Table 2. SHARE model-centered communication skills training programs

| Time | 1-day CST program (6 h) | | 2-day CST program (12 h) | |
	Procedures	Note	Procedures	Note
Day one morning	Facilitators' preworkshop meeting and participant check-in (30 min)	A large-scale classroom is required with a capacity of 50.	Facilitators' preworkshop meeting and participant check-in (30 min)	A large-scale classroom is required with a capacity of 50.
	Participant pretest (10 min)	Each group has four participants assigned to one classroom. Participants assemble in the large classroom to complete truth-telling questionnaire and basic demographic data.	Participant pretest (30 min)	Each group has four participants assigned to one classroom. Participants assemble in the large classroom to complete truth-telling questionnaire and basic demographic data.
	Introduction to workshop (10 min) Grouping; introduction to SHARE modules (50 min)	The principal investigator gives the introduction in the large classroom. The facilitator of each group starts grouping participants. Facilitators introduce the SHARE model in small-group teaching. SP complete check-in procedure.	Introduction to workshop (10 min) Grouping; introduction to SHARE modules (50 min)	The principal investigator gives the introduction in the large classroom. The facilitator of each group starts grouping the participants. Facilitators introduce the SHARE model in small-group teaching. SP complete check-in procedure.
	First role-playing practice (60 min)	Each role-playing practice includes only one participant and one SP. The participant and SP practice the truth-telling process, whereas the other three participants observe.	First role-playing practice (60 min)	Each role-playing practice includes only one participant and one SP. The participant and SP practice the truth-telling process, whereas the other three participants observe.
	Second role-playing practice (60 min)			
Day one afternoon	Third role-playing practice (60 min) Fourth role-playing practice (60 min)		Second role-playing practice (60 min) Third role-playing practice (60 min)	Day 1 includes four role-playing practice sessions, with each participant practicing once.
	Participant posttest (10 min)	Participants return to large classroom to complete truth-telling questionnaire and survey on program satisfaction.	Fourth role-playing practice (60 min)	
	Group feedback (50 min) Certificates issued (10 min)	Mutual feedback from SP, participants, and facilitators. Sharing of feedback. Facilitators personally issue certificates to participants in their groups. The workshop closes for participants.		
Day two morning			Participant, SP, and facilitator check-in	Grouping is initiated right after check-in.
			Fifth role-playing practice (60 min) Sixth role-playing practice (60 min) Seventh role-playing practice (60 min)	Day 2 includes four role-playing practice sessions so all participants can practice again.
Day two afternoon			Eighth role-playing practice (60 min)	
			Participant posttest (30 min)	Participants return to large classroom to complete truth-telling questionnaire and survey on program satisfaction.
			Group feedback (80 min)	Mutual feedback from SP, participants, and facilitators. Sharing of feedback.
			Certificates issued (10 min)	Facilitators personally issue certificates to participants in their groups. The workshop closes for participants.
			Facilitators' postworkshop meeting (30 min)	Facilitators share CST experiences with each other. If any incident happened during CST, facilitators should reach a consensus on how to manage the situation in the future.

CST, communication skills training; SP, standard patients.

Descriptive analysis showed that participants in the 2-day program had better posttest truth-telling scores (Table 4),

but this difference was not significant ($p > 0.05$) in multiple regression analysis when confounding variables were controlled, except for the setting subscale (Table 5).

Discussion

Our results show that, after participating in the CST program, healthcare personnel's preference for truth-telling improved significantly, consistent with previous reports on the effectiveness of CST [3,6,17–22]. However, our study evaluated CST effectiveness on the basis of participants' truth-telling preference, whereas other studies assessed participants' self-efficacy [3], confidence in truth telling [17], communication skills with patients [22], and confidence in communication [9,10]. Although the outcomes measured are different, the effectiveness of CST was verified. To more objectively compare the effectiveness of CST in cross-institutional and cross-national studies, future studies should develop and apply consistent assessment outcomes.

Moreover, our results show that the CST had a large ($d = 0.91$), significant effect. This large effect might have been associated with our theoretical framework (SHARE model-centered CST), facilitator quality (facilitators were certified after receiving at least 50 h training), low ratio of facilitators to participants ($2 : 4$), quality of standard patients (standard patients received intense training and were assessed regularly), and solid, standard teaching materials that were regularly revised according to empirical evidence or experts' comments.

Moreover, 70% of participants had volunteered to attend the CST program. Their motivation to learn may have been stronger than in previous studies. In addition, our participants included doctors with abundant clinical experience and other healthcare personnel, such as psychologists, nurses, and social workers. Including professionals from different fields has been suggested as preferable in CST programs because these professionals provide different perspectives that may enable participants to learn from one another [23]. These reasons may have contributed to the large effect of CST in our study.

Table 3. Participant characteristics ($N = 257$)

Characteristic	Mean ± standard deviation (range)	n (%)
Age (years)	38.60 ± 8.09 (24–64)	
Gender		
Male		122 (47.5)
Female		135 (52.5)
Education level		
Junior college		12 (4.7)
College		157 (61.1)
≥ Graduate school		88 (34.2)
Marital status		
Never married		94 (36.6)
Married		161 (62.6)
Divorced		2 (0.8)
Clinical experience (years)		
1–3		39 (15.2)
4–6		55 (21.4)
7–9		34 (13.2)
≥ 10		129 (50.2)
Job title		
Doctor		147 (57.2)
Psychologist		19 (7.4)
Nurse		57 (22.2)
Social worker		21 (8.2)
Other		13 (5.0)
Workplace hospital level		
Medical center		131 (52.8)
Nonmedical center		117 (47.2)
Motivation to participate in CST		
Personal interest		180 (70.0)
Assigned		77 (30.0)
CST program (hours)		
6		94 (36.6)
12		163 (63.4)
Satisfaction with the program		
Extremely dissatisfied		7 (2.7)
Neutral		9 (3.5)
Satisfied		82 (31.9)
Extremely satisfied		159 (61.9)
Willing to recommend CST to colleagues		
Yes		253 (98.5)
No		4 (1.5)

CST, communication skills training.

Table 4. Comparison of pretest and posttest truth-telling scores ($N = 257$)

	Total sample		1-day CST ($n = 94$)		2-day CST ($n = 163$)	
	Pretest (mean ± SD)	Posttest (mean ± SD)	Pretest (mean ± SD)	Posttest (mean ± SD)	Pretest (mean ± SD)	Posttest (mean ± SD)
Overall scale	263.88 ± 27.0	281.89 ± 22.9*	263.56 ± 30.63	283.56 ± 25.12	264.00 ± 24.62	280.86 ± 21.45
Method of disclosure	77.37 ± 8.87	83.48 ± 7.46*	77.23 ± 9.81	83.52 ± 7.87	77.49 ± 8.29	83.41 ± 7.23
Emotional support	70.78 ± 8.54	76.74 ± 7.08*	70.33 ± 9.10	76.61 ± 7.01	71.01 ± 8.18	76.79 ± 7.13
Additional information	68.26 ± 8.16	72.94 ± 6.91*	67.91 ± 8.72	73.00 ± 6.68	68.45 ± 7.80	72.87 ± 7.05
Setting	47.46 ± 8.50	48.73 ± 9.00*	48.09 ± 10.27	50.44 ± 11.31	47.04 ± 7.32	47.79 ± 7.19

CST, communication skills training; SD, standard deviation.
*$p < 0.001$.

