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**Characteristics of Patients Who Visit the
Emergency Department with Self-Inflicted
Injury**

by

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Major in Medicine

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**A Dissertation Submitted to The Graduate School of
Ajou University in Partial Fulfillment of the Requirements
for the Degree of Doctor of Medicine**

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Characteristics of Patients Who Visit the Emergency Department with Self-Inflicted Injury

During visits to emergency medical facilities, the primary care of and risk identification for individuals who have attempted suicide is considered an important element in suicide prevention. With the ultimate goal of helping to prevent suicide, the aim of the present study was to determine the characteristics of patients with self-inflicted injuries who presented in the emergency department. Patients with self-inflicted injuries who visited 1 of 3 sentinel emergency medical centers from 2007 through 2009 were included in the study. The characteristics, methods, and reasons for suicide attempts were evaluated. Moreover, predictors of severe outcomes were evaluated. A total of 2,996 patients with self-inflicted injuries visited the three centers during a period of 3 years. The male-to-female suicide ratio was 1:1.38 ($P < 0.001$). The mean age was 41 years. Poisoning was the most common method of self-inflicted injury (68.7%) among all age groups. Medication was the primary means of injury in the < 50 age group, and the use of agricultural chemicals was the primary means in the ≥ 50 age group. The reasons for attempting suicide varied among the age groups. The predictors of severe outcome were male gender, older age, and not having consumed alcohol.

Keyword: Suicide, Attempted, Suicidal Ideation, Emergency

TABLE OF CONTENTS

ABSTRACT	i
TABLE OF CONTENTS	ii
LIST OF FIGURES	iii
LIST OF TABLES	iv
I . INTRODUCTION	1
II . MATERIALS AND METHODS	4
III. RESULTS	7
A. General characteristics	7
B. Method of self-inflicted injury	8
C. Reasons for suicide attempts	8
D. Outcome of injury treatment	12
E. Predictors of severe outcome	13
IV. DISCUSSION	16
V . CONCLUSION	22
REFERENECS	24
국문요약	32

LIST OF FIGURES

Fig. 1. Summary of treatment outcomes among the patients who visited an emergency department with a self-inflicted injury 12



LIST OF TABLES

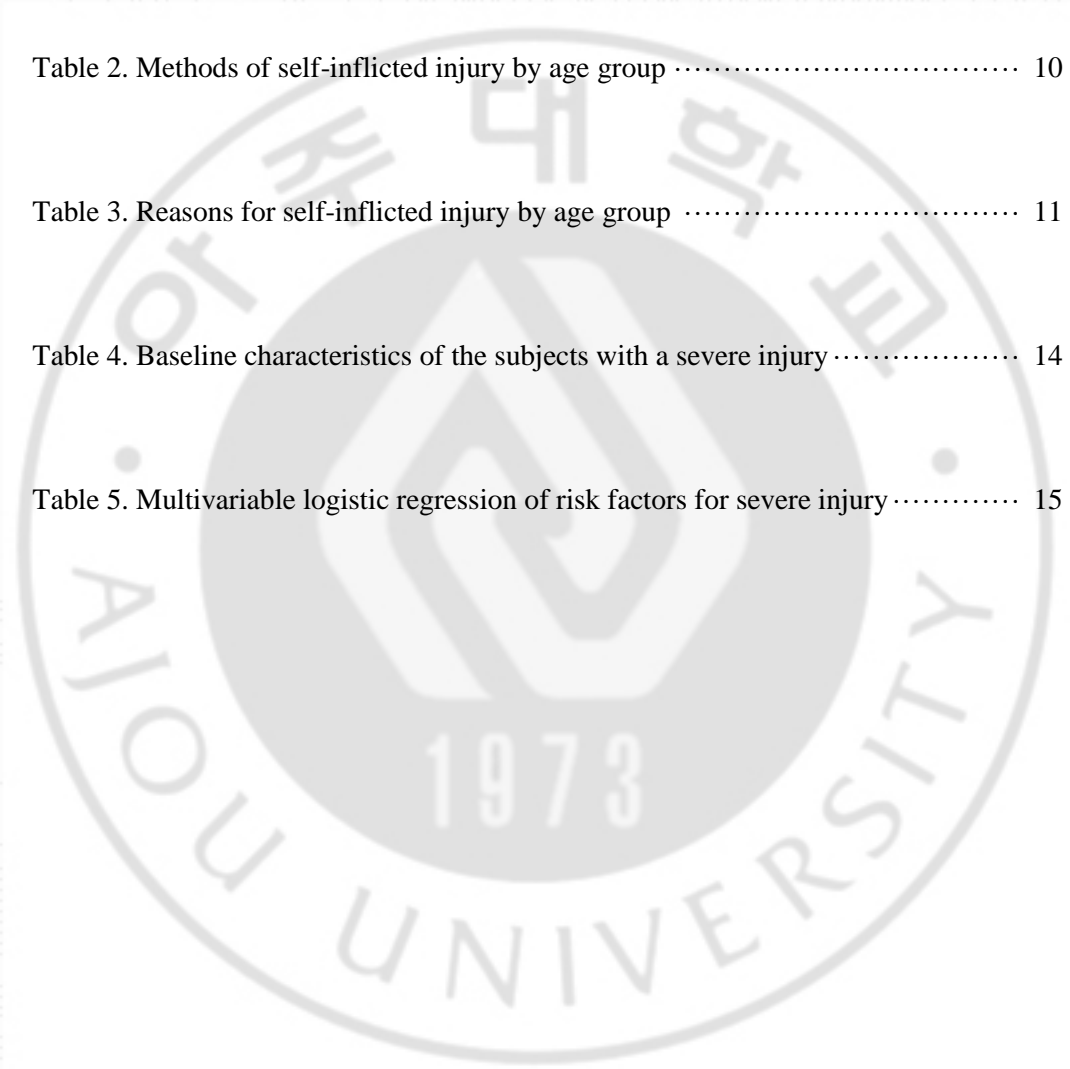
Table 1. The demographic characteristics of the patients with a self-inflicted injury .. 9

Table 2. Methods of self-inflicted injury by age group 10

Table 3. Reasons for self-inflicted injury by age group 11

Table 4. Baseline characteristics of the subjects with a severe injury 14

Table 5. Multivariable logistic regression of risk factors for severe injury 15



I. INTRODUCTION

Suicide is an act with a fatal outcome that is deliberately initiated and performed by the person himself or herself in the knowledge, or expectation, of its fatal outcome (WHO, 1994). The Centers for Disease Control and Prevention defined a suicide attempt as a non-fatal, self-directed, and potentially injurious behavior with an intent to die as a result of the behavior. Suicidal ideation is defined as thinking about, considering, or planning suicide.

