



# The Current Status of Suicide and Medical Care System in Japan: An Analysis of 81,407 Patients Using the Diagnosis Procedure Combination Database

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Japan has a high suicide mortality rate compared to other developed countries. To reduce suicide mortality in Japan, it is important to systematically analyze factors related to death of patients with suicide attempt. This study aimed to analyze the characteristics of patients with suicide attempt, and the factors related to their death using the Diagnosis Procedure Combination (DPC) data— a nationally representative inpatient database. We collected 81,407 cases of suicide attempt from 2016 to 2018 from DPC data and performed a multilevel logistic analysis of factors associated with death discharges. The analysis results showed that patients who received psychiatric liaison care had a lower mortality rate, but only 0.6% of surviving patients received psychiatric liaison care after admission. The odds ratio (OR) of death was high for hanging (28.86;  $p < 0.001$ ) and jumping (16.28;  $p < 0.001$ ), compared to wrist cutting. Patients without a psychiatric diagnosis were more likely to choose means such as hanging (14.1%) than those with a psychiatric disorder. The weekend cases had a higher OR of death than weekday (Wednesday as reference) cases (Friday 1.14,  $p = 0.011$ ; Saturday 1.60,  $p < 0.001$ ; Sunday 1.67,  $p < 0.001$ ). Based on these findings, we suggest that improving the availability and quality of psychiatric care in acute care hospitals and primary care settings, as well as enhancing the emergency department system on weekends, could help reduce the mortality of suicide attempts.

**Keywords:** diagnosis procedure combination database; Japan; medical care system; psychiatric liaison care; suicide  
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## Introduction

The annual number of suicides in Japan exceeded 30,000 in 1998, and this cause of death remains a serious social issue in Japanese society today. The Japanese legislation aimed at curbing suicide [Basic Law on Suicide Countermeasure (Law no. 85 of 2006)] and has had some effect on reducing the number of suicides over time, and the mortality from suicide has been declining in Japan since 2010. However, Japan's suicide mortality rate is still high among developed countries (Ohbe et al. 2021).

Reducing the suicide rate in Japan is a top priority. To that end, it is considered necessary to systematically analyze the factors related to the death of suicide attempt patients. Previous studies have shown that history of sui-

cide attempts is an important risk factor for suicide. A prior suicide attempt or self-harm episode is the single most important risk factor for completed suicide, and suicide risk has been reported to be 50 to 100 times higher in the year following a suicide attempt or instance of self-harm than the risk in the general population (Kuo et al. 2012; Hawton et al. 2015). After the 2006 legislation, the Japanese Diagnosis Procedure Combination (DPC) database — nationally representative inpatient database, began to collect suicide data including non-fatal cases and the means of suicide attempts, including hanging, jumping, poisoning, overdosing, self-harming with a knife (excluding wrist cutting), wrist cutting, and others. Studies on suicide using this data are still scarce. A previous study using this DPC data found that half of acute care hospitals did not provide

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hospital psychiatric intervention for patients who suicide attempt, but factors related to death of these patients were not analyzed (Ohbe et al. 2021).

The primary objective of this study was to analyze the characteristics of patients who attempted suicide and the factors associated with death in these patients using the DPC database. Based on these analysis data, it is thought that concrete measures to prevent suicide deaths can be proposed.

### Materials and Methods

The DPC database is a national medical information system that combines diagnosis-based medical fees and hospitalization systems maintained by the Japanese Ministry of Health, Labour, and Welfare (MHLW). About 90% of all acute care hospitals and all university hospitals in Japan participate in collecting information for the DPC database. In 2018, the number of DPC participating hospitals nationwide was 1,730 (Hayashida et al. 2021). The number of hospitals included in this study was 1,036, covering about 60% of the total. This system contains inpatient discharge abstracts and government medical billing data from participating hospitals, and it is used for a variety of research purposes. This database contains the following information: 1) diagnosis of the primary disease and the comorbidities and complications based on the *International Classification of Diseases, 10th Revision (ICD-10)*; 2) admission condition, as either emergency or planned hospitalization; 3) admission path, such as from other medical or social facilities; 4) demographic characteristics, such as age and sex; 5) admission and discharge data; 6) status at discharge, such as recovered, worsened, or in-hospital death; 7) medical care provided, such as surgical procedure, diagnostic imaging, blood and biochemical tests, and pharmaceutical treatment with dosage and frequency data; 8) cancer and cancer stage; 9) severity scores on various scales, such as New York Heart Association classification, Killip classification, A-DROP score, and Hugh-Jones score; and 10) hospitalization costs based on Japanese tariff tables. Each medical procedure is linked with a Japanese original code (called the *K code*) determined by MHLW (Hayashida et al. 2021). All patient-identifiable data are anonymized in this database.

