

## Characteristics of Intentional Acute Drug Intoxication Patients in Emergency Medical Center

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**Abstract:** The purpose of this study was to determine the characteristics of acute substance poisoning patients admitted at a regional emergency medical center located in an urban rural complex. The general characteristics of medical records, occurrence season and emergency care records of acute substance poisoning patients among patients admitted into an emergency medical center located in S region, Chungnam from January to December 2015 were evaluated. SPSS Win 22.0 Program was used for statistical analysis including Chi-square test and Fisher's exact test. The percentage of acute substance poisoning patients in the total number of patients admitted at the emergency medical center was 0.12%. Within the intentional substance poisoning group, 70.4% were female patients. This was higher than that (63.6%) in the unintentional poisoning group. Patients were divided into the elderly group and the non-elderly group using a cutoff value of 65 years of age. The percentages of both the intentional substance poisoning group and the unintentional poisoning group were higher in the elderly group than those in the non-elderly group. As for the presence of diseases, there were more cases in the intentional poisoning group compared to that in the unintentional poisoning group. The use of 119 ambulance was the most frequent admission method for both intentional poisoning group and unintentional poisoning group. The use of other vehicles was more common in the unintentional poisoning group compared to that in the intentional poisoning group. Of different months, April was the most frequent months (18.5%) for cases of intentional poisoning while May and December were the most frequent months for cases of unintentional poisoning (27.3%). Emergency treatment results was in the order of hospitalization, transfer and recovery for the intentional poisoning group rather than unintentional poisoning group. The general characteristics and substance poisoning related characteristics of subjects were determined. These data will provide basis for suicide prevention programs and national health program.

**Key words:** Emergency, intoxication, suicide, intentional poisoning, pesticides, hospitalization

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### INTRODUCTION

The Organization for Economic Cooperation and Development (OECD) has found that the suicide rate in Korea is 2.3 times higher than the OECD average. Suicide rate in Korea has been ranked the 1st among member countries for 12 years in a row. According to the 2015 cause of death statistics published by the Republic of Korea National Statistical Office, death rate due to suicide is 5.3 per 100,000. It is the fifth highest cause of death after malignant neoplasm, cerebrovascular disease, heart disease and pneumonia. Death rate related to suicide can fluctuate according to region, gender, age and social demographic aspects. Unlike general causes of death, suicide death has pathological burden on the population (Miller *et al.*, 2012). Generally, acute poisoning caused by side effect of toxic substances can be divided into two types: unintentional and intentional (Akbaba *et al.*, 2007). Intentional poisoning has higher rate of death

compared to unintentional position because most of the time a high amount is consumed with the purpose of committing suicide. According to data from the World Health Organization, death rate is around 20% in case of intentional poisoning. About >200,000 deaths worldwide are caused by pesticide alone every year. About 3 pesticides and herbicides are commonly used in rural areas while sleeping pills, acid and alkaline substances are commonly used in urban areas. Administration of poisonous substance for the purpose of committing suicide is the most common in adults. In children, inattention by parents is the most common (Lee and Park, 1993). Preventing suicide through bio-psychological factors (genetic, personality characteristics, etc.) and socio-economical factors (recession, family breakdown, etc.) the fundamental causes of suicide is very difficult. Especially, it is difficult to establish active measures for stress, suicidal thoughts and suicide attempts, the important intermediate between

fundamental causes of suicide and committing suicide. The problem of suicide must not be treated as a problem of individuals but as part of social problems. Therefore, suicide prevention programs considering subject characteristics should be developed. For this, the study classified substance poisoning patients admitted into an emergency medical center into two groups: an intentional substance poisoning patient group with a purpose of committing suicide and an unintentional substance poisoning group. By analyzing the general characteristics of subjects and substance poisoning related characteristics it is expected that our study will be utilized as basic data for suicide prevention programs and national health programs.

## **MATERIALS AND METHODS**

**Research subjects:** The study subjects were 38 acute substance poisoning patients admitted into an emergency medical center located in S region from January-December of 2015.