The global estimated annual rate of mortality by committing suicide is 14.5 deaths per 100,000 people, which is equivalent to one death every 40 seconds (Krug et al, 2002). Self-inflicted death accounts for 1.5% of all deaths and is the tenth leading cause of death worldwide (Levi et al, 2003).

Although there is some variability among reported suicide rates, depending on the source of the data, reports published in 2009 by the Organization for Economic Cooperation and Development (OECD) Social Indicators indicated that Korea has the highest suicide rate, with 28.4 deaths per 100,000 people among the member states of the OECD (OECD, 2010). In the past two decades, the suicide rate in Korea has sharply increased. The National Statistical Office of Korea (the Statistics Korea) reported that the suicide rate was 9.20 deaths per 100,000 people in 1988 and had increased to 24.7 deaths per 100,000 people by 2009 (Statistics Korea, 2010).

Suicide affects not only the person who commits it but also his/her family. Bailley et al. reported that suicide survivors (persons who have experienced suicide by someone close to them) perceived stigmatization and shame, which set them apart from those who mourned non-suicidal deaths (Bailley et al, 1999).

Barrett and Scott identified four types of reactions of suicide survivors (Barrett and Scott, 1990). The first type is grief, a normal reaction to losing a family member. It may include somatic symptoms, hopelessness, anger, guilt, loss of social support, and self-destructive behavior. The second type of reaction to a death other than by natural causes and perceived as having been avoidable includes feeling stigmatized and shamed by the death, feeling abandoned by the deceased, and perceiving the death as preventable. The third type includes grief reactions to the shock and pain of experiencing a sudden death, regardless of its cause. Finally, the fourth type is a result of the additional trauma of dealing with the suicidal nature of the death, and includes feeling rejected by the deceased, feeling embarrassed over the mode of the death, wondering about the reason of the deceased for not wanting to live anymore, feeling as if the deceased wanted to somehow get even with the survivor by dying, and concealing the suicide. Suicide survivors consistently experience more grief reactions than other death survivors, including depression, serious personality disturbances, and obsession with suicide as the predestined fate for oneself, especially on the anniversary of the suicide or when the suicide survivor reaches the same age as that of the person who committed the suicide when he performed the fatal act (Hoff, 1989).

The tragic effect of a suicide is particularly striking in the youth after a parent's suicide. Child survivors have shown learning disabilities, sleepwalking, delinquency, and commission of arson (Cain and East, 1972). Suicide can lead to another suicide. Several literatures have reported that suicide contagion is also referred to as imitative, copycat, or mass cluster suicide. Although the media is only one feature of the social environment (Schmidtke et al., 1989) and its influence is perhaps slighter than that of other psychosocial risk factors of suicide (Velting et al., 1997), it is a significant agent of the social construction

of reality, especially for vulnerable persons (Sisask M. et al., 2012). Suicide also imposes an economic burden. In the United States, the total lifetime cost of self-inflicted injuries in 2000 was approximately \$33 billion. This includes \$1 billion for medical treatment and \$32 billion for lost productivity (Corso et al., 2007).

Previous studies regarding suicide have shown that a history of a previous suicide attempt is a key risk factor for a successful suicide (Robins et al, 1959; Rosenberg et al, 1988; Cavanagh et al, 2003). Owens et al. reported a strong link between self-injury and suicide; in a 9-year follow-up period, 3%-12% of patients who had previously harmed themselves subsequently committed suicide (Owens et al, 2002). The study also reported that a suicide attempt is common after self-harm. Suicide is important to emergency physicians because of the need for medical treatment, arranging psychiatric services, and subsequent psychiatric intervention. Thus, in emergency medical facilities, the identification and primary care of patients who have made previously attempted suicide are important components of suicide prevention.

The aim of the present study was to determine the characteristics of patients with self-inflicted injuries in the emergency department and the predictors of severe outcome to help prevent future suicide.

II. MATERIALS AND METHODS

A cross-sectional, retrospective study was conducted. This study included self-inflicted injury cases of visits to the emergency department (ED) in 3 sentinel hospitals from January 2007 through December 2009. Data from all patients were retrieved from the Korea Center for Disease Control and Prevention (KCDC) and the National Emergency Medical Center (NEMC).

The National Emergency Department Information System (NEDIS) of the NEMC is similar to the National Electronic Injury Surveillance System (NEISS) in the United States (Centers for Disease Control and Prevention, 2001). The NEDIS is a near real-time system that draws information regarding each patient who visits any 1 of 125 EDs. Core data such as the patient's name, age, gender, intentionality, activity at the scene, injury location, and injury mechanism are collected for each patient with an injury.

Since 2006, the KCDC has been conducting in-depth sentinel surveillance in EDs of 6 injury types since 2006, including the following injuries: motor vehicle crashes, brain or vertebral injuries, pre-school child injuries, suicide injuries, falling injuries in the elderly, and poisoning injuries.

The EDs of Ajou University Hospital, Ehwa Women's University Mokdong Hospital, and Chosun University Hospital participate in the in-depth surveillance of suicide, poisoning, and falling injuries. These 3 emergency departments have approximately 25,000-85,000 patients annually, and more than 20% of the entire patient population consists of injury cases. Based on the International Classification of External Causes of Injury (ICECI) (WHO, 2004), a supplementary dataset of self-inflicted injuries was collected and consisted of the

mechanism of the injury, the objects/substances that were used to produce the injury, the location of the injury, the intention, and the use of alcohol.

All of the patients were grouped into the following age categories: 19 years of age and younger, 20 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years, and 60 years and older. All of the patients with a self-inflicted injury were interviewed by emergency physicians or psychiatrists who determined whether the patients had a genuine suicidal intention or had merely behaved impulsively. In cases of hemodynamic or mental instability, information regarding the patient was obtained from the family or caregiver. We defined the "severe injury" group as patients who required emergency surgery, who were admitted to the intensive care unit, who were transferred to another hospital for specialized care or who were either dead on arrival or died within 3 days of being admitted to the hospital.

Data regarding the following descriptive characteristics were collected: age, gender, means of transportation to the ED, location of the injury, history of previous suicide attempts, and treatment outcome. The mechanism of the injury, the objects/substances that were used to inflict the injury, the location of the injury, suicide intent, and alcohol consumption were evaluated based on the ICECI (WHO, 2004).