We collected 81,407 cases of suicide attempt in 2016–2018 from the DPC database that was created by the DPC research institute. Using this data, we analyzed clinical characteristics and risk factors associated with mortality during hospitalization. Patient comorbid psychiatric disorders were based on ICD-10; F1: Mental and behavioral disorders due to psychoactive substance use; F2: Schizophrenia, schizotypal, and delusional disorders; F3: Mood (affective) disorders, F4: Neurotic, stress-related, and somatoform disorders; F5: Behavioral syndromes associated with physiological disturbances and physical factors; F6: Disorders of adult personality and behavior; F7: Mental retardation; F8: Disorders of psychological development;

F9: Behavioral and emotional disorders with onset usually occurring in childhood and adolescence. This data does not include patients with elective admissions to psychiatric hospitals and without being admitted to the emergency department. This study was approved by the Medical Research Ethics Committee (R3-060).

It is known that there are regional differences in suicide deaths (Koda et al. 2022). To confirm this point in this analysis, we conducted a multilevel analysis of the null model using only prefecture codes and observed significant regional effects. Therefore, we conducted a multilevel logistic regression analysis with individuals as the primary level and prefectures as the second level for analysis concerning factors associated with mortality. Explanatory variables were age, sex, means of suicide, psychiatric disorders, day of hospitalization, psychiatric liaison care, and emergency care at critical care center. All statistical analyzes were performed by the IBM SPSS Statistics ver. 28.0 (IBM, Tokyo, Japan). The study was approved by the Ethics Committee of the University of Occupational and Environmental Health (No. R2-046).

### Results

The number of hospitals included in this study was 1,036. Table 1 shows characteristics of 81,407 patients who attempted suicide. Although more female (58.1%) than male (41.9%) attempted suicide, the mortality was twice as high for male (15.0%) than for female (7.4%). The most common means of suicide was overdosing (34.1%), followed by hanging (11.2%), and jumping (7.3%). The highest mortality was hanging (49.7%), followed by jumping (29.5%). The most common psychiatric disorders were no psychiatric diagnosis (51.5%), followed by F3: Mood disorders (25.5%), F2: Schizophrenia (11.2%), and F4: Neurotic disorders (10.6%). The highest mortality was those with no psychiatric diagnosis (16.5%), followed by dementia (6.6%), F3: Mood disorders (5.3%). Hospitalization was more common at the beginning of week, Monday (18.0%) and Tuesday (17.0%), whereas the mortality was high on the weekend, Sunday (14.0%), and Saturday (13.5%). Only 0.6% of surviving patients were eligible for psychiatric liaison care after their admission, and 5.2% were receiving emergency care at critical care center. The overall mortality was 10.6%.

Table 2 shows the results of multilevel logistic analysis of factors related to death among 81,407 patients who attempted suicide. Women had lower odds ratio (OR) of death than male (0.69,  $p < 0.001$ ), and patients eligible for psychiatric liaison care had lower OR of death (0.62,  $p = 0.019$ ). The weekend cases tended to have a higher OR of death compared with weekday cases (Wednesday as reference; Friday 1.14,  $p = 0.011$ ; Saturday 1.60,  $p < 0.001$ ; Sunday 1.67,  $p < 0.001$ ). Regarding the means of suicide, the OR of death (wrist cutting as reference) was small for overdosing (0.37,  $p < 0.001$ ), and large in other cases (hanging 28.86,  $p < 0.001$ ; jumping 16.28,  $p < 0.001$ ; poi-

Table 1. Characteristics of 81,407 patients who attempted suicide.

