpatient suicides and there were 347 suicides in the 3 years before the survey. Cancer was the most common physical illness of inpatients who died by suicide ([Minami et al., 2007](#)).

There are many more studies of inpatient suicides in psychiatric settings than in medical settings. [Bowers et al. \(2010\)](#) conducted a

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Table 1

The number of inpatient suicides in each setting and ward.

Setting/Ward	Number of hospitals in which inpatient suicides occurred	Number of inpatient suicides
Medical setting (n=495 hospitals)	101	131
Medical wards in general hospitals without psychiatric wards (n=432 hospitals)	83	107
Medical wards in general hospitals with psychiatric wards (n=63 hospitals)	18	24
Psychiatric setting (n=97 hospitals)	60	131
Psychiatric wards in general hospitals (n = 63 hospitals)	33	50
Psychiatric hospitals (n=34 hospitals)	27	81

systematic review and found approximately 15,000 inpatient suicides (98 articles). They found that 1) male sex, admission rate increases, psychiatric illness, a history of suicide attempts, and a family history of suicides were risk factors; 2) the most common psychiatric diagnoses were schizophrenia and mood disorder; 3) the most common suicide method was hanging; and 4) hanging was a common method for inpatients within the wards or hospital sites compared with inpatients outside hospital sites.

The present study aimed to simultaneously investigate inpatient suicides in both medical and psychiatric settings in a large number of hospitals. We also aimed to examine the prevalence of common suicide risk factors, related symptoms in inpatients who had died by suicide, and differences in inpatient suicides between medical settings and psychiatric settings.

2. Methods

We defined “inpatient” as a patient in the grounds of a hospital, or on leave from or absent without leave from a hospital; “medical setting” as a group of non-psychiatric wards in general hospitals; and “psychiatric setting” as a group of psychiatric wards in general hospitals and psychiatric hospitals.

We conducted a survey of all hospitals that were members of the PSP of the JCQHC (The JCQHC, 2016). The JCQHC was established in 1995 and conducts third-party evaluations of health care institutions nationwide. The PSP consists of hospitals (1376 hospitals in September 2015) accredited by the JCQHC, which voluntarily develop patient safety activities, such as sharing information, education, and questionnaire surveys. The questionnaire surveys are one of the regular activities of the PSP. Therefore, we collaborated with the JCQHC and PSP to conduct our study.

The survey investigated inpatient suicides in the 3 years before the study (2012–2015) in the hospitals examined. Information was collected using multiple-choice items about the following: 1) presence or absence of inpatient suicides in each hospital; 2) the number of inpatient suicides (if any); 3) method, location, and timing of inpatient suicides; 4) signals or known risk factors before suicide; 5) departments into which patients were admitted (in medical settings); 6) physical illness and mental illness; 7) psychiatric consultation history; 8) the number of beds in each hospital; and 9) whether the wards in which inpatient suicides occurred were closed or open. Signals and known risk factors were chosen based on previous studies (World Health Organization, 2014).

Questionnaires were mailed to the staff in the patient safety divisions of 1376 participating hospitals in September 2015. The hospitals included 1133 general hospitals without psychiatric wards, 167 general hospitals with psychiatric wards, and 76 psychiatric hospitals. Each accredited hospital has established a division of patient safety that consists of multidisciplinary staff. The divisions conduct routine work, such as recording any medical incidents and accidents in the hospital, holding regular meetings, and implementing educational courses to promote patient safety. The staff were asked to provide information about the inpatient suicides that occurred in their hospital between April 1, 2012, and March 31, 2015. The staff responded to the questionnaire based on the data which was recorded by the staff and

patient records. Questionnaires were returned anonymously by October 2015 and did not identify the hospital by name or location.

We used Fisher's exact test to compare the characteristics of patients who died by suicide in medical settings with those who died by suicide in psychiatric settings and to examine association between suicide methods and location in both settings. Bonferroni-corection was used for multiple comparisons. Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 23.0 for Windows (IBM Corp., Armonk, NY, USA). This study was approved by the Ethics Committee of Sapporo Medical University.