A statistical analysis was conducted using SPSS 18.0 for Windows (SPSS Inc., Chicago, IL, USA). Descriptive analyses were performed to evaluate the general characteristics of the patients. Student's t-tests were used to analyze the continuous variables, and chi-square tests were used to analyze the categorical variables. A multiple logistic regression analysis was performed to determine the factors that could be considered independent predictors of severe outcomes, and a forward stepwise method by likelihood ratio test was used. We constructed a multivariate model using variables that were selected from the univariate analysis,

including gender, alcohol consumption, age, history of previous suicide attempts and injury severity. In all cases, differences with $P < 0.05$ were considered to be significant.



III. RESULTS

A. General characteristics

During 36 months of the study period (January 2007 through December 2009), a total of 125,288 patients with injuries visited the EDs of Ajou University Hospital, Ehwa Women's University Mokdong Hospital, and Chosun University Hospital. Of these patients, 2,996 (2.4%) had a self-inflicted injury. The male-to-female ratio was 1 (1,259 subjects):1.38 (1,737 subjects). The patients ranged in age from 12 to 95 years, with a mean \pm SD age of 41.29 ± 17.61 years.

Among the 2,996 patients in the study, 2,539 patients (84.7%) were injured in a residential setting, which included their homes or other residential area. Sports and athletic locations were the second-most common area (233 patients, or 7.8%), and this was followed by transportation-related areas such as roadways, sidewalks, cycling areas, or other public highways (157 subjects, or 5.2%).

A total of 1,389 patients (46.4%) arrived at the ED by public emergency medical services, and 630 patients (21.1%) used private medical emergency services. Nine hundred and sixteen patients (30.6%) used individual transportation such as a private car, public transportation or walking.

A total of 1,312 patients (43.8%) had consumed alcohol. A total of 432 patients (14.4%) refused to indicate whether they were under the influence of alcohol.

Two thousand, seven hundred thirty one (2,731) patients (91.2%) attempted suicide with intention, and 264 patients had induced self-inflicted injuries without real suicidal intention. Of the patients with suicidal intention, 435 patients (16.3%) had a history of a

previous suicide attempt. Fifty-seven subjects refused to reply. Two hundred and seventy-two patients had a previous psychiatric consultation (10.0%; Table 1).

B. Method of self-inflicted injury

Poisoning was the most common method of self-inflicted injury among all of the age groups, accounting for a total of 2,059 patients (68.8%). Medication was the principal method of poisoning among patients over the age of 50 years, and the use of an agricultural chemical was another primary method in the ≥ 50 years age group. Cutting or stabbing was the second-most common method of self-inflicted injury in the < 60 years age group, and hanging (45 patients, 9.1%) was the second-most common method in the ≥ 60 years age group. The third-most common method in the < 20 years age group was jumping to fall (19 patients, 6.8%; Table 2).

C. Reasons for suicide attempts

We evaluated the reasons for attempting suicide in the 2,731 subjects who expressed genuine suicidal intentions. The reasons varied among the age groups. “Conflict with parents” was a major reason for suicide attempt (70 patients, or 28.7%) and “conflict with friends” was the second-most common reason (34 patients, 13.9%) in the < 20 years age group. In the 20 to 59 years age group, “Conflict with spouse or lover” was the most common reason, followed by “depression”. “Financial problems” was the third most-common reason in the 40 to 59 years age group. “Medical illness” was the most-common reason in the ≥ 60 years age group (130 patients, 27.1%; Table 3).

Table 1. The demographic characteristics of the patients with a self-inflicted injury

Parameters		No. (%) (n = 2,996)
Gender	Female	1,737 (58.0)
	Male	1,259 (42.0)
Age (years)		41.29 ± 17.61*
	10-19	279 (9.3)
	20-29	597 (19.9)
	30-39	658 (22.0)
	40-49	626 (20.9)
	50-59	341 (11.4)
	60+	495 (16.5)
Location of injury	Residential area	2,539 (84.7)
	Sports and athletic locations	233 (7.8)
	Transportation areas	157 (5.2)
	School and educational areas	20 (0.7)
	Industrial or construction areas	12 (0.4)
	Other	35 (1.2)
Transportation to Emergency department	Public emergency medical services	1,389 (46.4)
	Private emergency medical services	620 (20.7)
	Individual transportation	918 (30.6)
	Other	69 (2.3)
Consumption of alcohol [†]	Yes	1,312 (51.2)
Suicidal intent	Yes	2,731 (91.2)
Previous suicide attempts [‡]	Yes	435 (16.3)
	Once	310 (11.6)
	Twice	63 (2.4)
	Three times or more	62 (2.3)
Previous psychiatric consult [§]	Yes	272 (10.0)

* mean ± SD; [†]432 subjects refused to mention whether they had consumed alcohol (n=2,564);

[‡]Subjects include suicidal attempters, except for those who refused to answer the questions (n=2,675);

[§]Subjects with the intent to commit suicide were included (n=2,731)

Table 2. Methods of self-inflicted injury by age group

Method	Age (years)													
	10-19		20-29		30-39		40-49		50-59		60+		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Poisoning	176	63.1	337	56.4	428	65.1	457	73.1	261	76.5	400	80.9	2059	68.8
Medicine	143	(81.3)*	258	(76.6)*	296	(69.2)*	277	(60.6)*	111	(42.5)*	123	(30.8)*	1208	(58.7)*
Pesticides	10	(5.7)*	26	(7.7)*	69	(16.1)*	119	(26.0)*	114	(43.7)*	239	(59.8)*	577	(28.0)*
Corrosive substances	14	(8.0)*	25	(7.4)*	41	(9.6)*	48	(10.5)*	31	(11.9)*	23	(5.8)*	182	(8.8)*
Carbon monoxide	5	(2.8)*	26	(7.7)*	21	(4.9)*	11	(2.4)*	4	(1.5)*	12	(3.0)*	79	(3.8)*
Other poisoning	4	(2.3)*	2	(0.6)*	1	(0.2)*	2	(0.4)*	1	(0.4)*	3	(0.8)*	13	(0.6)*
Cutting/stabbing	60	21.5	158	26.5	133	20.2	85	13.6	31	9.1	22	4.4	489	16.3
Hanging	8	2.9	32	5.4	41	6.2	41	6.5	24	7.0	45	9.1	191	6.4
Jumping	19	6.8	11	1.8	24	3.6	9	1.4	7	2.1	21	4.2	91	3.0
Others	16	5.7	59	9.9	32	4.9	34	5.4	18	5.3	7	1.4	166	5.5
Total	279	100.0	597	100.0	658	100.0	626	100.0	341	100.0	495	100.0	2996	100.0

*Numbers in parentheses represent the percentage of causes in poisoning patients.