Table 5. Multiple regression on truth-telling preference by communication skills training dose ($N = 257$)

	CST dose β(2-day vs. 1-day)	p
Overall scale	−3.325	0.168
Method of disclosure	−0.108	0.892
Emotional support	−0.281	0.706
Additional information	−0.961	0.183
Setting	−1.736	0.046

CST, communication skills training.
1-day CST is used as the baseline value.
Adjusted for age, gender, education level, marital status, clinical experience, and workplace hospital level.

Our study did not find a significant difference in the truth-telling preference of participants in the 1-day and 2-day CST programs ($p > 0.05$), except for the setting subscale. This finding contrasts with a previous finding that the communication skills of oncologists participating in a 3-day CST program were significantly superior to those of participants in a 1.5-day CST program [19]. The setting subscale items (e.g., ensuring that the telephone does not ring, using technical words, and breaking bad news at the first meeting) are basic communication skills but are often neglected by physicians in Taiwan [15]. Thus, Taiwanese clinicians may need more practice in long CST programs to change their truth-telling preference related to the setting. Our findings suggest that a shorter training program is as equally effective as a longer training program. If this hypothesis is supported in future empirical studies, shorter CST programs can be promoted, which will be particularly beneficial in extremely busy medical environments, such as in Taiwan.

However, our finding that the effectiveness of the two CST programs did not differ significantly may be explained by the selection of assessment times and inadequate selection of outcome variables. We measured participants' outcomes immediately after the programs, but the effectiveness of the two CST programs might differ if the outcomes were measured at longer times, for example, 3 or 6 months after CST. Unfortunately, our plan for long-term assessments was hindered by the difficulty and expense of passing Institutional Review Board (IRB) review at the 62 hospitals across Taiwan from which our participants were recruited. In Taiwan, IRB approval is needed for studies on hospital personnel [24].

Another reason for failure to detect a difference in effectiveness of the 1-day and 2-day CST programs might be inadequate selection of outcome variables. In addition to measuring participants' truth-telling preference, future studies are advised to concurrently assess their self-efficacy [3], confidence in communication [9,10], or anxiety while truth telling. We also suggest that other researchers refer to specific suggestions proposed in a review of CST programs [25] using Kirkpatrick's Triangle to evaluate CST effectiveness at four levels: participants' reactions, participants' learning, participants' behavior, and patients' outcomes. At the first level, participants' satisfaction with the

CST (each module) can be assessed. At the second level, standard patients can be invited to assess the truth-telling skills of participants before/after their participation in the CST programs. At the third level, actual clinical situations before/after the CST program can be videotaped to record participants' actual consultations for patients with cancer. At the fourth level, cancer patients can be invited to assess doctors' truth-telling skills, their understanding of the patients' needs, and the fit of their responses. In this study, we used only first-level assessment. Future studies may gradually expand the scope to second-level, third-level, or even fourth-level assessment to more effectively and comprehensively evaluate CST effectiveness.

This study had some limitations. First, participants only completed one posttest immediately after the end of the CST programs. Therefore, the long-term CST effectiveness (e.g., at 3 or 6 months) is unknown. Second, because of time and equipment limitations at the study sites, we did not videotape the participants' truth-telling process and did include standard patients' assessment of participants' truth-telling skills. Instead, we used only first-level assessment. Future researchers may choose higher-level assessments as suggested [24] to evaluate the benefit of CST more completely. Third, 70% of our participants had volunteered to participate in the CST program. Their self-selection and motivation to learn may have biased our assessment of the effectiveness of the CST program. However, this possibility is minimized by our findings that voluntary and nonvoluntary (assigned) participants did not differ significantly in either their overall truth-telling preference scores or most subscale scores and by the 1-day and 2-day CST programs having the same percentage of voluntary and assigned participants (data not shown).

Conclusions

SHARE model CST improved Taiwanese healthcare providers' preferences for cancer truth telling. Truth-tell' knowledge and skills should be replenished every few years for all healthcare personnel, including clinically experienced attending physicians. Further studies are needed to assess the long-term benefit of CST on patients' outcomes and to compare the effectiveness of different CST programs and the factors affecting physicians' method of truth telling.

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Conflict of interest

The authors have declared that there is no conflict of interest.

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Original communication

Suicide of physicians in the special wards of Tokyo Metropolitan area

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ABSTRACT

Numerous studies on physician suicide in various countries have been reported but no data from Japan on the issue can be found to date. In this study, physician suicides in the special wards of Tokyo Metropolitan area in 1996–2010 were investigated retrospectively. A total of 87 cases were enrolled. The results suggested that physician suicide has been linked to pre-existing psychiatric illnesses and occupational problems, and that psychiatrists have a relatively higher suicide risk compared to those majoring in other specialities of medicine. A distinctive feature was that 19 cases had used either drugs or devices which were accessible due to their profession some time during the process of committing suicide. Another notable feature was that 4 out of 5 anaesthesiologists enrolled in the study had chosen poisoning for their suicide method, with the drugs frequently used in their speciality. The findings advocate strongly for efficient suicide prevention measures for physicians including an early detection and treatment of psychiatric illnesses, as well as an urgent need for a more effective pharmacy management in applicable institutions together with the implementation of self discipline on each physician. This is the first broad academic study on physician suicide in Japan.

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1. Introduction

Suicides numbered 32,863 in Japan in 1998 and have exceeded 30,000 in every subsequent year, which accounts for the highest rate in the world.[1] Various analyses, researches and measures have been taken by professionals in various fields to stop such a long lasting trend of a complex public health problem. However, an absence of central institution to manage the detailed data on suicide has been making it difficult to grasp the actual condition through a large scale epidemiological study nationwide.

On the other hand, the shortage of physicians in Japan has become a serious social problem in recent years.[2,3] It is a great loss for the whole society to lose a physician by suicide, even though the number of cases is expected to be relatively small. It should be an issue to be dealt with not only by the professionals of forensic science or epidemiology, but by those from a variety of academic fields. No broad academic study on physician suicide from Japan can be found to date, due to the lack of academic epidemiological data.

The main objective of the present study was to examine the characteristics of physician suicide cases in the special wards of Tokyo Metropolitan area in 1996–2010, as the first broad academic study on the issue in Japan.

2. Methods

Data on suicides of physicians and non-physicians handled in the Tokyo Medical Examiner's Office during 1996–2010 were extracted for descriptive analysis retrospectively. The Tokyo Medical Examiner's Office is an institution in which all unnatural deaths, including suicide, occurring in the special wards of Tokyo Metropolitan area are reported and the inquests are performed. This therefore provides that all suicide cases occurring in the area are processed by this institution. Death certificates and supplementary documents were examined which included age, gender, professional speciality, past and present illness/es, device/s used, proposed motive and other relevant information of each case. The ethical committee of the Tokyo Medical Examiner's Office approved the protocol of this study.

3. Results

The total number of suicides handled in the Tokyo Medical Examiner's Office during the study period was 28248 and 87 were physicians (0.31%). Of these 87 cases, the age varied from 25 to 82 (mean = 47.97, median = 47.00) and the male to female ratio was 68:19 (the percentage of female physicians = 21.84%). The suicide methods consisted of 49 hanging, 14 poisoning, 12 jumping, 3 diving, 3 hypoxia, 3 cutting, 1 hydrogen sulfide intoxication, 1 carbon monoxide intoxication and 1 drowning. The percentage of

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methods chosen by physicians and non-physicians are shown in Fig. 1. Regardless to the suicide method, 19 physicians (21.84%) were found to have used either drugs or devices which were accessible due to their profession at some time during the process of committing suicide. Forty five cases (51.72%) had been diagnosed with a psychiatric illness, and the main motives of suicide of each case were psychiatric illnesses, occupational problems and non-psychiatric illnesses. The area of speciality of physicians consisted of 21 internists, 16 psychiatrists, 6 paediatritians, 5 anaesthesiologists, 4 dermatologists, 3 otolaryngologists, 2 radiologists, 2 surgeons, 2 obstetricians/gynaecologists, 1 orthopaedist, 1 plastic surgeon, 1 ophthalmologist, 1 pathologist, 1 researcher, 1 freelance, 1 industrial physician and 4 unknown, while 6 were junior residents (Table 1). Out of 5 anaesthesiologists, only 1 had chosen hanging as a suicide method but the remaining 4 had chosen poisoning with anaesthetics, using the devices most likely to have been taken out from their workplace (Table 2).