3. Results

Valid responses were received from 529 hospitals (response rate: 38%), including 495 medical settings and 97 psychiatric settings. In total, 262 inpatient suicides occurred in 161 hospitals, with 131 suicides in 101 medical settings and 131 suicides in 60 psychiatric settings (Table 1). The total number of beds in each hospital was 47,716 in 101 medical settings and 12,209 in 59 psychiatric settings (1 psychiatric setting did not respond). In psychiatric settings, 27 and 81 patients were admitted to closed and open wards, respectively (21 patients; not determined).

Table 2 shows the method, location, and timing of the inpatient suicides. Hanging was the most common suicide method in both settings, followed by jumping from a height. However, jumping from

Table 2

The method, location, and time of suicide (n =262).

	Medical settings (n=131) n (%)	Psychiatric settings (n=131) n (%)	Fisher's exact test (Bonferroni correction) p
Method			
Hanging	67 (51.0)	76 (58.0)	1.000
Jumping from a height	45 (34.3)	30 (22.9)	0.221
Cutting	9 (6.9)	6 (4.6)	1.000
Jumping in front of a moving train or similar	0 (0.0)	8 (6.1)	0.028
Other	9 (6.9)	11 (8.4)	
N.D.	1 (0.8)	0 (0.0)	
Location			
Within the wards	76 (58.0)	62 (47.3)	0.323
Outside the wards, within hospital sites	30 (22.9)	4 (3.1)	0.000
Outside hospital sites	24 (18.3)	65 (49.6)	0.000
N.D.	1 (0.8)	0 (0.0)	
Time			
12:00 PM–8:00 AM	47 (35.9)	25 (19.1)	0.010
8:00 AM–4:00 PM	41 (31.3)	56 (42.7)	0.219
4:00 PM–12:00 PM	41 (31.3)	39 (29.8)	1.000
N.D.	2 (1.5)	11 (8.4)	

N.D.: not determined.

a height was more common in medical settings than in psychiatric settings. Regarding inpatients who committed suicide by hanging, 85% (57/67) of inpatients died within the wards in medical settings, and 76% (58/76) of inpatients died within the wards in psychiatric settings. In psychiatric settings, hanging was more frequent in closed wards than in open wards (Fisher's exact test, $p < 0.05$ (with Bonferroni correction)). Regarding inpatients who committed suicide by jumping from a height, 27% (12/45) of inpatients died within the wards, 51% (23/45) of inpatients died outside the wards but within the hospital sites, and 22% (10/45) of inpatients died outside hospital sites in medical settings; in contrast, 97% (29/30) of inpatients died outside hospital sites in psychiatric settings. Fifty-three percent (43/81) of patients admitted to closed wards died by suicide within the wards and 46% (38/81) of those died by suicide outside hospital sites. Seventy-two percent (21/29) of patients admitted to open wards died by suicide outside hospital sites.

There was no common time for inpatient suicides in medical settings, whereas in psychiatric settings they tended to occur between 8:00 AM and 4:00 PM. Suicides that occurred between 8:00 AM and 4:00 PM were more likely to occur outside hospital sites, with 41% (17/41) in medical settings and 64% (36/56) in psychiatric settings. In contrast, inpatient suicides that occurred from 4:00 PM to 8:00 AM were likely to occur on the ward, with 70% (62/88) in medical settings and 70% (45/64) in psychiatric settings. We conducted Fisher's exact test to assess the association between location and timing; p -value was < 0.001 in both medical settings and psychiatric settings.

Table 3 presents the characteristics of inpatients who died by suicide. About half of those in psychiatric settings had made previous suicide attempts and self-harmed, compared with only 12% of inpatients in medical settings. More than 40% of inpatients in medical settings showed worse physical health before suicide, and more than 40% of inpatients in psychiatric settings showed worse psychiatric symptoms before suicide. In medical settings, 28% of inpatients had stated that they wanted to die, and 22% of those in psychiatric settings had expressed this wish. Cancer accounted for about half of physical illnesses experienced by inpatients who died by suicide in medical settings, with the remainder having various other diseases. Gastrointestinal cancer was the most common type of cancer. Only 15% of inpatients in medical settings had received psychiatric treatment during their hospitalization. In both settings, the most common psychiatric diagnosis was Depressive episode (diagnosis code F32 of the International Classification of Diseases, tenth revision).