Table 3. Reasons for self-inflicted injury by age group

Reason	Age (years)													
	10-19		20-29		30-39		40-49		50-59		60+		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Conflict with														
Spouse or lover	17	7.0	164	32.7	252	42.1	235	40.6	89	27.1	59	12.3	816	29.9
Parents	70	28.7	54	10.8	21	3.5	12	2.1	3	0.9	0	0.0	160	5.9
Children	0	0.0	1	0.2	8	1.3	24	4.1	10	3.0	50	10.4	93	3.4
Friends	34	13.9	13	2.6	3	0.5	4	0.7	0	0.0	2	0.4	56	2.1
Others	7	2.9	14	2.8	17	2.8	14	2.4	15	4.6	16	3.3	83	3.0
Medical illness of														
Oneself	4	1.6	10	2.0	15	2.5	19	3.3	24	7.3	130	27.1	202	7.4
Others	2	0.8	2	0.4	3	0.5	1	0.2	1	0.3	8	1.7	17	0.6
Psychiatric disease														
Depression	24	9.8	59	11.8	84	14.0	62	10.7	39	11.9	62	12.9	330	12.1
Others	9	3.7	33	6.6	37	6.2	35	6.0	17	5.2	18	3.8	149	5.5
Death of someone	0	0.0	5	1.0	8	1.3	7	1.2	6	1.8	11	2.3	37	1.4
Tasks at workplace or school	20	8.2	33	6.6	23	3.8	17	2.9	14	4.3	3	0.6	110	4.0
Financial problems	1	0.4	20	4.0	34	5.7	47	8.1	25	7.6	17	3.5	144	5.3
Others	56	23.0	94	18.7	94	15.7	102	17.6	85	25.9	103	21.5	534	19.6
Total	244	100.0	502	100.0	599	100.0	579	100.0	328	100.0	479	100.0	2731	100.0

D. Outcome of injury treatment

Nine hundred and eighty-four (984) patients (32.8%) recovered fully after treatment. One thousand, two hundred and thirty-five (1,235) patients (41.2%) were admitted to the hospital. Among these admitted patients, 504 patients (16.8%) were admitted to an intensive care unit, and 418 patients (14.0%) were admitted to a general ward without undergoing surgery. Seventy-five subjects underwent an emergency operation. A total of 238 subjects (7.9%) were transferred to another hospital, and 40 patients (1.3%) required special care such as hyperbaric oxygen administration therapy, hemoperfusion or hemodialysis, or an operations performed by a specialists. A total of 207 subjects (6.9%) died either before or after receiving emergency care (Fig. 1).

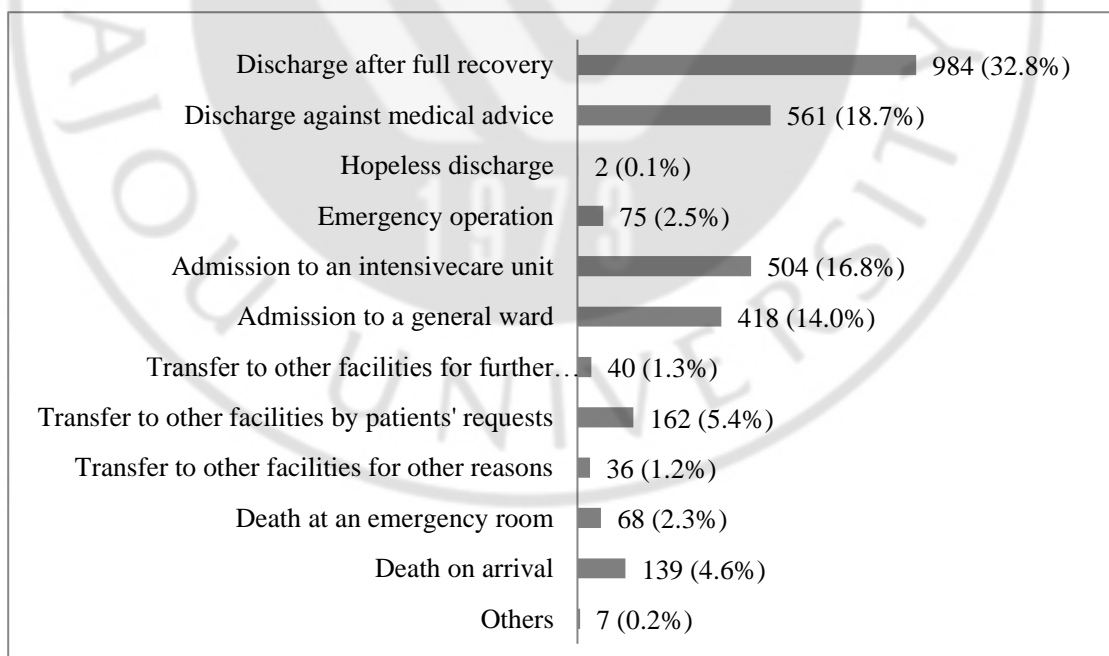


Fig. 1. Summary of treatment outcomes among the patients who visited an emergency department with a self-inflicted injury.

E. Predictors of severe outcome

The univariate analysis revealed statistically significant relationships between injury severity and gender ($P < 0.001$), age ($P < 0.001$), alcohol drinking ($P < 0.001$), and a history of a previous suicide attempt ($P = 0.024$; Table 4). In a multivariate logistic analysis, the predictors of a severe outcome were male gender (OR, 1.65; 95% CI, 1.34-2.02), old age (OR, 8.00; 95% CI, 5.10-12.5), and having consumed no alcohol (OR, 1.48; 95% CI, 1.21-1.81; $P < 0.001$; Table 5).