4. Discussion

Several studies have been carried out on the issue of suicide of physicians in various countries,[4–10] presenting notable findings in the distribution of suicidal methods and specialities in medicine. The present study revealed numerous noteworthy findings on the issue, some of which were unique in characteristics.

The mean and median age of physician suicides enrolled in the present study, 47.97 and 47.00 respectively, had no statistical difference compared to those of non-physician suicides in the equivalent period (mean = 49.69, median = 51.00, p > 0.05). The
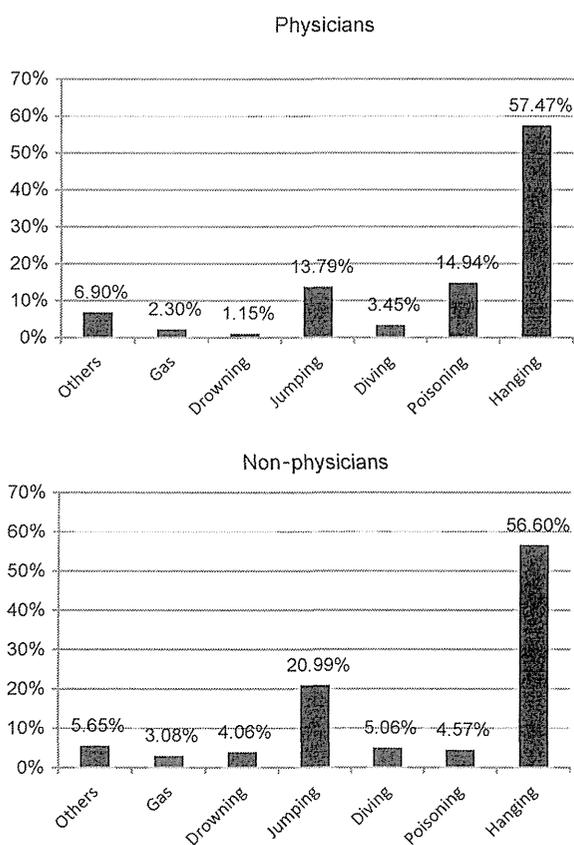
Table 1
The speciality of physicians on the national registry and those in the present study.

	Percentage in physicians over 15 years	Number of physician suicide	%
Internists	37.15–40.65%	21	24.14
Dermatologists	2.95–3.06%	4	4.60
Paediatritians	5.58–5.98%	6	6.90
Psychiatrists	4.64–5.06%	16	18.39
Surgeons	9.54–12.03%	2	2.30
Orthopaedists	7.09–7.44%	1	1.15
Plastic surgeons	0.57–0.78%	1	1.15
Ophthalmologists	4.56–4.99%	1	1.15
Otolaryngologists	3.22–3.84%	3	3.45
Obstetricians/ gynaecologists	4.40–5.39%	2	2.30
Radiologists	1.82–2.00%	2	2.30
Anaesthesiologists	2.19–2.75%	5	5.75
Unknown	0.47–0.77%	13	16.09
Others	7.32–13.96%	10	11.49

percentage of female physicians enrolled in the study (21.84%) was slightly higher compared to the percentage of females accounting for whole physicians; which increased from 13.39% in 1996 and 18.94% in 2010.[11,12]

It was found that 45 out of 87 cases had been diagnosed and received some kind of treatment for a psychiatric illness. Furthermore, a closer examination of supplementary documents revealed that the most common motives of suicide were pre-existing psychiatric illnesses, mostly depression, followed by occupational problems and non-psychiatric illnesses. There has been some evidence that depression, drug abuse, and alcoholism are often associated with suicides of physicians according to the studies conducted in other countries,[8,9] which is in accordance with the results of present study. The most common motive among non-physician suicides during the equivalent period was also psychiatric illnesses [data not shown], which indicates that an early detection and an appropriate treatment of psychiatric illnesses would be a key factor in the prevention of suicides, regardless of the occupational background.

It has been pointed out that psychiatrists and anaesthesiologists have a relatively higher risk of suicide compared to physicians majoring in other specialities.[10,13,14] According to the biennial reports released by the Ministry of Health, Labour and Welfare of Japan in 1996–2010, psychiatrists accounted for 4.64–5.06% of the whole registered physicians respectively.[11,15–21] On the other hand, there were 16 psychiatrists (18.39%) enrolled in the present study, which accounted for a distinctly higher percentage compared to the proportion of physicians in the national registry over the equivalent period; the assumption that the speciality distribution is the same in the Tokyo Metropolitan area. It is unknown whether there are occupational stresses particular to the psychiatric fields of medicine, or if the choice of speciality is influenced by factors that might differentially influence risk. However, there is a study reporting high levels of stress and dissatisfaction for psychiatrists.[22]

The present study revealed that the most common suicide method was hanging for physicians. Although the percentage of suicidal poisoning for physicians was relatively high compared to that of non-physicians, it only accounted for about a quarter of that of hanging (Fig. 1). On the other hand, poisoning was found to be the most common suicide method among physicians in some previous studies.[4,7] Some authors suggested that this phenomenon is due to physicians being rich in knowledge on lethal drugs and doses, as well as accessibility to them. While these factors may have had effects to the results, another factor

Fig. 1. The suicide method of physicians and non-physicians in 1996–2010 in the Tokyo Metropolitan area.

Table 2
The method of suicide by the speciality of physicians.

Speciality/method of suicide	Internists	Dermatologists	Paediatritians	Psychiatrists	Surgeons	Orthopaedists	Plastic surgeons	Ophthalmologists	Otolaryngologists	Obstetricians/ gynaecologists	Radiologists	Anaesthesiologists	Unknown	Others	Total
Hanging	14	2	4	12			1	1	1	2	1	1	6	4	49
Poisoning	3	1		3								4	1	2	14
Diving	1												1	1	3
Jumping	1								1				3	3	12
Drowning	1		2		2										1
Gas		1		1							1		2		2
Others						1			1						6
Total	21	4	6	16	2	1	1	1	3	2	2	5	13	10	87

for consideration was established through the cases noted in the present study.

Physicians generally have more knowledge of effective suicide methods than those with less medical knowledge. It is notable that either drugs or devices only accessible to medical professionals had been used during the process of committing suicide in 19 out of 87 cases (21.84%). Furthermore, it is concerning to note that 4 out of 5 anaethesiologists had chosen poisoning for their method of suicide, using anaesthetics; droperidol, vecuronium bromide, midazolam, barbiturate and propofol. This is a distinct contrast to internists, with only 4 out of 21 using accessible medical drugs or devises during the suicidal process. Anyhow, these results indicate that an easy access to and a substantial knowledge of potentially dangerous drugs may lead to an inappropriate usage. For example, it is well known to medical professionals that propofol has sedative and relaxing properties, and brings euphoric feelings.[23] Quite a number of lethal cases have been reported on those dying from the misuse of propofol on themselves.[24-27] Medical institutions are responsible in managing potentially dangerous drugs and devices appropriately, but it also strongly depends on the moral of each professional involved. Every member of staff, not only those with management responsibilities, should be aware that there is a possibility that they might be used for unintended purposes other than suicide, such as addiction and homicide. There are case reports in which anaesthetics were suspected of having been accessories in homicides.[28,29]

It is clear that measures need to be taken to address the current problem of drug and device misuse by physicians. With the availability and ease of obtaining them along with the difficulty of detection, the use of prescribed drugs for wrong purposes, including suicide, will probably continue in the future. However, the best solution may not be to place restrictions on their circulation as the majority would be used for their intended purpose. Instead, a more strict pharmacy accounting of potentially dangerous drugs and devices in applicable institutions, together with the implementation of self-discipline on physicians should be encouraged to prevent their illicit diversion.