Characteristics	Patients (%)	Mortality (%)
Age (years)		
≤ 20	8,326 (10.2)	4.9
21-40	22,976 (28.2)	7.3
41-60	21,351 (26.2)	11.7
61-80	20,501 (25.2)	12.7
> 81	8,253 (10.1)	17.0
Sex		
Male	34,150 (41.9)	15.0
Female	47,257 (58.1)	7.4
Means of suicide		
Hanging	9,089 (11.2)	49.7
Jumping	5,936 (7.3)	29.5
Poisoning	3,170 (3.9)	8.1
Overdosing	27,773 (34.1)	0.8
Self-harming with a knife	3,572 (4.4)	5.9
Wrist-cutting	3,068 (3.8)	2.5
Others	28,799 (35.4)	5.4
Psychiatric disorders (ICD-10)		
F1	3,106 (3.8)	1.5
F2	9,133 (11.2)	2.7
F3	20,783 (25.5)	5.3
F4	8,653 (10.6)	2.0
F5	707 (0.9)	1.4
F6	2,000 (2.5)	0.4
F7	546 (0.7)	0.7
F8	1,055 (1.3)	1.5
F9	1,062 (1.3)	3.5
Dementia	2,620 (3.2)	6.6
No diagnosis	41,924 (51.5)	16.5
Day of hospitalization		
Sunday	8,512 (10.5)	14.0
Monday	14,692 (18.0)	9.5
Tuesday	13,805 (17.0)	9.5
Wednesday	12,809 (15.7)	9.6
Thursday	12,246 (15.0)	9.6
Friday	11,340 (13.9)	10.9
Saturday	8,003 (9.8)	13.5
Psychiatric liaison care	471 (0.6)	8.3
Emergency care at critical care center	4,149 (5.2)	10.8
Death	8,608 (10.6)	-

ICD-10, International Classification of Diseases, 10th Revision.

F1: Mental and behavioral disorders due to psychoactive substance use. F2: Schizophrenia, schizotypal, and delusional disorders. F3: Mood (affective) disorders. F4: Neurotic, stress-related, and somatoform disorders. F5: Behavioral syndromes associated with physiological disturbances and physical factors. F6: Disorders of adult personality and behavior. F7: Mental retardation. F8: Disorders of psychological development. F9: Behavioral and emotional disorders with onset usually occurring in childhood and adolescence.

Table 2. Risk factors related to death among 81,407 patients who attempted suicide.

Variable	OR	95% CI	p Value
Sex			
Male	Reference	-	-
Female	0.69	0.65-0.73	< 0.001
Psychiatric liaison care	0.62	0.42-0.92	0.019
Emergency care at the critical care center	1.06	0.93-1.20	0.373
Age (years)			
≤ 20	Reference	-	< 0.001
21-40	2.16	1.90-2.47	< 0.001
41-60	3.11	2.74-3.53	< 0.001
61-80	2.55	2.25-2.90	< 0.001
> 81	4.33	3.76-4.97	< 0.001
Day of hospitalization			
Sunday	1.67	1.50-1.87	< 0.001
Monday	0.91	0.82-1.00	0.054
Tuesday	0.94	0.85-1.04	0.254
Wednesday	Reference	-	-
Thursday	0.97	0.87-1.07	0.532
Friday	1.14	1.03-1.27	0.011
Saturday	1.60	1.43-1.79	< 0.001
Means of suicide			
Hanging	28.86	22.55-36.94	< 0.001
Jumping	16.28	12.67-20.92	< 0.001
Poisoning	2.96	2.25-3.91	< 0.001
Overdosing	0.37	0.28-0.49	< 0.001
Self-harming with a knife	2.36	1.78-3.14	< 0.001
Wrist-cutting	Reference	-	-
Others	1.16	0.90-1.49	0.246
Psychiatric disorders (ICD-10)			
F1	0.20	0.14-0.27	< 0.001
F2	0.17	0.15-0.20	< 0.001
F3	0.35	0.33-0.38	< 0.001
F4	0.18	0.15-0.21	< 0.001
F5	0.22	0.12-0.44	< 0.001
F6	0.06	0.03-0.11	< 0.001
F7	0.10	0.04-0.28	< 0.001
F8	0.20	0.12-0.34	< 0.001
F9	0.32	0.22-0.48	< 0.001
Dementia	0.33	0.28-0.40	< 0.001
No diagnosis	Reference	-	-