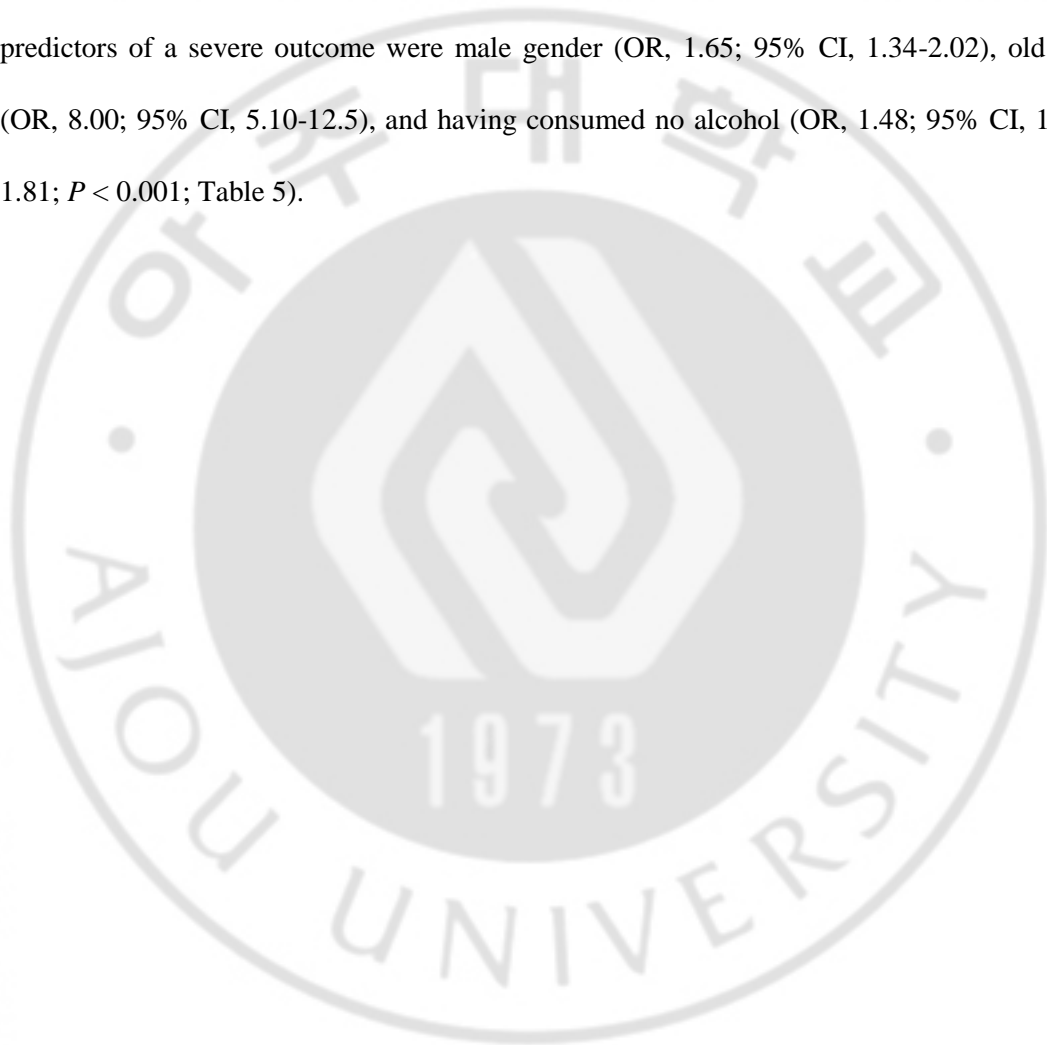


Table 4. Baseline characteristics of the subjects with a severe injury

Parameters	Severity		χ^2	P-value
	Not severe	Severe		
Gender				
Male	827	432	48.40	< 0.001
Female	1,341	396		
Age				
10-19	242	37	261.11	< 0.001
20-29	489	108		
30-39	517	141		
40-49	472	154		
50-59	224	117		
60+	224	271		
Previous psychiatric consult*				
Yes	1,728	731	1.55	0.233
No	201	71		
Previous suicide attempt [†]				
Yes	329	106	5.19	0.024
No	1,573	667		
Consumption of alcohol [‡]				
Yes	939	373	14.55	< 0.001
No	978	274		

*Subjects with the intent to commit suicide were included (n=2,731); [†]Subjects include suicide attempters, except for those who refused to answer (n=2,675); [‡]432 subjects refused to indicate whether they had consumed alcohol (n=2,564).

Table 5. Multivariable logistic regression of risk factors for severe injury

Variables	B	S.E.	Wals	OR	95% CI		P-value
					Inferior	Superior	
Gender, Female	-0.499	0.104	23.025	0.607	0.495	0.744	0.000
Consumption of alcohol	-0.392	0.104	14.146	0.676	0.551	0.829	0.000
Age							
10-19	-2.076	0.228	83.235	0.125	0.08	0.196	0.000
20-29	-1.713	0.171	100.488	0.18	0.129	0.252	0.000
30-39	-1.422	0.155	84.085	0.241	0.178	0.327	0.000
40-49	-1.326	0.153	75.498	0.266	0.197	0.358	0.000
50-59	-0.829	0.169	24.005	0.436	0.313	0.608	0.000
60+			168.648		Reference		
Previous suicide attempt	0.171	0.136	1.575	1.187	0.908	1.55	0.210

IV. DISCUSSION

The word “suicide” was first introduced by Thomas Browne. He coined the word based on the Latin words “sui” and “caedere,” meaning “of oneself” and “to kill,” respectively (Minois, 1999). As quoted by Shneidman in 1973, suicide is “an act of self-inflicting one’s own life cessation” (Shneidman, 1985).

Suicide is a complex problem that is influenced by multiple factors. In studying this problem, it is important to obtain epidemiologic information such as severity, mechanism and cause of the injury, thus facilitating the development of a plan for treatment, rehabilitation, and prevention. Given that the ED is usually the first gateway to a medical facility for a self-inflicted injury patient, the ED may be the best place to obtain the epidemiologic information or characteristics of patients who commit suicide. However, there is a paucity of studies investigating the overall characteristics of suicide attempts based on information from EDs and multicenters that deal with the suicide problem in Korea. Although the present study is a sentinel survey, it is the first multicenter study that was based on the ED evaluation of the characteristics of patients who attempt suicide.