There are a number of limitations to this study. Due to the extremely small number of cases covered despite 15 years of study period, it is impossible to draw a reliable conclusion on the trends on physician suicide by age and period. A new distinctive characteristic may be revealed by continuous research on the issue and the accumulation of further cases of this nature. Furthermore, the study is based only on the physician suicides occurred in the Tokyo Metropolitan area. A different trend, such as the distribution in the speciality of medicine, may be observed in the other areas of the nation, particularly in the rural area.

5. Conclusion

Although the number of physician suicide accounted for less than 1% of whole suicides in the Tokyo Metropolitan area, numerous distinctive features were observed by background analyses. The results of the present study should encourage physicians and all physician associated co-workers to pay attention to the need for early intervention for psychiatric illness among themselves, and also to review of pharmacological management in their workplace and their morals as professionals handling potentially dangerous drugs and devices.

Conflict of interest

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■研究報告

検案書類のテキストマイニングによる
高齢自殺者における病苦の探索

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抄録：目的：わが国の60歳以上の自殺者は全体の約4割にも達し，高齢者の自殺対策は重要である。この世代の自殺動機の6割以上が「健康問題」と指摘されるなか，高齢自殺者の生前歴から病苦の概形を知ることを目的とした。方法：東京都23区で発生した全自殺に関する情報を反映した東京都監察医務院の検案書類をテキストマイニングにより分析した。結果：高齢自殺者の検案書類には精神医学的問題の存在を示唆する言葉と心身の様々な病気や病苦を示す言葉が頻出した。特徴的な病歴はうつ病，がん，筋骨格系疾患であり，筋骨格系疾患を抱えていた事例では，疼痛を訴え，疼痛からの解放手段として自殺を選択したことを示唆する記述が多く記載されていた。結論：高齢自殺者の背景として，筋骨格系疾患による疼痛が高齢者に与える心理的苦痛は，他の世代と比べて深刻である可能性が示唆された。　　　　　　　精神科治療学　29(6)；797-804，2014

I.　は じ め に

2012年，わが国の自殺者件数は15年ぶりに3万人を下回ったものの依然として高い水準にある。警察庁の自殺の状況[9]（平成24年）によれば，60歳以上の自殺者が全体の約4割にも達しており，そ

の数の多さから高齢者の自殺対策は重要である。

この世代の自殺者は，その動機の6割以上が「健康問題」（病気の悩み・影響など）であるという指摘がある[6]。高齢者の健康問題とは，その年齢を考慮すると，他の世代に比べて身体疾患の占める割合が比較的高いと予想される。身体疾患はそれ自体が単独でも自殺の危険因子であるが[2,7]，若年者や中高年に比べると同じ身体疾患でも生活機能障害は重篤であり，主観的な苦痛も深刻なものとなりやすい。事実，高齢の自殺企図者では，他の年代に比べて身体疾患に罹患していた者が有意に多いという報告が存在する[4]。

他方で，高齢者の健康問題として，うつ病などの精神疾患を無視することもできない。実際，高齢者は，配偶者などの重要他者との死別や社会的孤立などを体験しやすい年代であり[8,11]，こうしたライフイベントや状況が契機となって発症したうつ病により，最終的に自殺へと至る可能性は十

分にありえる。また，身体疾患への罹患がうつ病発症の契機となることも稀ではなく，さらには，うつ病に罹患することが身体疾患への罹患リスクを高めるという指摘もある[13]。

その意味では，高齢者の自殺予防という観点に立てば，高齢者が抱えうる様々な心身の疾患のなかで，どのような疾患が最も自殺に影響を与えるのかを明らかにすることは臨床的に非常に重要と思われる。しかし，我々が知りえた限りでは，様々な身体疾患のなかで特にどのような疾患が高齢者の自殺と密接に関連するのかを明らかにした研究は，いまのところ存在しない。

今回我々は，高齢自殺者の背景にある，心身の病気に関する悩みや影響といった，いわゆる病苦の概形を知るための一助とすべく，高齢自殺者の生前歴の調査を行った。その際，我々が調査資料として用いたのは，東京都監察医務院において作成され，保管されている自殺事例の死体検案通報書と死体検案調書（両者を合わせて以下，検案書類）である。これは東京都23区で発生した全自殺に関する情報を反映したものであり，対象の代表性という点では非常に優れたものであるが，現状では，その情報のすべてをデータベース化できておらず，ただちには詳細な自殺の実態解明には活用できない。

そこで我々は，検案書類の分析にあたって，文章分析の技術であるテキストマイニングの手法を用い，データベース化されていないテキストから，個人情報を除去したうえ，対象の特徴を明らかにすることを試みた。

よって，ここにその分析の結果を報告するとともに，高齢者の自殺に影響を与える心身の疾患について若干の考察をしたい。

II. 方　　法

1. 対象

本研究における分析対象の抽出母体となるのは，2009年の1年間に東京都監察医務院にて作成された，死亡時65歳以上の自殺既遂者の死体検案通報書と死体検案調書（両者を合わせて以下，検案書類）である。書類の性質は，前者は警察官が

死亡者の生活歴を調査したものであり，後者は監察医が遺体所見を主に記載したものである。

調査対象年である2009年の1年間で，東京都23区内における総自殺件数は2,003件であった。このなかで65歳以上の自殺者は440件（男299，女141）であり，平均年齢73.5歳であった。このうち，本研究の分析対象としたのは，この65歳以上の440件から無作為に抽出した100件（男65，女35）である。対象の平均年齢は75.0歳であった。母集団とサンプルの男女比及び平均年齢には統計的な有意差はなかった（P≧0.05）。なお，分析するにあたり，本サンプルを高齢自殺群とした。

本研究では，二つの対照群を設定した。これらの対照群はいずれも2009年の東京都監察医務院事例であり，一つは65歳未満の自殺例（非高齢自殺群），他方は65歳以上の病死例（高齢病死群）である。非高齢自殺群は65歳未満の自殺例340件（男234，女106）から無作為に抽出した100件（男65，女35）である。平均年齢は43.6歳であった。また，高齢病死群は65歳以上の病死例6,566件（男3,653，女2,913）から無作為に抽出した100件（男65，女35）である。平均年齢は76.0歳であった。

なお，本研究は，東京都監察医務院倫理委員会により承認（22-1）を得て実施された。

2. 分析方法

分析手順は，まず，検案書類をテキストマイニングした。本技術は，情報処理分野[10]のみならず，自殺研究[5]にも応用された確立したものである。これにより，高齢自殺群と他の2群とのあいだで比較を行い，高齢自殺群で頻出な話題を明確にした。