A value of  $p < 0.05$  was considered statistically significant.

ICD-10, International Classification of Diseases, 10th Revision.

F1: Mental and behavioral disorders due to psychoactive substance use. F2: Schizophrenia, schizotypal, and delusional disorders. F3: Mood (affective) disorders. F4: Neurotic, stress-related, and somatoform disorders. F5: Behavioral syndromes associated with physiological disturbances and physical factors. F6: Disorders of adult personality and behavior. F7: Mental retardation. F8: Disorders of psychological development. F9: Behavioral and emotional disorders with onset usually occurring in childhood and adolescence.

soning 2.96,  $p < 0.001$ ; self-harming with a knife 2.36,  $p < 0.001$ ). In addition, the OR of death were small for those with psychiatric disorders (F2: Schizophrenia 0.17,  $p <$

0.001; F3: Mood disorders 0.37,  $p < 0.001$ ; F4: Neurotic disorders 0.18,  $p < 0.001$ ).

Fig. 1 shows the type of psychiatric disorders and

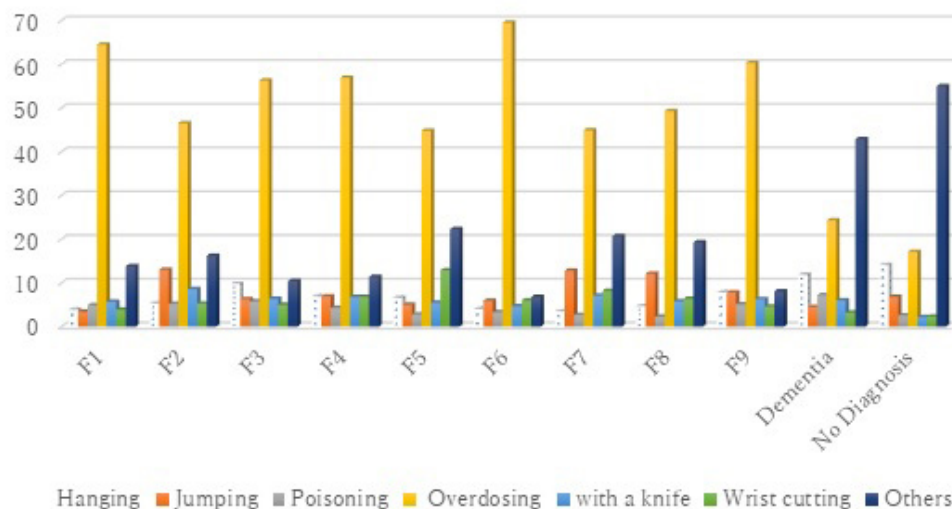


Fig.1. Type of psychiatric disorders and means of suicide.

F1: Mental and behavioral disorders due to psychoactive substance use. F2: Schizophrenia, schizotypal, and delusional disorders. F3: Mood (affective) disorders. F4: Neurotic, stress-related, and somatoform disorders. F5: Behavioral syndromes associated with physiological disturbances and physical factors. F6: Disorders of adult personality and behavior. F7: Mental retardation. F8: Disorders of psychological development. F9: Behavioral and emotional disorders with onset usually occurring in childhood and adolescence.

means of suicide. Patients with no psychiatric diagnosis were more likely to choose means such as hanging (14.1%) or others (55.0%), than those with psychiatric disorders. On the other hand, they were less likely to choose means such as overdosing (17.1%).