According to the report by the WHO, the male-to-female ratio for suicide ranges from 2:1 to 4:1 in developed countries, and this ratio seems to be increasing (Krug et al, 2002). Asian countries typically have a much lower male-to-female suicide ratio, and this might also be increasing (Yip, 2008); in China, however, more women die by suicide than men (Phillips et al, 2008). Our results also demonstrate that the rate of suicide attempts among females (58%) was also higher than that in males, which is similar to a previous report in

Korea (Conner and Duberstein, 2004). In our study, 265 of the subjects (8.8%) among all of the age groups exhibited no real suicidal intention, compared with 14.8% in the 20 to 29 age group. This was similar to the 14%-21% rate in adolescent and young-adult populations that was reported in another study (Jeon et al, 2010). We believe that these results indicate that younger patients are more impulsive than older patients.

The methods of committing suicide vary among countries. In the United States, a firearm is the most common method for committing suicide, and the risk of its use is highest among households in which a gun is kept (Andres and Hemstead, 2010). In the rural areas of many developing countries, the ingestion of pesticides is the principal method of committing suicide, and the prevalence of this method is believed to be an easy access to pesticides in developing countries (Gunnel et al, 2007). In Japan, which has a high suicide rate, poisoning by drugs is the most common method of committing suicide (Kudo et al, 2010). Because Korea and Japan have heavily controlled firearms, injuries by firearms are extremely rare compared to the United States. In the present study, poisoning by drugs was the most common method in the < 50 years age group, and poisoning by pesticides was more frequent in the ≥ 50 years age group. We believe that this result may be due to the characteristics of the hospitals. Three hospitals participated in the present study, and despite location in an urban area, these hospitals manage the poisoned patients from each province. Therefore, we believe that a relatively high number of patients who were poisoned by agricultural chemicals were included in the present study. However, it is possible that this finding reflects the availability of pesticides to elderly individuals who live in rural areas.

The reasons for suicide are multifaceted and complex and have been studied by many

researchers. Cavanagh et al. (Cavanagh et al, 2003) reported that psychiatric disorders are present in approximately 90% of people who commit suicide and represents 47%-74% of the population's risk of suicide in developed countries. However, according to Jeon et al. familial conflict was the most frequent precipitant of suicide attempts in Korea, and our results are consistent with these data. When the reasons for suicide attempts were classified according to age group, "medical illness" was the most common reason in the ≥ 60 years age group, and "conflict with friends" was the main reason in the < 20 years age group. This may indicate that the elderly expected a higher quality of life without illness and that most life activities for young people (i.e., < 20 years old) are mainly based in schools. As in previous studies, depression was a principal factor that was associated with suicide attempts among all age groups (Jeon et al, 2010; Jeon, 2011).

In addition, we identified predictors of a severe outcome following a suicide attempt (Table 5). In the present study, male gender is a predictor amongst others of a severe outcome following suicide attempt. Suicidal behaviors tend to be more prevalent in males, which is in agreement with the results of the previous studies (Skogman et al, 2004; Brådvik et al, 2008). Among the predictors of a severe outcome after a suicide attempt, in agreement with the results of previous studies, suicide-related behaviors tend to be more prevalent among males (Skogman et al, 2004; Brådvik et al, 2008). Conner and Duberstein reported that alcohol dependence was a potential risk factor for suicide (Conner and Duberstein, 2004). However, drinking alcohol resulted in less severe outcomes after attempting suicide. We speculate that the discrepancy between alcohol consumption and injury severity following a suicide attempt originates from the impulsiveness of the person committing

suicide. Suicide attempts that are associated with relatively strong impulse owing to the prior alcohol consumption may have been the cause of a less severe outcome. Numerous studies have shown that old age is a predictor for committing suicide (Powell, 2000; Conwell, 2002; Harwood et al, 2006), and the current study confirmed that old age was one of the predictors of a severe outcome. In contrast to previous studies (Robins et al, 1959; Rosenberg et al, 1988; Cavanagh et al, 2003), a history of a previous suicide attempt was not significantly associated with a severe outcome.

What can be done to prevent suicide? Previous projects and studies have showed their effectiveness.

Physical illness is considered an important risk factor to suicidal behavior and ideation, especially if there are also mood disorders or depressive symptoms (De Leo et al, 1999). Using a psychological autopsy, some studies have shown that people committing suicide have signs or symptoms of a psychiatric condition (Isometsa and Lonnqvist, 1997; Waern et al, 1999). Lithium showed specific anti-suicidal effects for people with bipolar disorder. Anti-psychotics also have been observed a reduction of suicide (Goldsmith et al, 2002). Verkes et al investigated that the substance paroxetine (selective serotonin reuptake inhibitor, SSRI) was effective in reducing suicidal behavior (Verkes et al, 1998). Psychotherapy can reduce the risk of suicide. Problem-oriented intervention showed reduction of suicidal ideation and attempts for suicide attempters until 6 months.

Community mental health centers cannot prove their effectiveness for suicide prevention. But School-based programs have shown some success in reducing suicide.

Screening programs, gatekeeper training programs, crisis management and connection to community are useful for youth suicide. In hospital, there is a brief intervention for suicide attempters, called by green cards. It was not proved to be effective. The green card is a offering system for a 24-hour crisis telephone consultation with a psychiatrist. It was effective with those who had attempted suicide for the first time, but not effective on those who had made re-attempts (Morgan et al, 1993).

A control of the means of suicide can be helpful for suicide prevention. In the rural areas of developing countries, restriction of pesticides made a reduction in suicide rates by toxic substances (Bowles, 1995). The removal of carbon monoxide from domestic gas and from car exhausts has proved effective in reducing suicide rates (Kreitman, 1972; Lester, 1998). In Australia, Canada and the United States, restrictions on the ownership of firearms have influenced to a decrease in their use for suicide (Carrington, 1994; Kellermann, 1992)

Roles of media are important. Dissemination of the original suicidal news on television and in other media provokes new injuries, which is called as a copycat suicide or the Werther effect. Responsible reporting of suicides by the media is fundamental. Various organizations and governments have proposed guidelines for suicide reporting, including Befrienders International in the United Kingdom, the Centers for Disease Control and Prevention in the United States, the World Health Organization, and the Australian and New Zealand governments (World Health Organization, 2000)

Our study has several limitations. First, information of self-inflicted injuries is not enough, because we obtained the data from previous surveillance system through

retrospective study. It needs a concrete definition about planned suicide, impulsive self-inflicted activity without suicide ideation or denial of suicidal ideation even though having suicidal risk. And we should determine that patients attempted suicide for continuous factors or instantaneous provocateurs.

Second, there is no guideline and education program of interview for emergency physicians. Most patients with self-inflicted injury are unstable medically as well as emotionally. It is difficult that health care providers establish close rapport with them and obtained exact data within restricted hours in ER. Emergency physicians require standardized education.