**Research methods:** Gender, age, presence of disease, method of admission, consciousness at the time of admission or arrival time at the medical center, transition of substance poisoning by month, type of poisoning substance, types of emergency treatment and emergency treatment results of subjects were investigated. According to the intentionality of acute substance poisoning patient it was divided into intentional poisoning group and unintentional poisoning group. Investigation was done retrospectively through medical records of patients. Statistical analysis was conducted with SPSS Win 22.0 Program. Chi-square test and Fisher's exact test were conducted.

## **RESULTS**

**Comparison of general characteristics of subjects:** The total number of patients admitted into the regional emergency medical center within the investigation period was 31,570 including 38 (0.12%) acute substance poisoning patients admitted within the investigation period. Of the 38 subjects, 33 patients whose intentions of poisoning were actually recorded. The 33 patients included 22 subjects who were assigned into the intentional substance poisoning group and 11 subjects who were assigned into the unintentional substance poisoning group. In the intentional substance poisoning group, the percentage of females was 70.4% which was higher than that (63.6%) in the unintentional substance poisoning group. These 33 patients were also divided into

the elderly group and the non-elderly group based on cut off value of 65 years of age. Both unintentional substance poisoning group and intentional substance poisoning group had more elderly patients (55.6 and 63.6%, respectively) compared to non-elderly patients. Regarding the presence of diseases, more cases were found in the intentional substance poisoning group compared to those in the unintentional substance poisoning group. However, there was no significant difference in the number of cases with the presence of diseases between the two groups (i.e., unintentional substance poisoning group and intentional substance poisoning group). The most frequent admission method was the use of 119 ambulance in both groups. The percentage of using other vehicles was higher in the unintentional poisoning group (18.2%) than that (14.8%) in the intentional substance poisoning group. There was no significant difference in other characteristics between the two groups (Table 1).

### **Poisoning characteristics comparison of subjects:**

Regarding the consciousness state of patients in the intentional substance poisoning group at the time of admission, 51.9% were in clear state of consciousness, 33.3% were in confusion state and 14.8% were in unconscious state. In the unintentional substance poisoning group, 63.6% of patients were in clear state of consciousness while 18.2% were in confusion state. The percentage of patients in unconscious state in the unintentional substance poisoning group was similar to that in the intentional substance poisoning group.

For emergency treatment at the time of admission, gastric leverage was used for 44.4 and 36.4% of patients in the intentional substance poisoning group and the unintentional substance poisoning group, respectively. Although, the percentage of gastric leverage use was higher in the intentional substance poisoning group, the two were not statistically significant ( $p > 0.05$ ). The percentage of charcoal solution use in the unintentional substance poisoning group was 45.5% which was higher than that (29.6%) in the intentional substance poisoning group. However, the difference between the two was not statistically significant ( $p > 0.05$ ). In the intentional substance poisoning group, the percentages of poisoning substances were sleeping pills, 63.0% herbicide, 22.2%; pesticide, 11.1%. In the unintentional substance poisoning group the percentages of poisoning substances were: sleeping pills, 45.5%, herbicide, 27.3%; pesticide, 18.2%. These percentages by poisoning substance were not significantly different between the two groups (Table 2).

Table 1: Comparison of general characteristics of subjects

Variables	Intentional poisoning N = 22 (71.1%)	Unintentional poisoning N = 11 (28.9%)	p-values*
<b>Gender</b>			0.714
Male	8 (29.6)	4 (36.4)	
Female	19 (70.4)	7 (63.6)	
<b>Age</b>			0.729
Under old age (= 64 years)	12 (44.4)	4 (36.4)	
Old age (<65 years)	52 (55.6)	7 (63.6)	
<b>Medical history</b>			0.955
Yes	12 (44.4)	5 (45.5)	
No	15 (55.6)	6 (54.5)	
<b>Transportation</b>			0.796
119 ambulance	23 (85.2)	9 (81.8)	
Other cars	4 (14.8)	2 (18.2)	

