

Clinical Characteristics, Precipitating Stressors, and Correlates of Lethality among Suicide Attempters

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Background: Given that suicide attempt is a major risk factor for suicide completion, this study investigated the clinical features, precipitating stressors, and the correlates of lethality in suicide attempters.

Methods: The sample comprised 357 people who had attempted suicide and had been sent to the emergency room in a general hospital from November 2002 to June 2005. Data collection was conducted by a consultant psychiatrist and social worker through interview.

Results: The proportion of females was much higher than that of males. Suicide attempts peaked at 20 to 29 years old in females, and 30 to 39 years old in males. The females reported significantly more family relationship problems than the males, while the males more commonly reported unemployment or economic problems. The most prevalent psychiatric diagnosis was affective disorders. The females had a higher rate of self-poisoning by medication than the males, while the males had a higher rate of self-poisoning by non-medicinal chemicals than the females. Those with high-lethality attempts were older than those with medium- and low-lethality attempts, and more were males.

Conclusion: While females and young adults had higher rates of suicide attempts, males and the elderly were considered at higher risk for suicide completion.
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Key words: suicide attempt, suicide risk factor, suicide lethality, gender, age

Suicide is a prevalent public health issue and among the leading causes of death around the world.⁽¹⁾ It has been estimated that approximately 4.6% of individuals in the United States have made at least one suicide attempt in their lifetime.⁽²⁾ In Taiwan, suicide was the ninth leading cause of death from 1999 to 2006. Due to the high impact of suicide, investigation of this issue for the potential suicide population is important. Factors contributing to

or associated with suicidal behavior have been broadly studied. These findings are crucial since the goals of preventing and treating suicidal behaviors often involve with the associated risk factors.^(3,4) Past studies have demonstrated that gender,^(5,6) age,^(7,8) and marital status^(8,9) are associated with the risk of suicide. Moreover, unemployment,⁽¹⁰⁾ a family history of suicide,⁽¹¹⁾ physical illness or disability, substance abuse, depression, schizophrenia and other mental

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illnesses have also been suggested as contributing factors.^(4,12,13) Besides these variables, a previous suicide attempt is among the best predictors of eventual death by suicide.^(14,15) It was found that the suicide rate among people who had attempted suicide in the subsequent one year was 1%, which was a hundred times higher than in the general population.^(16,17)

The fact that previous suicide attempts can strongly predict completed suicide suggests the necessity for investigating people who have suicide attempts. Nevertheless, previous studies on suicide have often been conducted using community samples.^(2,18,19) Although they have shown several potential risk factors or precipitating factors for suicide, but they may not fully capture its complicated natural course. Investigation of suicide attempts in the clinical setting may help to overcome some of these problems. First, most suicide attempts in these studies had occurred recently; this may reduce the influence of memory bias. Second, the severity of the suicide attempt was shown by the fact that most of the suicide attempters needed hospital admission or emergency care. This group may differ from individuals who merely had suicidal ideation or a suicide plan. Moreover, it is noteworthy that there may be considerable differences between people who have a suicide attempt with a high level of suicidal lethality and those with a low level of suicidal lethality.

A review of the literature revealed a significant gender difference with consistent female predomi-

nance among suicide attempters. Higher rates of suicide were also consistently found among young adults.^(15,20-23) In addition, it is also worth examining precipitating stressors prior to suicidal acts. Are these stressors different from major stressful life events or difficulties? In contrast to a community sample, seeing suicide attempters in a clinical setting provides a more direct avenue to respond to this issue, since most studies using community samples rely on a retrospective survey and run the risk of memory bias. In terms of this issue, Beautrais, Joyce, and Mulder found that the most common precipitants of serious suicide attempts were relationship breakdowns, other interpersonal problems, and financial difficulties.⁽²⁴⁾ They also found that psychiatric comorbidity could significantly predict lethality of suicide behavior among people who attempt suicide.⁽²⁾

In Taiwan, there have not been many studies on suicide attempts in the past decades. Among the four studies that have focused on suicide attempts in emergency settings (Table 1), one focused on the characteristics of patients using acetaminophen overdose,⁽²⁰⁾ and only two examined suicide lethality.^(21,22) Males and elderly subjects were found more likely to have severe suicide lethality, compared to females and young adult groups when severe lethality was defined according to the following six criteria: generalized-anesthesia assisted surgery, unrecoverable injury, admission beyond 24 hours, jumping from