Third, because the present study was based on a sentinel survey, a selection bias may influence the outcome of the analysis.

Forth, despite the fact that suicide attempts were made under various psychiatric conditions, this study found that only a previously confirmed psychiatric disease was a risk factor for suicide. It is indeed impossible for suicide attempters to be thoroughly psychiatrically evaluated upon presentation at the ED. Therefore, the effects of coexisting psychiatric disease on suicide attempts might be underestimated in the present study.

Finally, even though Korea has a high suicide rate, it has historically been considered taboo to seek consultation for a psychiatric crisis. Moreover, patients with a self-inflicted injury tend to mask their suicidal intent. Thus, the suicidal intent of patients may be underestimated.

V. CONCLUSION

In summary, despite the aforementioned limitations, the present study is the first ED-based multicenter trial to evaluate the characteristics of patients with self-inflicted injuries. Poisoning was the most common method of suicide attempt among all age groups. However, the reasons for self-inflicted injuries varied among the age groups. Male gender, old age, and not having consumed alcohol were predictors of a severe outcome following a suicide attempt. Further studies should be conducted to confirm these results. I suggest the following for suicide prevention:

1. Modification of current dataset

We need to group the patients based on intent and reasons of suicide. First of all, we need to identify the patients with suicidal intents and those who deny their suicide ideation. Patients with suicidal intents can be divided into two groups: planned suicide and impulsive suicide. Patients who deny their suicide ideation are also classified into two groups: impulsive self-harm activity and denial of suicidality despite having the intent. Based on the types of problems, patients are divided into three groups. The first is a group of patients who attempt suicide because of chronic problems, and the second is a group of patients who have provocateurs other than chronic problems. The last group consists of patients without chronic problems but are influenced by impulsive factors. Risk assessment for patients can sort out a vulnerable group.

To understand the patients' surroundings, we need to survey socioeconomic states such as occupation, income, marital state, relationship with people around them. As this study showed, human relationship is the most common factor for suicide attempts. Also, medical information should be complemented. Previous datasets have not reflected medical history and current condition. The new survey needs a multi-dimensional approach.

2. Education for health care providers in ER

Most data are obtained through interviews. They can be interpreted in various ways depending on the circumstances: patients' factors, health care providers' factors and environments. For standardization of data, we need to strengthen education for health care providers.

3. Connection to proper intervention

The current registry system is only for identification of risky groups. To reduce suicide, we have to identify patients who have high risks of committing suicide and help them not to re-attempt. Systemic and financial support systems are required to connect suicide attempters to psychiatrists as well as social workers.

REFERENCES

Andrés AR, Hempstead K: Gun control and suicide: The impact of state firearm regulations in the United States, 1995-2004. *Health Policy*, 2010

Bailey SE, Kral MJ, Dunham K: Survivors of suicide do grieve differently: Empirical support for a common sense proposition. *Suicide Life Threat Behav* 29: 256–271, 1999

Barrett T, Scott T: Suicide bereavement and recovery patterns compared with non-suicide bereavement patterns. *Suicide Life Threat Behav* 20: 1-15, 1990

Bowles JR: Suicide in Western Samoa: an example of a suicide prevention program in a developing country. In eds. Preventive strategies on suicide. Leiden, Brill, 1995

Brådvik L, Mattisson C, Bogren M, Nettelbladt P: Long-term suicide risk of depression in the Lundby cohort 1947-1997--severity and gender. *Acta Psychiatr Scand* 185-191, 2008

Cain A, East R: Children's disturbed reactions to parent suicide: Distortions of guilt, communication and identification. Thomas, 1972

Carrington PJ, Moyer MA: Gun control and suicide in Ontario. *Am J Psychiatry* 151:606–608, 1994

Cavanagh JTO, Carson AJ, Sharpe M, Lawrie SM: Psychological autopsy studies of suicide: a systematic review. *Psychol Med* 33: 395-405, 2003

Chao A, Law CK, Li PC, Yip PSF: Suicide in Asia: Causes and prevention. Hong Kong, Hong Kong University Press, 2008

Conner KR, Duberstein PR: Predisposing and precipitating factors for suicide among alcoholics: empirical review and conceptual integration. *Alcohol Clin Exp Res* 28(5 Suppl): 6S-17, 2004

Conwell Y, Duberstein PR, Caine ED: Risk factors for suicide in later life. *Biol Psychiatry* 52: 193-204, 2002

Corso PS, Mercy JA, Simon TR, Finkelstein EA, Miller TR: Medical costs and productivity losses due to interpersonal violence and self- directed violence. *Am J Prev Med* 32(6): 474-482, 2007

De Leo D, Scocco P, Marietta P, Schmidtke A, Bille-Brahe U, Kerkhof AJ, Lonnqvist J, Crepet P, Salander-Renberg E, Wasserman D, Michel K, Bjerke T: Physical illness and parasuicide: evidence from the European Parasuicide Study Interview (EPSIS/WHO-EURO). *Int J Psychiatry Med* 29:149-163, 1999

Goldsmith SK, Pellmar TC, Kleinman AM, Bunney WE: Reducing Suicide: A National Imperative, National Academy of Sciences, 2002

Gunnell D, Eddleston M, Phillips MR, Konradsen F: The global distribution of fatal pesticide self-poisoning: systematic review. *BMC Public Health* 7: 357, 2007

Harwood DMJ, Hawton K, Hope T, Harriss L, Jacoby R: Life problems and physical illness as risk factors for suicide in older people: a descriptive and case-control study. *Psychol Med* 36: 1265-1274, 2006

Hoff L: People in Crisis: Understanding and Helping. Redwood City, Addison-Wesley Publishers, 1989

Isometsa ET, Lonnqvist JK: Suicide in mood disorders. In: Botsis AL, Soldatos CR, Stefanis CN, eds. Suicide: biopsychosocial approaches. Amsterdam, Elsevier, 1997

Jeon HJ: Depression and suicide, *J Korean Med Assoc* 54: 370-375, 2011

Jeon HJ, Lee JY, Lee YM, Hong JP, Won SH, Cho SJ, Kim JY, Chang SM, Lee D, Lee HW, Cho MJ: Lifetime prevalence and correlates of intent to suicide, plan, and single and multiple attempts in a Korean nationwide study. *J Nerv Ment Dis* 198: 643-646, 2010