さらに，自殺に特異的に影響する可能性のある疾患を探索するため，高齢自殺群と，同じ高齢者でありながら自殺ではなく病死という異なる結果をきたした，高齢病死群とのあいだで，病歴疾患の比較を行った。この手続きを追加すれば，もしも高齢自殺群に偏在する疾患が存在した場合には，その疾患が高齢自殺者の病苦となっている可能性が高いと結論できると考えたからである。
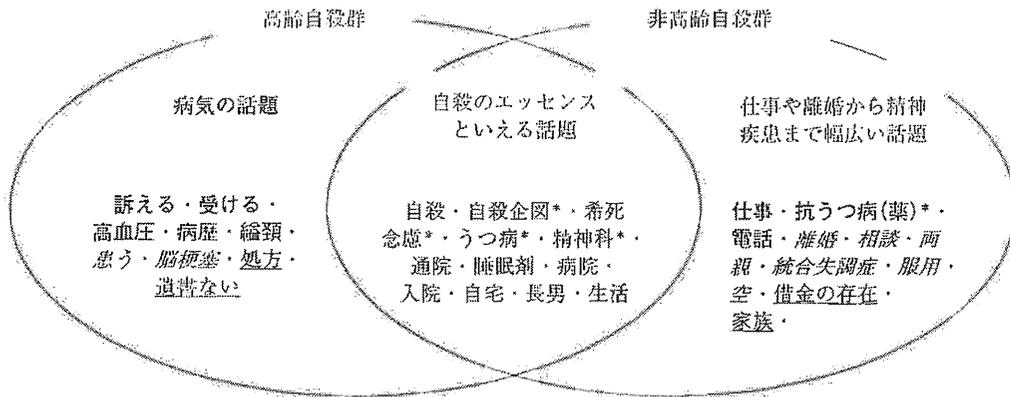
図1　自殺例における高齢者の特徴—高齢自殺群と非高齢自殺群の比較—
頻出語は上位20語，特徴語は上位10語を対象とした。太字：頻出語と特徴語でともに検出した語，
斜体：特徴語だけに検出した語，下線：頻出語だけに検出した語

3．統計学的解析

本研究では，疾患に関する比較において，データを恣意的ではなく，客観的に分類するために，クラスター分析を用いた。具体的には，階層的クラスター分析（Ward法）を用い，個体間の距離は平方ユークリッド距離で測定した。最後に，高齢自殺群の偏在疾患に関し，テキストを分析し，高齢自殺者が訴えた病苦の様子を抽出する。分析にあたっては，Text Mining Studio 4.0とSPSS version 19を用いた。

Ⅲ．結　　果

1．検案書類のテキストマイニング—高齢自殺群に
　　頻出な話題の抽出—

検案書類の分析では，1）頻出語の集計，2）特徴語の比較，3）係り受け抽出を行った。特徴語とは，データに付随する属性毎（高齢自殺群，非高齢自殺群，高齢病死群）に偏在する語のことを示し，特徴的とする統計指標には汎用的な補完類似度[12]を用いた。なお，分析結果で語末尾に＊を付記したものは，同義語を集約したものである。

1）自殺例における高齢者の特徴

自殺例のなかで，高齢自殺群と非高齢自殺群の2群を比較し，高齢自殺群に頻出な話題を抽出した。その結果を図1に示す。両群に共通した頻出

語は，「自殺・自殺企図＊・希死念慮＊・うつ病＊・精神科＊」などであり，まさに，自殺のエッセンスといえる語であった。その一方で，高齢自殺群の頻出語と特徴語をみると，病気の話題に関連したものがほとんどであった。具体的には「高血圧・病歴・患う・訴える・受ける・縊頚」などである。一方，非高齢自殺群では「仕事・抗うつ病（薬）＊・電話・離婚・相談」などが検出され，仕事や離婚から精神疾患まで幅広い語から構成されていた。なお，本群では精神障害以外の病気の話題は検出されなかった。

2）高齢者における自殺例の特徴

同じ高齢者でありながら自殺と病死という異なる結果をきたした，高齢自殺群と高齢病死群を比較し，高齢自殺群の特徴を抽出した。その結果を示したものが図2である。両群に共通した頻出語は，「受ける・病院・入院・妻・長男・自宅」であり，病気と家族の話題に関するものが多かった。高齢者という枠組みでは，自殺と病死とは無関係に，病気と家族の話題は頻繁に記載された生前歴であった。そして，高齢自殺群の頻出語と特徴語をみると，「遺書＊・うつ病＊・希死念慮＊・精神科＊・診療行為＊」であり，自殺と関連が深い語が並んだ。

3）高齢自殺群に頻出した用法が不明確な語の
　　文章分析

高齢自殺群の検案書類には病気の話題が頻出し

図2　高齢者における自殺例の特徴―高齢自殺群と高齢病死群の比較―
頻出語は上位20語，特徴語は上位10語を対象とした。太字：頻出語と特徴語でともに検出した語，
下線：頻出語だけに検出した語

た。しかし，なかには「受ける」や「訴える」のように用法が不明確な語がある。この2語の係り元語をそれぞれ分析し，文章中の用法を調査した。分析の結果，「受ける」の係り元語は「通院・手術・診療行為*」などであり，「受ける」とは主に「診療行為を受ける」として用いられていた。また，「訴える」の係り元語は「脊椎の痛み・首から腰の痛み・疲労と膀胱炎・不眠・うつ病」などであり，主に「身体疾患と気分障害の不調を訴える」として用いられていた。したがって，頻出語や特徴語でありながら用法が不明確であった「受ける」と「訴える」は，他の多くの頻出語と同様に病気の話題に関係したものであった。

2. 高齢自殺者に偏在する病歴疾患の探索

テキストマイニングによる分析結果より，高齢自殺群では病気の話題が多かったが，この特徴は高齢自殺群のみならず，高齢病死群も同様であることが明らかにされた。高齢自殺者に偏在する病歴疾患を探索するため，検案書類から疾患だけを改めて抽出し，疾患の種類と件数を集計して両群を比較した。その際，疾患は国際疾患分類（ICD-10コード）にならい集約し，集約結果が5件以下のものは，その他疾患として分析外とした。その結果を示したものが表1である。疾患数は高齢自殺群169（1症例あたり約1.7疾患），高齢病死

表1　高齢自殺群と高齢病死群―病歴疾患の集計表―

病歴疾患	高齢自殺群	高齢病死群
循環器系疾患	27	36
高血圧症	12	35
消化器系疾患	10	19
筋骨格系疾患	17	7
その他疾患	12	11
うつ病	22	0
がん	13	8
脳梗塞	8	12
呼吸器系疾患	5	14
糖尿病	6	9
神経系疾患	6	8
高脂血症	5	6
腎尿路生殖器系疾患	5	6
認知症	5	4
内分泌・栄養及び代謝疾患	3	5
不眠症・睡眠障害	5	1
耳及び乳様突起疾患	3	2
精神及び行動の障害	5	0
計	169	183