\*By Chi-square test tset and Fisher's exact test at  $\alpha = 0.05$

Table 2: Poisoning characteristics comparison of subjects

Variables	Intentional poisoning N = 22 (71.1%)	Unintentional poisoning N = 11 (28.9%)	p-values*
<b>Mental status</b>			0.647
Coma	4 (14.8)	2 (18.2)	
Drowsy	9 (33.3)	2 (18.2)	
Alert	14 (51.9)	7 (63.6)	
<b>Gastric lavage</b>			0.647
Yes	12 (44.4)	4 (36.4)	
No	15 (55.6)	7 (63.6)	
<b>Charcoal</b>			0.351
Yes	8 (29.6)	5 (45.5)	
No	19 (70.4)	6 (54.5)	
<b>Substance</b>			0.454
Pesticide	3 (11.1)	2 (18.2)	
Herbicide	6 (22.2)	3 (27.3)	
Sleeping pills	17 (63.0)	5 (45.5)	
Kitchen detergent	1 (3.7)	0 (0.0)	
Dementia drugs	0 (0.0)	1 (9.1)	

\*By Chi-square test and Fisher's exact test at  $\alpha = 0.05$

**Comparison of temporal characteristics of subjects:** The arrival time of the substance poisoning patients was in the order of morning 40.7%, afternoon and evening 22.2% and dawn 14.8% in the intentional substance poisoning group and in the unintentional substance poisoning group, it was in the order of afternoon 54.5%, morning 27.3%, evening 18.2% and there were no statistically significant differences between groups. In the comparison by month, April was the highest with 18.5% in the intentional substance poisoning group with 11.1% in each January, February and October and in the unintentional substance poisoning group it was the highest in May and December with 27.3% and there were no statistically significant differences between groups (Table 3).

**Comparison of post emergency treatment results in subjects:** In the comparison of post emergency treatment results, intentional substance poisoning group showed hospitalization 55.6%, transfer 29.6% and the cover he 14.8% and in the unintentional substance poisoning group, hospitalization and transfer was 36.4% and recovery 27.3% which were similar between groups and there was no statistical significance (Table 4).

Table 3: Comparison of temporal characteristics of subjects

Variables	Intentional poisoning N = 22 (71.1%)	Unintentional poisoning N = 11 (28.9%)	p-values*
<b>Monthly distribution</b>			0.128
January	3 (11.1)	1 (9.1)	
February	3 (11.1)	0 (0.0)	
March	2 (7.4)	1 (9.1)	
April	4 (18.5)	1 (9.1)	
May	2 (7.4)	3 (27.3)	
June	1 (3.7)	0 (0.0)	
July	2 (7.4)	2 (18.2)	
August	2 (7.4)	0 (0.0)	
September	2 (7.4)	0 (0.0)	
October	3 (11.1)	0 (0.0)	
November	2 (7.4)	0 (0.0)	
December winter	0 (0.0)	3 (27.3)	

\*By Chi-square test and Fisher's exact test at  $\alpha = 0.05$

Table 4: Comparison of post emergency treatment results in subjects

Variables	Intentional poisoning N = 22 (71.1%)	Unintentional poisoning N = 11 (28.9%)	p-values*
<b>Management result</b>			0.510
Admission	15 (55.6)	4 (36.4)	
Transfer	8 (29.6)	4 (14.8)	
Recovery	4 (36.4)	3 (27.3)	

\*By Chi-square test and Fisher's exact test at  $\alpha = 0.05$

## DISCUSSION

Depending on the type of poisoning substance, clinical symptoms are diverse. Some are fatal. Some can cause severe convocations after treatment. Substance poisoning brings large financial and emotional burden to guardians. In addition, poisoning patients can become big problems medically and socially (Persson *et al.*, 1998). According to this study, the total number of patients admitted into the emergency medical center for substance poisoning was 38 within 1 year. It accounted for 0.12% of total patients admitted to the emergency medical center. frequency of substance poisoning by gender revealed that the percentage of female patients was higher in both the intentional substance poisoning group (70.4%) and the unintentional substance poisoning group (63.6%). This result is consistent with the results of a previous study of Ko and Lee (2012) showing that the percentages of female subjects of 60.3 and 61.4% in the two groups. In the United States while there are more suicide attempts by women, more men have succeeded in committing suicide. Regarding suicide methods, although, many women prefer nonfatal substances, men are more likely to use fatal methods (Kim and Lee, 2009) In this study, after subjects were divided into the elderly group and the non-elderly group based on the cutoff value of 65 years of age, both the intentional substance poisoning group and the unintentional substance poisoning group had more elderly patients than non-elderly patients. Elderly suicide in Korea has reached a critical level. Among methods of