Jeon HJ, Lee JY, Lee YM, Hong JP, Won SH, Cho SJ, Kim JY, Chang SM, Lee HW, Cho MJ: Unplanned versus planned suicide attempters, precipitants, methods, and an association with mental disorders in a Korea-based community sample. *J Affect Disord* 127: 274-280, 2010

Juurlink DN, Herrmann N, Szalai JP, Kopp A, Redelmeier DA: Medical illness and the risk of suicide in the elderly. *Arch Intern Med* 164: 1179-1184, 2004

Kellermann AL, Rivara FP, Simes G, Reay DT, Francisco J, Banton JG, Prodzinski J, Fligner C, Hackman BB: Suicide in the home in relation to gun ownership. *N Engl J Med* 327:467-472, 1992

Krug EG, Mercy JA, Dahlberg LL, Zwi AB: The world report on violence and health. *Lancet* 360(9339): 1083-1088, 2002

Kreitman N: The coal gas history: United Kingdom suicide rates, 1960-1971. *Br J Prev Soc Med* 30:86-93, 1972

Kudo K, Otsuka K, Endo J, Yoshida T, Isono H, Yambe T, Nakamura H, Kawamura S, Koeda A, Yagi J, Kemuyama N, Harada H, Chida F, Endo S, Sakai A: Study of the outcome of suicide attempts: characteristics of hospitalization in a psychiatric ward group, critical care center group, and non-hospitalized group. *BMC Psychiatry* 10: 4, 2010

Lester D: Preventing suicide by restricting access to methods for suicide. *Archives of Suicide Research* 4:7–24, 1998

Levi F, La Vecchia C, Lucchini F, Negri E, Saxena S, Maulik PK, Saraceno B: Trends in mortality from suicide, 1965-99. *Acta Psychiatr Scand* 108: 341-349, 2003

Minois G, History of suicide: voluntary death in Western culture. Baltimore, Johns Hopkins University Press, 1999

Morgan HG, Jones EM, Owen JH: Secondary prevention of non-fatal deliberate self-harm. The Green Card Study, *Br J Psychiatry* 163:111-112, 1993

Organization for Economic Cooperation and Development: OECD health data 2009: statistics and indicators for 30 countries. Paris. Organization for Economic Co-operation and Development, 2010

Owens D, Horrocks J, House A: Fatal and non-fatal repetition of self-harm. systematic review. *Br J Psychiatry* 181: 193-199, 2002

Phillips MR, Li X, Zhang Y: Suicide rates in China, 1995–99. *Lancet* 359(9309): 835-840, 2002

Powell J, Geddes J, Deeks J, Goldacre M, Hawton K: Suicide in psychiatric hospital inpatients. Risk factors and their predictive power. *Br J Psychiatry* 176: 266-272, 2000

Robins E, Gassner S, Kayes J, Wilkinson RH Jr, Murphy G: The communication of suicidal intent: a study of 134 consecutive cases of successful (completed) suicide. *Am J Psychiatry* 115: 724-733, 1959

Rosenberg ML, Davidson LE, Smith JC, Berman AL, Buzbee H, Gantner G, Gay GA, Moore-Lewis B, Mills DH, Murray D: Operational criteria for the determination of suicide. *J Forensic Sci* 33: 1445-1456, 1988

Schmidtke A, Häfner, H: Suicide and Its Prevention: The Role of Attitude and Imitation: Netherlands, 1989

Shneidman E, Definition of suicide. New York, John Wiley & Sons, 1985

Sisask M, Värnik A: Media Roles in Suicide Prevention: A Systematic Review. *Int J Environ Res Public Health*, 9(1): 123-138, 2012

Skogman K, Alsen M, Öjehagen A: Sex differences in risk factors for suicide after attempted suicide—a follow-up study of 1052 suicide attempters. *Soc Psychiatry Psychiatr Epidemiol* 39: 113-120, 2004

Statistics Korea: Death statistics in 2009. Daejeon, Statistics Korea, 2010

Velting DM, Gould MS: Review of Suicidology. New York, Guilford Press, 1997

Verkes RJ, Van der Mast RC, Hengeveld MW, Tuyl JP, Zwinderman AH, Van Kempen GM: Reduction by paroxetine of suicidal behaviour in patients with repeated suicide attempts but not with major depression. *Am J Psychiatry*. 155(4):543-547, 1998

Waern M, Beskow J, Runeson B, Skoog I: Suicidal feelings in the last year of life in elderly people who commit suicide. *Lancet* 354:917-918, 1999

World Health Organization: Guidelines for the primary prevention of mental, neurological and psychosocial disorders. Geneva, World Health Organization, 1994

World Health Organization: Preventing suicide: a resource for media professionals. Geneva, World Health Organization, 2000

WHO-Health and Development Network: Injury Surveillance Guidelines. Atlanta, Centers for Disease Control and Prevention, 2001

WHO-ICECI Coordination and Maintenance Group: International Classification of External Causes of Injuries (ICECI) Testing ICECI: Review and Field Testing. Amsterdam, WHO-

ICECI Coordination and Maintenance Group, 2004

Yip PS: Suicide in Asia: causes and prevention. Hong Kong, Hong Kong University Press,
2008



응급실을 내원한 자해 환자들의 특징

자살 시도자들에 대한 일차적 치료와 자살 위험 인자의 분석은 자살예방을 위한 중요한 요소 중 하나이다. 이 연구는 자살 예방을 위해 자해로 응급실을 내원한 환자들의 특징을 파악하는 것에 초점을 맞추고 있다. 2007 년부터 2009 년까지 3 년동안 질병관리본부에서 지정한 3 개의 표본 병원에 방문한 자해환자들을 대상으로 연구를 진행하였다. 대상의 일반적 특징과 자살 시도의 방법, 이유 등에 대해 조사하였다. 3 년간 총 2,996 명의 자해환자가 대상 의료기관의 응급실을 방문하였다. 여자가 남자에 비해 1.38 배 많았으며($P<0.001$), 평균연령은 41 세였다. 모든 연령군에서 중독에 의한 자살시도가 가장 많았으나(68.7%) 연령군에 따라 중독물질은 차이를 보였다. 50 세 미만의 연령에서는 치료약물이 가장 많았고, 50 세 이상의 연령에서는 농약이 가장 많았다. 자살시도의 이유는 연령군마다 다르게 나타났다. 중증 손상의 예측인자로는 남자, 노령, 비음주 상태로 나타났다.

핵심어: 자살생각, 자살시도, 자살예방