群183（1症例あたり約1.8疾患）であった。

さらに，この集計結果をクラスター分析（3クラスター解を採用）した結果を図3に示す。各クラスターは疾患分布を勘案し，▲高齢自殺群，○高齢病死群，●共通群と考えた。▲高齢自殺群にはうつ病，がん，筋骨格系疾患の3疾患，○高齢病死群には消化器系疾患，呼吸器系疾患，糖尿病など12疾患，●共通群は循環器系疾患と高血圧症であった。
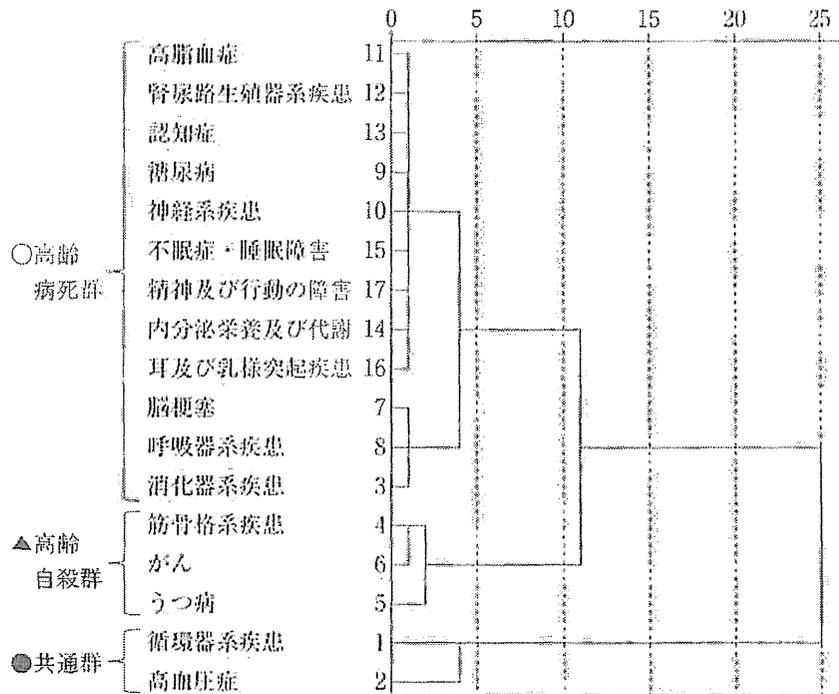
図 3　高齢者の自殺と病死における病歴疾患の階層クラスター分析

3. 高齢自殺者の病苦となる疾患の詳細と苦悩の様子の抽出

高齢自殺者にクラスタリングされた，がん，筋骨格系疾患に関し，事例ごとの疾患名・自殺関連因子・病苦の様子を抽出した。その結果を表 2，表 3 に示す。筋骨格系疾患 13 例中（男 9，女 4）の 6 例は，疾患による疼痛を訴えた事例であった。そして，その多くは疼痛からの解放手段として自殺を選択した様子が記されていた。また，身体的不自由の訴えは 2 例，うつ病は 4 例であった。なお，その他の情報を整理すると，家族構成（独居 5，夫婦 4，その他複数 4），住居（一戸建て 4，3 階以上集合住宅 8，2 階以下集合住宅 1），収入（年金・預貯金 10，生活保護 2，自営業 1）であり，飲酒習慣は全例で認めなかった。なお，直近の死別や借金の記載例はなかった。

がん 12 例（男 11，女 1）では，疼痛の訴えは 2 例，将来の悲観は 1 例であった。また，うつ病 22 例（男 11，女 11）に関し，発症の原因と思われる因子を集計すると，病気 9 例（筋骨格系疾患 4 例，がん 2 例，神経疾患 1 例，他 2 例），借金 2 例，死別 2 例，その他は，独居，男女関係，介護

疲れ，団地理事長役職のプレッシャーなどであった。

IV. 考　察

本研究は，東京都監察医務院の検案書類から高齢自殺者の背景にある要因を描き出すために，検案書類のテキストマイニングによる分析を試みたものである。その結果，高齢自殺者における特徴として，以下の二つが浮き彫りにされた。

一つは，高齢病死群との比較から明らかにされたものであり，高齢自殺群では，検案書類において，「遺書・うつ病・希死念慮・精神科・診療行為」といった，自殺や，自殺の背景にある精神医学的問題の存在を示唆する言葉が頻出するという特徴である。この結果は，国内外における心理学的剖検研究[1,3]が指摘する，自殺者の大半が自殺直前に精神障害に罹患した状態にあるという知見，あるいは，国内の心理学的剖検調査[3]が指摘する，自殺者の約半数は自殺時点では精神科治療中であったという知見と一致する。このことは，テキストマイニングによって描き出された高齢自殺者の

表2　筋骨格系疾患の詳細と病苦の様子

事例	疾患名	他疾患	性別	年齢	疼痛	身体的不自由	将来悲観	希死念慮	病苦の様子
1	脊椎管狭窄症・坐骨神経痛	うつ病	男	73					病気を苦に自殺します
2	腰部脊椎管狭窄症・腰痛症		女	96	○				
3	脊髄狭窄症		男	72		○	○		こんな身体になって生きても仕方ない
4	腰椎側弯症	腰椎圧迫骨折・うつ病	女	98	○			○	この歳でこんな痛みにあうなら死んだ方がまし
5	腰痛症		女	96	○				
6	腰痛症	他疾患多数	男	82					
7	膝痛症	うつ病	女	81	○				わけのわからない痛みあり
8	腰椎症・坐骨神経痛・強直性脊椎炎		男	78	○			○	体が痛くてどうしようもない。生きているより死んだ方が楽だと思う
9	リウマチ		男	78					
10	腰椎ヘルニア	うつ病	男	69					
11	関節リウマチ		男	78	○				夜，身体が痛く，よく眠れない。体重が減少する
12	痛風	癌（詳細不明）	男	82		○			生きていてもしょうがない。ガンだし，手術してもしょうがない
13	関節痛		男	74					視力や前立腺の不調だ

特徴が，心理学的剖検によって同定された自殺者一般と同様の特徴を持っていることを意味し，本研究で用いた手法には一定の妥当性があることを示す傍証になると思われる。

もう一つは，非高齢自殺群との比較から明らかにされたものであり，高齢自殺群の特徴は，心身の様々な病気や病苦を示す言葉，あるいは，病気の治療のために医療機関で治療を受けることを示唆する表現が頻出するという特徴である。これは，高齢自殺者の多くが心身の様々な疾患を抱え，また，その疾患の治療のために医療機関とのつながりを持っている可能性を示唆し，こうした特徴は，わが国における国民全体の統計資料[9]が示す高齢者一般の特徴と矛盾しないものといえるであろう。同時に，この結果は，高齢者に特化した自殺予防対策を考える場合には，高齢者に広くみられる心身の様々な病気を念頭に置く必要があることを示唆している。

そのようななかで，本研究では，クラスター分析を通じて，高齢自殺者に特徴的な疾患名として，うつ病，がん，筋骨格系疾患という3疾患が同定された。興味深いのは，この3疾患のなかに筋骨格系疾患が含まれていることである。周知のように，うつ病は年代を問わず自殺に関連深い精神疾患であり，また，がんについても近年自殺との密接な関連を指摘する報告は枚挙にいとまがなく，これら二つの疾患に関しては，我々が得た結果は先行知見を確認しただけの意義しかない。しかし，腰椎症や坐骨神経痛，あるいは慢性関節リウマチなどの筋骨格系疾患の多くは，根本的な治療は困難であるにしてもその進行は緩徐であり，ただちに生命予後に影響するものは少なく，自殺との関連はむしろ意外であった。

高齢者の自殺と筋骨格系疾患とが関連する説明として，我々は，筋骨格系疾患がもたらす疼痛の影響に注目している。というのも本研究では，筋骨格系疾患を抱えていた高齢自殺者の検案書類には，疼痛を訴え，疼痛からの解放手段として自殺