Table 1. Studies of Suicide Attempters in the Emergency Setting

Study	Sample	Male-to-female ratio	Age groups with highest suicide rates	Focus on suicide lethality
Chien-Chih Yin et al, 2002	Only the first suicide was included	1:2	Male, 35-59 (36%); Female, 24-34 (35%) & 35-59 (34%)	Yes
Chen-Huan Chiu et al, 2006	Suicide reports from the TSPC	1:1.69	Male, 20-29 (49.6%); Female, 20-29 (31.6%) & 30-39 (30.2%)	No
Chun-Hung Lin et al, 2006	Suicide reports from the TSPC	1:2.38	Male, 25-44 (40%); Female 25-44 (51.1%)	No
Yu-Ling Huang et al, 2002	Comparing patients with acetaminophen and sedative-hypnotics overdoses	1:2.65	Male, 25-34 Female, 15-24	No

Abbreviation: TSPC: Taiwan Suicide Prevention Center.

high floors, hanging and gunshot.⁽²³⁾ However, there is difficulty in showing the degree of lethality with this definition.

According to a report from the National Statistics of Health and Demography (Department of Health, Executive Yuan, 2006), Keelung had the highest suicide rate in Taiwan, i.e., 28.9 per million people, and has been persistently among those with the highest suicide rates for several years. There is an urgent need to investigate reasons or factors associated with this high prevalence. The purposes of this study were: (A) to describe the subject characteristics and clinical features of suicide attempters in Keelung; (B) to examine the precipitating events before attempted suicide; and (C) to investigate the variables associated with lethality of suicidal behaviors. There is a causal relationship between the lethality of the suicidal act and the severity of the precipitating stressor. It is hypothesized that male suicide attempters show higher lethality than female suicide attempters, and attempters with higher suicide lethality distribute over a certain age population.

METHODS

Sample

Our sample comprised of 357 people who had attempted suicide and had been sent to the emergency room in a general hospital in Keelung from November 2002 to June 2005. The sample consisted of 271 (75.9%) females and 86 (24.1%) males. The mean age was 39.13 years (SD = 15.58), with a range of 14 to 84 years. Among them, 22 (6.2%) people were reported to have more than one attempted suicide during the data collection; only their first suicide attempt was included.

Procedure

Psychiatric assessment was conducted after the patient was examined by the physician in the emergency room. The psychiatric evaluation, which took an hour to complete, was conducted by a resident or attending psychiatrist. A psychiatric diagnosis was made based on the criteria of the *DSM-IV* (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; American Psychiatric Association, 1994). Additionally, a social worker also completed a suicide report form that included information about psychiatric history, suicide meth-

ods, and precipitating stressors prior to the suicide attempt. This supplemental data was provided by available family members through an interview in the emergency room and/or via contact by telephone within 24 hours.

Information on the suicide report form, medical records, and psychiatric assessments were again examined and verified to obtain a set of several variables for further analysis, including suicide methods, degrees of lethality, precipitating factors, psychiatric diagnoses, and medical and psychiatric histories. A coding system was used to reclassify the suicide method and to evaluate the degree of lethality (presented in the next section).

Measures

Precipitating stressors

The precipitating stressors checklist was used to assess any causes relating to suicide, and summarized into twelve main stressors: unemployment, economic distress other than unemployment, couple relationship problems, family relationship problems, other relationship problems, chronic physical illness, substance abuse, occupational stress, academic stress, death of friends or relatives, living alone, and others. The events or difficulties were based on statements by the patient or his/her family members.

Suicide method

The suicide method was coded according to the *ICD-9-CM* (International Classification Disease, Ninth Revision, Clinical Modification; WHO, 1990) criteria for suicide and self-inflicted injury (i.e., E950-E959). These methods were further classified into three categories: poisoning by medication (E950.0-950.5), poisoning by non-medicinal chemicals (E950.6-950.9), and others (E951-959).