4. Discussion

This retrospective study provided descriptive data about the characteristics of inpatient suicides that occurred in medical settings and psychiatric settings over a 3-year period. In accordance with previous studies, we found that the most common suicide methods in both settings were hanging and jumping from a height (Ballard et al., 2008; Ho and Tay, 2004; Large et al., 2011; Proulx et al., 1997; Sakinofsky, 2014; Suominen et al., 2002; Tishler and Reiss, 2009); jumping from a height was more common in medical settings than in psychiatric settings (Ballard et al., 2008). Inpatients who attempt suicide tend to choose easily available suicide methods (Bowers et al., 2010; Sakinofsky, 2014). Most general hospitals are tall buildings with more floors than psychiatric hospitals; therefore, jumping might be more accessible to patients in medical settings than in psychiatric settings. Most of the patients who committed suicide by hanging died within the wards in both settings; therefore, it is important to check if patients have access to objects that can be used for hanging, including checking each patient's belongings. Inpatient suicides in medical settings tended to occur within the hospital sites compared with inpatient suicides in psychiatric settings, which is consistent with previous study findings (Ballard et al., 2008). Bowers et al. (2010) reported that the timing of inpatient suicides in psychiatric settings

Table 3
The characteristics of suicide victims ($n=262$).

	Medical settings ($n=131$) n (%)	Psychiatric settings ($n=131$) n (%)	Fisher's exact test (Bonferroni correction) p
Signal or known risk factor			
Previous suicide attempts or self-harm	15 (11.5)	60 (45.8)	0.000
New psychiatric symptoms appeared before suicide	22 (16.8)	7 (5.3)	0.036
Psychiatric symptoms worsened before suicide	19 (14.5)	53 (40.5)	0.000
Physical health worsened before suicide	54 (41.2)	11 (8.4)	0.000
Stated that they wanted to die	37 (28.2)	29 (22.1)	1.000
Received a description of medical condition just before suicide	16 (12.2)	8 (6.1)	0.927
Continued not having much sleep	24 (18.3)	11 (8.4)	0.198
Other	35 (26.7)	49 (37.4)	
N.D.	4 (3.1)	5 (3.8)	
Physical illness [†]			
Cancer ^{**}	64 (48.9)		
Gastrointestinal cancer	32 (24.4)		
Lung cancer	13 (9.9)		
Head and neck cancer	7 (5.3)		
Breast cancer	5 (3.8)		
Hematological cancer	4 (3.1)		
Urologic cancer	3 (2.3)		
Uterine cancer	1 (0.8)		
Gastrointestinal disease	10 (7.6)		
Cardiovascular disease	9 (6.9)		
Neurological disease	8 (6.1)		
Orthopedic and rheumatological disease	8 (6.1)		
Pulmonary disease	8 (6.1)		
Genitourinary disease	7 (5.3)		
Other	17 (13.0)		
N.D.	3 (2.3)		
Psychiatric consultation history			
Received psychiatric consultation during hospitalization	19 (14.5)		
Received psychiatric treatment before hospitalization	10 (7.6)		
Did not receive psychiatric treatment in hospital or before hospitalization	93 (71.0)		
N.D.	9 (6.9)		
Psychiatric diagnosis (ICD-10) ^{***}			
F0	0 (0.0)	4 (3.1)	
F1	1 (0.8)	1 (0.8)	
F2	2 (1.5)	51 (38.9)	
F31	0 (0.0)	11 (8.4)	
F32	10 (7.6)	48 (36.6)	
F4	2 (1.5)	7 (5.3)	
F5	0 (0.0)	2 (1.5)	
F6	0 (0.0)	6 (4.6)	
F8	0 (0.0)	2 (1.5)	
F9	0 (0.0)	1 (0.8)	
N.D.	116 (88.5)	5 (3.8)	

N.D.: not determined; ICD-10: International Classification of Diseases, tenth revision.

[†] Three patients had multiple diagnoses,

^{**} one patient had double cancer,

^{***} five patients had multiple diagnoses.

varied across studies. In our study, inpatient suicides in psychiatric settings tended to occur between 8:00 AM and 4:00 PM.