表3　がんの詳細と病苦の様子

事例	疾患名	他疾患	性別	年齢	疼痛	身体的不自由	将来悲観	希死念慮	治療及び病苦の様子
1	食道癌		男	81					余命6ヵ月との告知を受ける
2	膵臓癌		男	81					化学療法により治療中の自殺
3	前立腺癌		男	69				○	余命3ヵ月，治療すれば1年。抗癌治療中，「死にたい」とうつ状態であった
4	がん（詳細不明）		男	75				○	余命2ヵ月と告知を受ける。ここ数日は「死にたい」と繰り返す
5	前立腺癌		男	72			○		癌手術後，経過が不良，以降，入退院を繰り返す。病状を悲観。昨年に妻と死別。病状の改善が見られず，家族に迷惑がかかるとしていた
6	前立腺癌	心筋梗塞，狭心症等	男	82	○				「腰が痛い，眠れない」
7	大腸癌	脳梗塞	男	72					
8	肺腺癌		男	69					末期の肺腺癌。骨転移。放射線治療中。化学療法が延期となり気落ち。「余命はどれくらいか」「延命治療はいらない」
9	悪性軟部腫瘍・肺癌		男	78	○				悪性軟部腫瘍による強烈な疼痛。薬効なく，常時「痛い，痛い」と訴える。肺癌も発見
10	悪性リンパ腫	大動脈解離	男	84					
11	肝臓癌	うつ病	女	74					1年前にうつ病と診断。肝臓癌で3ヵ月に1回，うつ病で3週間に1回の通院中の自殺
12	肺癌		男	77					末期の肺癌と診断される

を選択したことを示唆する記述が多く認められたからである。このことは，筋骨格系疾患による慢性的・持続的疼痛が高齢者に与える心理的苦痛は，通常，考えられているよりもはるかに深刻である可能性，もしくは，比較的若い年代においては耐えられた疼痛も，高齢になると耐えがたくなる可能性を示唆しているようにも思われる。あるいは，高齢になってから罹患したうつ病などの精神疾患の影響が，筋骨格系疾患の疼痛がもたらす主観的苦痛を増強し，高齢者を精神的に追い込んだのかもしれない。これらの推論は，今後，心理学的剖検などの精緻な情報収集による自殺の実態調査によって検証される必要があるが，本研究は，筋骨格系疾患を抱えた高齢者と接する頻度の高いプライマリケア医や整形外科医などの医療関係者は，高齢者の自殺予防においてゲートキーパーとなりうる立場にある可能性を示唆するものとして一定の意義があろう。

最後に本研究の限界について触れておきたい。本研究は多くの限界を含んでいるが，なかでも重要な点は以下の三点である。第1に，本研究の情報源が検案書類であるという点である。検案書類とは，死後，警察官による周辺調査からなり，聴取の際，情報の提供者と聴取者の積極性や先入観が関与した可能性がある。第2に，本研究で用いたテキストマイニングという分析手法の妥当性に関する点である。テキストマイニングとはデータベース化されないテキストを用い，対照と比べることで分析対象の概形の特徴を見出すことを特徴とする分析手法である。今回分析した検案書類の合計文字数は68,000を超え，このような膨大なテキストデータに対し，人手による分析では時間を多く要することに加え，たとえ分析したとしても，分析者の恣意性を排除したうえで多様な表現を漏れなくデータ化することは難しい。このため，本研究ではテキストマイニングを分析手法として用いた。そして最後に，本結果は東京都23区に限定されたデータであり，日本全体の自殺に一般化するのには慎重であるべきという点である。

しかし，以上の限界にもかかわらず，本研究の対象は東京都23区の全数データからのランダムサンプリングしたデータであり，対象の代表性は優れている。検案書類の情報はその正確性が均一でない問題はあるものの，死亡から時間経過を経ていない時点での情報収集のため，想起バイアスの混入が少ない点も自殺に用いる情報として大きな強みと考える。

Ⅴ．結　論

本研究では，東京都23区の全自殺例に関する情報を反映した東京都監察医務院の検案書類を対象として，テキストマイニングの手法を用いて分析を行った。その結果，高齢自殺者では，疼痛を伴う筋骨格系疾患がうつ病，がんとともに高齢者の自殺の健康問題として重要であるとともに，その疾患による疼痛が自殺既遂へ大きく影響する可能性が示唆された。しかし，筋骨格系疾患とともに，高齢自殺者の健康問題として分類した，うつ病とがんについては充分な検討ができなかった。今後，症例を増やすとともに詳細な分析が必要である。

検案書類から探索した本研究の結果が自殺予防対策の一助となれば，これ以上の幸いはない。

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RESEARCH ARTICLE

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Gender differences in suicide attempters: a retrospective study of precipitating factors for suicide attempts at a critical emergency unit in Japan

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Abstract

Background: There is a shortage of empirical data concerning precipitating factors for suicides in Japan. The purpose of the present study was to clarify gender differences of precipitating factors for suicide attempts in Japan.

Methods: The subjects were high-lethality suicide attempters who were admitted to the Nippon Medical School Hospital Critical Care Medical Center between March 1, 2010 and March 31, 2012. Precipitating factors for suicide attempt, method of suicide attempt, psychiatric diagnoses and other sociodemographic data were collected from the patients' medical records retrospectively, and statistical analyses were performed for categorical variables of male/female.

Results: The total number of subjects was 193 (88 males and 105 females). The rate of subjects attempting suicide by poisonous gas was significantly higher in males while that of subjects attempting suicide by drug overdose was significantly higher in females. The rate of subjects diagnosed with "major depressive disorder, bipolar disorder" was significantly higher in males while that of subjects diagnosed with "personality disorders" or "dysthymic disorder" was significantly higher in females. Subjects with "health problems", "financial problems", "work problems", "debts (others)" or "unwanted transfer" were significantly more numerous among males; subjects with "family problems", "parent–child relations" or "loneliness" were significantly more frequently found among females.

Conclusions: Mental disorders were the most common precipitating factor for suicide attempts regardless of gender. Significant gender differences were observed in psychiatric diagnoses, methods of suicide attempt and psychosocial problems. This indicates the necessity of suicide prevention measures corresponding to these gender differences.

Keywords: Suicide attempters, Precipitating factors for suicides, Gender differences, Critical care medical center

Background

In Japan, the number of suicides has been decreasing in recent years but has remained at around 30,000 annually after a sudden increase in 1998. Suicide prevention measures have been taken by the whole nation to reduce suicides after the Basic Act on Suicide Prevention was enacted in 2006. On the other hand, it is difficult to narrow down which measures should be taken intensively because empirical data regarding precipitating factors for suicides are insufficient in Japan.

Some previous studies have endeavored to clarify the characteristics of suicide-related behaviors in Japan by investigating suicide attempts [1-4]. However, in those studies, investigations focused only on psychiatric diagnoses or sociodemographic data of suicide attempters, and precipitating factors for suicide attempts were not examined. Pompili argued that suicide is better understood as a phenomenon centered in the individual [5]. Analysis of subjective motives as well as analysis of objective risk factors is useful for understanding suicide. The National Police Agency (NPA) yearly announces the

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annual number of suicides, and analysis of the precipitating factors for suicides based on the NPA's suicide statistics is made public simultaneously. However, it is possible that the actual state of suicides has not been grasped correctly in this analysis due to inadequate psychiatric assessment, and precipitating factors for suicides were specified in only about 70% of suicide committers in the NPA's suicide statistics [6].

Gender differences in suicide-related behavior are well-known. Females have a higher rate of suicide attempts than males, while males have a higher rate of mortality from suicide than females [7-9]. The male/female ratio of suicide attempts is 0.65-0.81 according to previous studies in Japan [1-4]. Females are more likely to attempt suicide by poisoning than males, while males are more likely to use methods of suicide with high lethality like hanging than females [8,9]. In addition to these characteristics, some gender differences in sociodemographic characteristics of suicide committers or attempters are known. Regarding the sociodemographic characteristics of suicide committers in Denmark, Qin et al. reported that being single, unemployed and having a low income were associated with higher suicide risk in males, whereas having a young child was associated with lower suicide risk in females [10]. Fekete et al. reported sociodemographic characteristics of suicide attempters in Hungary, including that females were economically inactive or widowed and males were unemployed or living alone [11]. Zhang et al. studied the sociodemographic characteristics of suicide attempters in American young adults, reporting that low income and smoking were associated with suicide attempts in males, and poor self-evaluated health, low educational attainment and drug use were associated with suicide attempts in females [12]. However, gender differences of precipitating factors for suicide-related behavior have been insufficiently investigated. Wu et al. reported that unemployment or economic problems were regarded as significant precipitating factors for suicide attempts to a greater extent in males than in females in Taiwan, but the sample consisted mainly of people with a suicide lethality ranging from mild to moderate [13]. Tóth et al. reported that interpersonal conflict was found to be the most frequent precipitating factor for suicide attempts by deliberate self-poisoning in Hungary and also that male suicide attempters with interpersonal conflicts had lower levels of depression [14].