Degree of lethality

A six-point Likert scale (1 = *no danger*; to 6 = *extreme*) was used to estimate the degree of lethality for suicidal behavior. This scale was derived from the suicide section of the Chinese version⁽²⁵⁾ of the Diagnostic Interview for Genetic Studies.⁽²⁶⁾ The rating was based on several dimensions, including suicide method, situational characteristics of the rescue, physical consequences of the suicide attempt, and the necessity for medical or surgical intervention.

Statistical analysis

The analysis were conducted using the SPSS V10 package (SPSS In, Chicago, IL). Main statistical analyses were carried out with independent *t*-tests for metric variables and chi-square tests for categorical variables. Spearman correlation analysis was used to examine the correlation between age, gender, precipitating stressor, previous psychiatric treatment, affective disorder, suicide method and suicidal lethality. Meanwhile, chi-square tests were used to examine the associations between gender, age group and suicidal lethality. All tests were two-sided, and the level of significance was set at $p < 0.05$.

RESULTS

Patient and clinical characteristics of sample

There was a higher proportion of females (75.9%) than males (24.1%). However, no significant age difference was found between the males ($M = 39.49 \pm 16.72$) and females ($M = 39.01 \pm 15.22$), ($t = 0.81, ns$). To further explore the gender differences in the age distribution of the suicide attempts, the age variable was regrouped into seven groups; less than 19 yrs, 20 to 29 yrs, 30 to 39 yrs, 40 to 49 yrs, 50 to 59 yrs, 60 to 69 yrs, and more than 70 yrs. As can be seen in Table 2, suicides peaked at 20 to 29 years old (29.5%) in females and 30 to 39 years old (32.6%) in males. There was however no significant difference in age distribution of suicide attempts between males and females.

In our sample, 60.8% completed a psychiatric assessment. The percentages of affective disorder, adjustment disorder, schizophrenia, drug dependence, and delirium were 63.8%, 23.5%, 10.8%, 0.9%, 0.9%, respectively. In addition, 44.3% had received previous psychiatric treatment.

Precipitating stressors

Information about the precipitating stressors of suicide attempts could not be obtained from 115 (32.2%) individuals due to poor communication and clinical condition, such as consciousness disturbance, emotional instability, and refusal. To avoid overestimation in the analysis on stressors, only those who could provide information on stressors were included for further analysis (i.e., $n = 242$). These patients did not significantly differ in age or gender from those individuals who did not have this

Table 2. Gender Comparison for Age Group, Precipitating Stressors, and Suicide Methods

Variables	Male	Female	<i>p</i> -value
Age group (%)	(n = 86)	(n = 271)	
Less than 19 yrs	3.5	2.6	.565
20 – 29 yrs	27.9	29.5	
30 – 39 yrs	32.6	26.1	
40 – 49 yrs	11.6	20.1	
50 – 59 yrs	9.3	10.1	
60 – 69 yrs	7.0	6.3	
More than 70 yrs	8.1	5.2	
Precipitating stressors (%)*	(n = 51)	(n = 191)	
Unemployment or economic problems	25.5	7.3	< .005
Couple relationship problems	17.6	22.0	
Family relationship problems	19.6	37.2	
Chronic physical illness	9.8	15.7	
Substance abuse	9.8	3.7	
Stress from job or school	5.9	6.3	
Others	11.8	7.9	
Suicide method (%)	(n = 86)	(n = 271)	
Poisoning by medication	63.9	79.9	< .01
Poisoning by non-medicinal chemicals	20.5	9.8	
Others	15.7	10.2	

*: This information could not be obtained from 115 individuals and the remaining were 242 individuals.

information. The most common precipitating stressors for suicide attempts in our sample accordingly were family relationship problems (33.5%), followed by couple relationship problems (21.1%), chronic physical illness (14.5%), unemployment (7.0%), substance abuse (5.0%), occupational stress (4.5%), economic distress (4.1%), death of friends or relatives (2.5%), academic stress (1.7%), and other relationship problems (0.4%).

The precipitating stressors for suicide attempts could be regrouped into 7 categories, unemployment or economic problems ($n = 27$; 11.2%), couple relationship problems ($n = 51$; 21.1%), family relationship problems ($n = 81$; 33.5%), chronic physical illness ($n = 35$; 14.5%), substance abuse ($n = 12$; 5.0%), stress from job or school ($n = 15$; 6.2%), and

others ($n = 21$; 8.7%). As seen in Table 2, there were significant gender differences in the precipitating stressors among the suicide attempters, ($\chi^2 (65) = 28.24, p < .005$), and females reported significantly more family relationship problems than males, while males more commonly reported unemployment or economic problems. Furthermore, males more commonly reported substance abuse than females.