### Discussion

We analyzed the characteristics of patients who suicide attempt and the factors related to death of these patients using DPC data (including non-fatal causes). Nationwide studies of this type are a few and valuable. This study found the following. First, patients who were eligible for psychiatric liaison care had a lower OR of death, but only a few patients were eligible for such care. Second, patients with no diagnosis of psychiatric disorders chose hanging, which has a higher mortality than those with diagnosis. Third, the weekend cases tended to have a higher OR of death compared with weekday. Our results have several implications for current practices. According to previous studies, psychiatric interventions following self-harm may reduce subsequent repetition of self-harm (Bergen et al. 2010; Kapur et al. 2013). However, in this analysis, only 0.6% of patients were eligible for psychiatric liaison care. We propose the placement and intervention of psychiatrists in acute care hospitals. In Japan, the number of psychiatric beds is very large, making consolidation difficult, and the number of psychiatrists in acute care hospitals is low (Tsuchiya and Takei 2004). The “Regional Medical Care Plan” define the structure of the medical delivery system in Japan. Although this plan includes provision for emergency medical care, it does not mention the need for provision of psychiatric support in the emergency department. The

medical fee system evaluates the placement of psychiatrists in emergency departments, but in the future, the regional medical plan should also stipulate the placement of psychiatrists in emergency departments in order to disseminate it.

Second, patients with no diagnosis of psychiatric disorders chose hanging, which has a higher mortality than those with diagnosis. It is necessary to have a mechanism that detect and rescue patients with psychiatric disorders but have not visited a psychiatrist. Previous studies have shown that most people who attempt suicide have psychiatric problems immediately prior to their attempt (Wasserman et al. 2012). Somatic symptoms are known to be a prominent feature of depressed patients. Among new outpatients in an urban hospital medical setting in Japan, the majority (73.5%) of complaints among depressed patients were physical symptoms such as sleep disturbance, gastrointestinal symptoms, headache, and fatigue (Sugahara et al. 2004). To treat these symptoms, patients often visit the office of a local primary care physician rather than a psychiatrist. We think that it is effective for suicide prevention if this primary care doctor takes an interest in the patient’s mental state and appropriately refers the patient to a psychiatrist if necessary. In Japan, many people are hesitant to visit a psychiatrist even if they have a mental problem because of the stigma that remains against psychiatric disorders (Griffiths et al. 2006; Hanzawa et al. 2012; Ando et al. 2013; Yamaguchi et al. 2020; Komatsu et al. 2021). In European counties and the United States, the role of the family doctors is well established in the medical system. In these countries, the family doctors often see patients for early symptoms of psychiatric disorders (Kates 1988; Reneses et al. 2015; McBride 2016; Lee et al. 2019;

Moodley and Maisto 2022). Strengthening primary care at the community level may enable to early detect patients with psychiatric disorders who are hesitant to visit a psychiatrist, resulting in smooth intervention in their treatment.

On the other hand, drug overdose was the most common method of suicide in this study. Overdosing is also a major problem, and how to manage medication is an urgent issue to prevent overdose for suicide (Kawashima et al. 2014; Hori and Kinoshita 2016). Primary care doctors, psychiatrists, and pharmacists need to work together to support patients with mental illness and build a community system to prevent drug overdose (Matsumoto 2013; Ohsawa and Kawamura 2013; Shimane 2013, 2016).

Third, the weekend cases tended to have a higher OR of death compared with weekday. In Japan, EDs on the weekend tend to have fewer doctors and nurses, making it difficult to accept ambulances (Matsuyama et al. 2017; Tanaka et al. 2017). This may contribute to the higher mortality of patients who attempted suicide on Saturdays and Sundays. We propose that enhancing the emergency department system on weekend.

This study has the following limitations. First, the data used in this analysis are only data from hospitals cases of DPC system-participating hospitals and do not include all suicide patients in Japan. Therefore, the possibility of selection bias cannot be completely eliminated. Second, our study did not include patients who had attempted suicide or engaged in self-harm who were treated in emergency departments without being hospitalized or those who were hospitalized only in psychiatric hospitals. Thus, our results may present a distorted view of the epidemiology of suicide attempts and self-harm. Third, in the DPC data system, it is impossible to get background information, such as issues related to school, sex/gender, work, socioeconomic, overall health, and family. To consider more effective preventive measures for suicide, it is necessary to link socioeconomic psychological information with clinical information for comprehensive analysis.