The frequency of most suicide signals or known risk factors differed between the two settings. A previous suicide attempt and self-harm are the most important risk factors for suicide (Large et al., 2011; Madsen et al., 2012; Tishler and Reiss, 2009). About half of the inpatients in psychiatric settings had a lifetime history of suicide attempts or self-harm, whereas only 12% of inpatients in medical settings had such a history. Psychiatric symptoms have also been associated with suicide (Bowers et al., 2010; Cheng et al., 2009; Large et al., 2011; Minami et al., 2007; Proulx et al., 1997; Sakinofsky, 2014; Suominen et al., 2002; The Joint Commission, 2016; Tishler and Reiss, 2009). Several previous studies have reported that physicians in primary care under-recognize and under-treat psychiatric disorders such as depression (Goldman et al., 1999; Hirschfeld et al., 1997). Over 20% of inpatients in our study who died by suicide had stated that they wanted to die. It is important not to disregard such statements about suicide in medical settings. The World Health Organization has highlighted that beliefs such as “people who talk about suicide do not mean to do it” are myths (World Health Organization, 2014).

We found that cancer was the most common disease in patients in medical settings who died by suicide, which is consistent with previous studies (Ballard et al., 2008; Minami et al., 2007). A previous study has reported that lung and bronchus cancer, stomach cancer, oral cavity and pharynx cancer, and larynx cancer elevate the risk for suicide (Misono et al., 2008). We could not calculate the suicide risk for each type of cancer because details about the number of admissions for each cancer were not available, although our data showed that gastrointestinal cancer was the most common cancer.

Despite the fact that new psychiatric symptoms appeared or worsened before suicide in 31% of inpatients, and 28% of inpatients expressed suicidal ideation, only 15% of inpatients in medical settings received psychiatric treatment during their hospitalization. Another suicide myth is “depression is a normal reaction to medical illness” (Wint and Akil, 2006). Such beliefs may contribute to depressive symptoms being overlooked. Surprisingly, in medical settings, 40% of inpatients’ physical health worsened before suicide. It is important to conduct psychiatric evaluations of inpatients with severe physical illness to prevent suicidal behavior. In medical settings, 89% of inpatients did not have a psychiatric diagnosis, of those that did, the most common psychiatric disorder was F32 (Depressive episode), which is consistent with previous studies (Minami et al., 2007; Suominen et al., 2002). In psychiatric settings, the most common psychiatric disorders were F2 (schizophrenia, schizotypal and delusional disorders) and F32, a finding consistent with previous studies (Proulx et al., 1997).

This study has several limitations. First, our data set was created based on self-reports from the patient safety divisions of participating hospitals. However, the divisions conduct routine work such as collecting reports of any medical incidents to promote patient safety. In addition, staff in the divisions examined patient records to answer the questionnaire. Therefore, we considered the responses to our survey to be reliable. Second, we could not ask about patient characteristics, such as age, gender, and marital status, because this information would have identified the individuals who died by suicide. We also could not collect information such as health insurance, employment status, and educational status, and information about cancer, such as its severity and the length of time after diagnostic disclosure. Third, we did not obtain information about the number of annual admissions for the participating hospitals. Thus, we could not determine the suicide rate per patient admission. Nevertheless, we obtained information about the number of beds in participating hospitals. Fourth, the survey response rate was low. There might have been unidentified differences between the responding hospitals and non-responding hospitals. In addition, the data were obtained from the member hospitals of a specified body, therefore, the participating

hospitals probably had focused more on patient safety compared with other hospitals. Thus, the results of the present study cannot necessarily be generalized. Finally, we did not have a control group of patients who did not commit suicide. Therefore, the suicide risk factors that we surveyed in this study might not be specific to patients who were admitted to hospitals.

In conclusion, the known risk factors that we have emphasized in the present study are important in both medical settings and psychiatric settings. We have identified several differences in characteristics and risk factors between medical settings and psychiatric settings, and we suggest that it is particularly important for physicians in medical settings to monitor physical health instability as a risk factor for suicide.

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Conflicts of interest

none.

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論文目録

I. 原著論文

Keisuke Inoue, Chiaki Kawanishi, Kotaro Otsuka, Yoshinori Cho, Masaki Shiraishi, Takao Ishii, Hideki Onishi, Yoshio Hirayasu, 2017. A large-scale survey of inpatient suicides: comparison between medical and psychiatric settings. *Psychiatry Research*. 250: 155-158.

II. 副論文

なし

III. 参考論文

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