Suicide methods

The most common suicide methods used were poisoning by medication (76.1%), followed by poisoning by non-medicinal chemicals (12.4%), and others (11.5%). As shown in Table 2, there were significant gender differences in the method of suicide attempts. Females had a higher rate of poisoning by medication than males, while males had a higher rate of poisoning by non-medicinal chemicals than females.

Correlates of suicide lethality

The assessment of lethality of the suicide attempts could not be obtained in 50 individuals due to incomplete data. Based on the results of the suicidal lethality rating scale, assessment of the lethality of suicide attempts in our sample was as follows: no danger ($n = 4$; 1.3%), minimal risk ($n = 11$; 3.5%), mild risk ($n = 100$; 32.6%), moderate risk ($n = 147$; 47.9%), severe risk ($n = 35$; 11.4%), and extreme risk ($n = 10$; 3.3%). For further examination of the association between suicide lethality and other variables, suicide lethality was regrouped into high (scores 5 to 6), medium (score 4), and low levels (scores 1 to 3). It was found that suicide lethality was significantly associated with age ($r = .22, p < 0.001$) or age group ($\chi^2 = 23.87, df = 12, p < 0.05$) and gender ($\chi^2 = 14.57, df = 2, p < 0.001$).

As shown in Table 3, there was a significant difference in age group between lethality levels, ($F (2, 304) = 10.76, p < 0.001$). Using the post Tukey test, it was found that those who had high lethality suicide attempts were significantly older than those who had low or medium lethality attempts. Further examination showed that the percentage of young adults was higher in the low and medium lethality levels than in the high lethality level. On the contrary, the percentage of elderly was higher in the high lethality level than in the low and medium lethality levels.

There were significantly more females with

medium lethality levels than males (51.3% vs 37.3%). On the contrary, the proportion of males with high lethality levels was significantly higher than that of females (28.0% vs 10.3%). Considering the clinical variables, suicide lethality did not differ between those with previous psychiatric treatment or a diagnosis of mood episode on psychiatric consultation. There was no significant correlation among suicide lethality and any precipitating factor, but there were significant differences in suicide method among different suicide lethality levels. As expected, there were more suicide attempts involving poisoning by non-medical chemicals than by medication in the high lethality level.

DISCUSSION

The present study investigated the clinical characteristics and precipitating stressors of suicide attempters in an emergency room. Our findings revealed that the female to male ratio among the suicide attempters was 3.15, which was a little higher than in the findings of Welch.⁽¹⁸⁾ It was found that females had a higher rate of poisoning by drugs while males had a higher rate of poisoning by non-medicinal chemicals. Furthermore, females had a significantly higher proportion of moderate risk suicide attempts, but males had a significantly higher proportion of severe risk suicide attempts. This is not surprising since males tend to use more violent methods for suicides in more risky situations than females. The more violent suicides in males could be accounted for by greater suicidal intent, aggression, knowledge regarding violent means and less concern about bodily disfigurement.⁽⁶⁾ The age of 20-39 years which showed the highest rate of suicide attempts was similar to reports worldwide.⁽¹⁸⁾

This study also found that 63.9% of our sample could identify their precipitating stressors. However, it is inadequate to assume that the remaining one-third did not experience any stressor before a suicide attempt. We suggest that the latter group is better described as attempters whose life stressor was "unclear or difficult to address". It was hard to specify whether the relevant information was insufficient, or whether stressful events do not necessarily precede suicide behavior. For example, some attempters were unconscious when admitted to the emergency room because of drug intoxication. This condition