In conclusion, we suggest that improving the availability and quality of psychiatric care in acute care hospitals and primary care settings, as well as enhancing the emergency department system on weekends, could help reduce the mortality of suicide attempts.

### Author Contributions

Conceptualization: S.M.; Methodology: S.M.; Formal analysis and investigation: M.K. and S.M.; Data curation: M.K. and S.M.; Writing - original draft: R.T.; Writing-review and editing: S.M.; Visualization: R.T. and M.K.; Supervision: S.M.

### Conflict of Interest

The authors declare no conflict of interest.

### References

Ando, S., Yamaguchi, S., Aoki, Y. & Thornicroft, G. (2013)

- Review of mental-health-related stigma in Japan. *Psychiatry Clin. Neurosci.*, **67**, 471-482.
- Bergen, H., Hawton, K., Waters, K., Cooper, J. & Kapur, N. (2010) Psychosocial assessment and repetition of self-harm: the significance of single and multiple repeat episode analyses. *J. Affect. Disord.*, **127**, 257-265.
- Griffiths, K.M., Nakane, Y., Christensen, H., Yoshioka, K., Jorm, A.F. & Nakane, H. (2006) Stigma in response to mental disorders: a comparison of Australia and Japan. *BMC Psychiatry*, **6**, 21.
- Hanzawa, S., Nosaki, A., Yatabe, K., Nagai, Y., Tanaka, G., Nakane, H. & Nakane, Y. (2012) Study of understanding the internalized stigma of schizophrenia in psychiatric nurses in Japan. *Psychiatry Clin. Neurosci.*, **66**, 113-120.
- Hawton, K., Bergen, H., Cooper, J., Turnbull, P., Waters, K., Ness, J. & Kapur, N. (2015) Suicide following self-harm: findings from the Multicentre Study of self-harm in England, 2000-2012. *J. Affect. Disord.*, **175**, 147-151.
- Hayashida, K., Murakami, G., Matsuda, S. & Fushimi, K. (2021) History and Profile of Diagnosis Procedure Combination (DPC): development of a real data collection system for acute inpatient care in Japan. *J. Epidemiol.*, **31**, 1-11.
- Hori, S. & Kinoshita, K. (2016) Clinical characteristics of patients who overdose on multiple psychotropic drugs in Tokyo. *J. Toxicol. Sci.*, **41**, 765-773.
- Kapur, N., Steeg, S., Webb, R., Haigh, M., Bergen, H., Hawton, K., Ness, J., Waters, K. & Cooper, J. (2013) Does clinical management improve outcomes following self-harm? Results from the Multicentre Study of self-harm in England. *PLoS One*, **8**, e70434.
- Kates, N. (1988) Psychiatric consultation in the family physician's office. Advantages and hidden benefits. *Gen. Hosp. Psychiatry*, **10**, 431-437.
- Kawashima, Y., Yonemoto, N., Inagaki, M. & Yamada, M. (2014) Prevalence of suicide attempters in emergency departments in Japan: a systematic review and meta-analysis. *J. Affect. Disord.*, **163**, 33-39.
- Koda, M., Kondo, K., Takahashi, S., Ojima, T., Shinozaki, T., Ichikawa, M., Harada, N. & Ishida, Y. (2022) Spatial statistical analysis of regional disparities in suicide among policy units in Japan: using the Bayesian hierarchical model. *PLoS Glob. Public Health*, **2**, e0000271.
- Komatsu, H., Ono, T., Onoguchi, G., Tomita, H. & Kakuto, Y. (2021) Mediating effects of self-stigma and depression on the association between autistic symptoms and recovery in patients with schizophrenia-spectrum disorders: a cross-sectional study. *BMC Psychiatry*, **21**, 464.
- Kuo, C.J., Gunnell, D., Chen, C.C., Yip, P.S. & Chen, Y.Y. (2012) Suicide and non-suicide mortality after self-harm in Taipei City, Taiwan. *Br. J. Psychiatry*, **200**, 405-411.
- Lee, L., Hillier, L.M., Locklin, J., Lumley-Leger, K. & Molnar, F. (2019) Specialist and family physician collaboration: insights from primary care-based memory clinics. *Health Soc. Care Community*, **27**, e522-e533.
- Matsumoto, T. (2013) Current situation of suicide in Japan, and what pharmacists contribute to suicide prevention. *Yakugaku Zasshi*, **133**, 599-615 (in Japanese).
- Matsuyama, T., Kitamura, T., Katayama, Y., Kiyohara, K., Hayashida, S., Kawamura, T., Iwami, T. & Ohta, B. (2017) Factors associated with the difficulty in hospital acceptance among elderly emergency patients: a population-based study in Osaka City, Japan. *Geriatr. Gerontol. Int.*, **17**, 2441-2448.
- McBride, J.L. (2016) Family physician support for a family with a mentally ill member. *Ann. Fam. Med.*, **14**, 460-462.
- Moodley, S. & Maisto, A. (2022) Late-life depression and the family physician. *S. Afr. Fam. Pract.* (2004), **64**, e1-e4.
- Ohbe, H., Goto, T., Yamazaki, R., Jo, T., Matsui, H., Fushimi, K. & Yasunaga, H. (2021) Clinical trajectories of suicide attempts and self-harm in patients admitted to acute-care hospitals in