In the present study, we investigated precipitating factors for suicide attempts from the data of suicide attempters admitted to the Nippon Medical School Hospital Critical Care Medical Center. Gender differences in Japanese suicide-related behavior have not been clarified. Thus, we aimed to clarify the gender differences in precipitating factors for suicide attempts in Japan.

We previously reported a study concerning precipitating factors for suicide attempts based on a preliminary psychiatric assessment of suicide attempters, in which we explored the precipitating factors for suicide attempts among adolescent suicide attempters [15]. In the present study, we comprehensively investigated precipitating factors for suicide attempts via an approach unprecedented in Japan.

Methods

Study design and sample

The subjects were suicide attempters with high lethality who were admitted to the Nippon Medical School Hospital Critical Care Medical Center. All patients admitted to this facility are in medically serious and fatal condition. About 2,000 patients are admitted every year, and about 5% of them are suicide attempters excluding suicide committers. The study period was from March 1, 2010 to March 31, 2012.

In this report, the term "suicide attempt" follows the Columbia Classification Algorithm of Suicide Assessment (C-CASA), i.e., it is defined as a potentially self-injurious behavior, associated with at least some intent to die, as a result of the act [16]. We adopted this definition of the term "suicide attempt" because it is often clinically used. Silverman et al. proposed the nomenclature for suicidology, defining "suicide attempt" as a self-inflicted, potentially injurious behavior with a non-fatal outcome for which there is evidence of intent to die [17,18]. There is no essential difference between C-CASA and the nomenclature proposed by Silverman et al. in respect to the definition of the term "suicide attempt".

At the Nippon Medical School Hospital Critical Care Medical Center, psychiatrists examine all suicide attempters and confirm their intent to die when they attempted suicide. Psychiatrists assess their mental state and problems that precipitated their suicide attempt. Psychiatric diagnoses were made according to the DSM-IV-TR criteria [19] by agreement among two or more experienced psychiatrists. Psychiatrists also assessed precipitating factors for the suicide attempts. Precipitating factors for suicide attempt, methods of suicide attempt, psychiatric diagnoses and other sociodemographic data were collected from the patients' medical records retrospectively. If the subject had attempted suicide by two or more methods, we only presented the most lethal one.

Precipitating factors for suicide attempts were classified in accordance with the items used for the classification of precipitating factors for suicides by the NPA's 2010 suicide statistics (Table 1) [6]. These are the only official statistics that include data on precipitating factors for suicides, and they are widely used as the basic data for suicide prevention in Japan. This is why the classification by the NPA's suicide statistics was used in the present study. Three items or less were presented as precipitating factors for

Table 1 Items used for classification in NPA's suicide statistics, 2010

Major category	Sub-classification
Family problems	Parent–child relations, marital relations, relations with other family members, death in the family, pessimism over family's future, scolding from family members, worries about parenting, abuse, exhaustion from nursing or care, others
Health problems	Disease, depression, schizophrenia, alcohol dependence, drug abuse, other mental disorders, physical handicaps, others
Financial problems	Bankruptcy, business slump, redundancy, failure to find employment, poverty, debts (accumulated loans), debts (joint liability), debts (others), repayment pressure from creditors, insurance paid by suicide, others
Work problems	Failure in business, workplace relationship, unwanted transfer, work overload, others
Love problems	Marriage problems, broken heart, worries about adultery, trouble with boyfriend or girlfriend, others
School problems	Entrance examinations, career decisions, academic failure, relationship with teachers, bullying, relationship with schoolmates, others
Other problems	Having ones' crime revealed, crime victim, suicide over someone's death, loneliness, relationship with neighbors, others

suicides in the NPA's 2010 suicide statistics, while more than three items were also presented as precipitating factors of suicide attempts in the present study in order to show the background of suicide attempts more accurately. The items for mental disorders in the NPA's 2010 suicide statistics ("depression", "schizophrenia", "alcohol dependence", "drug abuse" and "other mental disorders") were removed from the items in the present study because psychiatric diagnoses were made according to the DSM-IV-TR criteria independently.

If there were two or more precipitating factors belonging to the same major category in one subject, the number of precipitating factors in that major category was considered to be one only when the analysis was performed between major categories.

Statistical analyses

Statistical analyses were conducted using PASW Statistics 18 (SPSS Inc., Chicago, IL, USA). Welch's t-test was used to compare the variables of age and the number of precipitating factors between males and females. Chi-square test or Fisher's exact test was used to determine the categorical variables of being under psychiatric treatment, employment status, method of suicide attempt, psychiatric diagnosis and precipitating factors for suicide attempt between males and females. Chi-square test or Fisher's exact test was also used to determine the categorical variables of method of suicide attempt between under psychiatric treatment and no psychiatric treatment. We used a significance level of $p < 0.05$ and two-sided probability.

Ethics

The present study was approved by the Ethics Committee of Nippon Medical School Hospital and conforms to the provisions of the Declaration of Helsinki.

Results

Characteristics of subjects
The results are shown in Table 2.

The total number of subjects was 193 (88 males and 105 females), with the male/female ratio being 0.84. Their mean age was 41.1 ± 16.3 SD years (range: 15–91 years). Sixty of the subjects (31.1%) were employed.

Those attempting suicide by drug overdose comprised the largest group, with 101 cases (52.3%). The second largest group, 33 cases (17.1%), consisted of those attempting suicide by jumping from a high place. Hanging is the most common method among suicide committers in Japan, but the subjects who attempted suicide by hanging were the fifth most, with 11 cases (5.7%).

182 of the 193 subjects (94.3%) had mental disorders and 131 of the 193 subjects (67.9%) were under psychiatric treatment. Those diagnosed with "mood disorders" were the most, with 68 cases (35.2%): 36 of them were diagnosed with "major depressive disorder", 6 with "bipolar disorder", and 26 with "dysthymic disorder". The subjects diagnosed with "schizophrenia and other psychotic disorders" were the second largest group, with 45 cases (23.3%). The third largest group, 27 cases (14.0%), consisted of those diagnosed with "adjustment disorders". The fourth largest group consisted of "personality disorders", with 22 cases (11.4%): 18 of them were diagnosed with "borderline personality disorder" and 4 with "personality disorder not otherwise specified".

The mean number of precipitating factors, except mental disorders, was 1.11 ± 0.78 SD per subject (range: 0–4). The subjects with "family problems" made up the largest group, with 62 cases (32.1%). Those with "financial problems" comprised the second largest, with 40 cases (20.7%), and those with "other problems" the third largest, with 29 cases (15.0%).

Gender differences
There was no significant difference in mean age and mean number of precipitating factors between males and females. The proportion of employed subjects was significantly larger among males (chi-square test, $\chi^2 = 13.216$, $p = 0.000$). 16.2% of the female subjects were housewives, and there were no house-husbands among the male subjects; the rate of subjects who were housewives or house-husbands