Table 3. Comparison between High, Medium, and Low Lethality Groups

Variables	Lethality of Suicide Attempt			<i>p</i> -value
	Low (<i>n</i> = 115)	Medium (<i>n</i> = 147)	High (<i>n</i> = 45)	
Gender (%)				
Male	34.7	37.3	28.0	< .001
Female	38.4	51.3	10.3	
Age (in years)				
M	36.90	38.32	48.69	< .001
SD	14.23	14.37	18.00	
Age group (%)				
Less than 19 yrs	2.6	2.7	0.0	< .05
20 – 29 yrs	34.8	29.3	17.8	
30 – 39 yrs	26.1	28.6	22.2	
40 – 49 yrs	20.0	19.0	15.6	
50 – 59 yrs	7.8	10.9	11.1	
60 – 69 yrs	5.2	5.4	17.8	
More than 70 yrs	3.5	4.1	15.6	
Previous psychiatric treatment (%)				
Yes	30.1	39.1	38.1	.307
Affective disorder (%)				
Yes	55.6	69.9	55.6	.099
Precipitating stressors (%)				
Unemployment or economic problems	8.9	11.1	20.0	.452
Couple relationship problems	20.3	18.2	20.0	
Family relationship problems	39.2	32.3	23.3	
Chronic physical illness	8.9	20.2	16.7	
Substance abuse	5.1	4.0	10.0	
Stress from job or school	8.9	4.0	3.3	
Others	8.9	10.1	6.7	
Suicide method (%)				
Poisoning by medication	79.3	87.5	25.6	< .001
Poisoning by chemicals	9.0	6.3	48.8	
Others	11.7	6.3	25.6	

impeded immediate assessment. In addition, some attempters could not specifically relate their suicidal behavior to any previous stressors or specific events. This might be because of poor cognitive ability or unconscious denial. It is likely that our results underestimated the actual rate of suicide attempters with precipitating stressors. In general, our findings are quite consistent with those of previous studies. This

indicates that among the adolescent group, around one third to one half of people who attempted suicide could not identify a precipitating event for the suicide attempt.^(24,27,28) The precipitating stressor most often reported was relationship problems, with females reporting more family relationship problems, while males reported more unemployment problems. The difference reflects the traditional gender roles

and expectations in the general East Asian culture. Since our study did not have a control or comparison group for occupation, marital status, living status, economic status and education, this assumption could not be confirmed and needs to be examined. Although the precipitating stressors for the suicide attempt are essentially psychosocial, they may be also caused or aggravated by previous existing psychiatric conditions.⁽¹³⁾

Affective disorders (including major depressive disorder, dysthymic disorder, and bipolar disorder) were found to be the most prevalent diagnoses, accounting for 63.8% of patients in this sample, followed by adjustment disorder. Cheng's study of suicide in eastern Taiwan found that a high proportion (98.3%) of suicidal individuals suffered from mental illness before committing suicide, and the most prevalent psychiatric disorders were depression and alcoholism.^(12,13) Alcohol use disorders accounted for a significant proportion of patients in Cheng's study (44%), but this factor was relatively low in this study (5.3%). A methodological deficit may be responsible for this because we did not use structured interviews for diagnosis and therefore may have underestimated the comorbidity.

It is crucial to consider the role of suicide lethality. While determining the disposition of suicidal individuals in the emergency room, their suicide intent, suicide lethality, and support system are often considered. In general, the suicide method seems concrete, objective and easily recognizable. However, the context or situation of the suicidal behavior, and accurate expectations of the lethality of the attempt also play important roles in the physical consequences of suicide behaviors. Typically, lethality refers to the medical or biological danger to life,⁽²⁹⁾ specifically, the potential for death associated with the means used to attempt suicide.⁽³⁰⁾ However, the ratings of the suicide lethality in this study were done retrospectively instead of on site. Several studies have reported low correlations between suicidal intent and medical lethality in attempted suicide except for those with accurate expectations of fatal outcomes.^(31,32) Both suicide intent and lethality are independent dimensions of suicide attempt behavior.⁽³²⁾