- Japan: a nationwide inpatient database study. *J. Epidemiol.*, **31**, 231-236.
- Ohsawa, M. & Kawamura, K. (2013) Pharmacist as a real “gatekeeper” for the prevention of suicide, overdose and depression: what should we need? *Yakugaku Zasshi*, **133**, 597-598 (in Japanese).
- Reneses, B., Garrido, S., Navalon, A., Martin, O., Ramos, I., Fuentes, M., Moreno, J. & Lopez-Ibor, J.J. (2015) Psychiatric morbidity and predisposing factors in a primary care population in Madrid. *Int. J. Soc. Psychiatry*, **61**, 275-286.
- Shimane, T. (2013) Pharmacist as gatekeeper: combating medication abuse and dependence. *Yakugaku Zasshi*, **133**, 617-630 (in Japanese).
- Shimane, T. (2016) The pharmacist as gatekeeper of prescription drug abuse: return to “community scientists.” *Yakugaku Zasshi*, **136**, 79-87 (in Japanese).
- Sugahara, H., Akamine, M., Kondo, T., Fujisawa, K., Yoshimasu, K., Tokunaga, S. & Kudo, C. (2004) Somatic symptoms most often associated with depression in an urban hospital medical setting in Japan. *Psychiatry Res.*, **128**, 305-311.
- Tanaka, K., Nakada, T.A., Fukuma, H., Nakao, S., Masunaga, N., Tomita, K., Matsumura, Y., Mizushima, Y. & Matsuoka, T. (2017) Development of a novel information and communication technology system to compensate for a sudden shortage of emergency department physicians. *Scand. J. Trauma Resusc. Emerg. Med.*, **25**, 6.
- Tsuchiya, K.J. & Takei, N. (2004) Focus on psychiatry in Japan. *Br. J. Psychiatry*, **184**, 88-92.
- Wasserman, D., Rihmer, Z., Rujescu, D., Sarchiapone, M., Sokolowski, M., Titelman, D., Zalsman, G., Zemishlany, Z. & Carli, V.; European Psychiatric Association (2012) The European Psychiatric Association (EPA) guidance on suicide treatment and prevention. *Eur. Psychiatry*, **27**, 129-141.
- Yamaguchi, S., Foo, J.C., Nishida, A., Ogawa, S., Togo, F. & Sasaki, T. (2020) Mental health literacy programs for school teachers: a systematic review and narrative synthesis. *Early Interv. Psychiatry*, **14**, 14-25.
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