No significant correlation was found among suicide lethality and any precipitating factor. The assumptions that a higher percentage of suicide

attempters with high lethality were males and from a certain age population were proven. Our results were consistent with the findings of Yin et al.⁽²³⁾ In that study, the characteristics of groups with a high level of suicide lethality were similar to those with suicide completion, both for gender or age. Previous studies have reported a male predominance in completed suicides and a female predominance in attempted suicides. It is also generally stated that elderly subjects tend to have a higher likelihood of completing suicide than younger subjects,⁽⁴⁾ and the clinical and sociodemographic factors associated with elderly attempters closely resemble those associated with elderly completers.⁽³³⁾ The long-term risk of suicide in people who performed potentially lethal attempts appears to be higher than in those who have reported attempted suicide in general. In a five-year follow up study, Rosen reported that those who had had a serious suicide attempt showed a suicide rate twice that of others.⁽³⁴⁾ Beautrais followed up on 302 individuals who had made serious suicide attempts and found that over one third had made a further suicide attempt and 7% had died by suicide within 5 years.⁽³⁵⁾ It is reasonable that the group with potentially fatal suicide attempts may be closer to the group with suicide completion, which may be seen as a distinct group. Although females and young adults had the highest rates of attempted suicide, males and the elderly were probably considered at high risk of suicide completion.⁽²³⁾

This study has certain limitations that should be addressed. First, our sample was mainly comprised of suicide attempters in an emergency room. It has been estimated that only one in every four attempts (24.3%) leads to contact with professional health services.⁽¹⁴⁾ Thus, the current results may have somewhat limited generalization to overall suicidal individuals. From an epidemiological standpoint, the approach used in the current study excluded people who did not seek medical treatment.⁽¹⁸⁾ Moreover, our sample mainly consisted of people whose suicide lethality mainly ranged from mild to moderate, because they were admitted to the emergency room. Those without risky or extremely lethal attempts may not have been sent to the hospital. Second, we did not perform a standardized structured interview. The prevalence rate of psychiatric disorders was thus probably underestimated. This is somewhat inevitable due to the nature of our sample. In addi-

tion, some patient data, such as occupation and marital status, were not collected. Nevertheless, this is the first study that investigated the clinical characteristics, precipitating stressors, and correlates of lethality among suicide attempters in Taiwan. In Keelung, in northern Taiwan, there are four general hospitals with emergency rooms, and only two of them offer emergency psychiatric services. To the best of our knowledge, during the period of data collection, most suicidal patients in Keelung were sent to one of the two local general hospitals according to the administrative area. Our sample was taken from one of the areas with the highest suicide rates in Taiwan and thus the implications are important to the study of suicide epidemiology in Taiwan.

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自殺企圖者之臨床特徵、誘發壓力及致命相關因子探討

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背景： 自殺企圖是自殺死亡之重要危險因子。此研究目的在探討急診自殺企圖個案之臨床特徵、誘發壓力及自殺致命性之相關因子。

方法： 樣本為某所區域綜合醫院急診之自殺企圖個案共 357 人。其中 22 位為重複企圖自殺者，但惟首次自殺通報被納入統計。收案期間為民國 90 年 6 月至 94 年 9 月。

結果： 基本人口統計變項方面，男性佔 24.1%，女性佔 75.9%，女性比例為男性的 3.1 倍，有顯著差異。男性以 30 至 39 歲年齡組別所佔百分比最高 (32.6%)，女性則以 20 至 29 歲所佔百分比最高 (29.5%)；但男女在年齡上無顯著差異。在自訴誘發壓力方面，整體以關係問題比率最高；其中女性主訴家庭關係問題的比例高於男性，而男性主訴失業的比例高於女性。照會評估後的精神疾病診斷，以情感性疾患 (63.8%) 最多。自殺前曾至精神科就醫者為 44.3%；自殺行為後一個月內至精神科就醫為 43.4%。在自殺方式的比例上，以服藥過量最多 (76.1%)。進一步探討自殺方式分佈，性別差異主要發生在服藥過量 (女性 79.9% 高於男性 63.9%)，與服用非藥物之化學物質 (男性 20.5% 高於女性 9.8%)。另外，在自殺行為導致的致命性評估方面，以輕度 (27.7%) 至中度 (40.8%) 危險性的比率最多。進一步檢視致命性程度，女性於低至中度程度較多，而男性的比例隨著致命性程度升高有增加的傾向；高致命性程度者明顯比中低致命性層級者年齡層要高。

結論： 自殺企圖者的性別與誘發壓力、自殺方式及自殺行為致命性相關。自殺致命性程度則與年齡有顯著相關。雖然女性與年輕成人在自殺企圖者所佔比例最高，男性與老年人可能需被考慮為接近自殺死亡者的高危險群。
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關鍵詞： 自殺企圖，自殺危險因子，自殺致命性，性別，年齡

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