suicide used by the elderly, poisoning through using toxic substances has been reported to be highest (at 7.8%) (Lee, 2006). At old age, many people experience the feeling of loss and loneliness due to retirement and unemployment, loss of social and financial position and death of people surrounding including spouses (Rhim *et al.*, 2009). Due to normal changes associated with aging the elderly might experience daunting lives with loss of physical functions due to chronic diseases. Suicide is often selected as a measure to solve these problems. Being an elderly has been reported to be the highest risk factor of suicide (Kim, 2002). In this study, the presence of disease was higher in the intentional substance poisoning group compared to that in the unintentional substance poisoning group, consistent with the result of a study by Lee *et al.* (2010). It has been reported that the elderly has 2-3 times higher prevalence of disease compared to younger people. Approximately 80% of the elderly have at least one chronic disease while more than half have a combination of two or more chronic diseases (Seok, 2006). In this study, the use of 119 ambulance was found to be the most frequent method of admission in both the intentional substance poisoning group and the unintentional substance poisoning group. This result is in agreement which result of a study by Ko and Lee (2012) reporting that the use of 119 ambulance is the most frequent admission method in both the intentional poisoning group and the unintentional poisoning group. According to the National Emergency Management Agency, among patients transferred to emergency medical center by 119 ambulance, the number of acute substance poisoning patients is continuously increasing. Regarding patient consciousness state upon admission, clear state of consciousness accounted for the most in both groups, followed by the state of confusion and the state of unconsciousness. In both groups, the most frequent poisoning substance was sleeping pills, followed by herbicide and pesticide. However, for most patients who take sleeping pills, death is not reported (Korean Statistics Information Service). The increase of incidence of sleeping pill taking compared to previous study results showing that herbicides and pesticides are the more frequent poisoning substances might be due to the influence of industrialization. It has been suggested that prevention of acute poisoning should break away from the modest dimensions of education on pesticide spraying or usage of the past to actively promote and educate substance side effects (Choi *et al.*, 2008). While conducting effective management on groups with possibility of substance poisoning, there should be emphasis for the need of systematic devices to prevent purchase of poisonous substance for the purpose of committing suicide in the process of substance distribution (Choi *et al.*, 2008).

In this study, April was found to be the most frequent month of admission in the intentional substance poisoning group while May and December were found to be the most frequent month of admission in the unintentional substance poisoning group. In a study by Park *et al.* (2003). Investigating the relationship between late hours and suicide rates, it has been reported that suicide rates are higher for both men and women in spring and summer with overall higher amounts of light compared to those in the fall and winter. Regarding the results of emergency treatment, the most frequent treatment method was hospitalization, followed by transfer and recovery in both the intentional substance poisoning group. In the unintentional substance poisoning group, hospitalization and transfer were the highest treatment methods followed by recovery. The ratio of hospitalization and transfer was found to be higher in the intentional substance poisoning group compared to that in the unintentional substance poisoning group, indirectly indicating that the severity of poisoning might be higher in the intentional substance poisoning group as reported previously (Han *et al.*, 2016).

## CONCLUSION

In the results of emergency treatment, most frequent was in the order of hospitalization, transfer and recovery in the intentional substance poisoning group and in the unintentional substance poisoning group, hospitalization and transfer were the highest and next was recovery. The ratio of hospitalization and transfer was shown to be higher in the intentional substance poisoning group compared to the unintentional substance. The study compared characteristics of 38 substance poisoning patients admitted to an emergency medical center in S region from January-December 2015 by dividing into intentional substance poisoning group and unintentional substance poisoning group. The following results were obtained.

First, the number of substance poisoning patients among admitted patients at the emergency vehicle center was 38 which was 0.12% of total patients. In both intentional substance poisoning group and unintentional substance poisoning group, frequency by gender was higher in females. Based on 65 years of age, it was divided into elderly and nonelderly group and intentional substance poisoning group and unintentional substance poisoning group were both higher in the elderly group. History of disease was more frequent in the intentional substance poisoning group compared to unintentional substance poisoning group. Method of admission was most frequently 119 ambulances in both groups.

Second, the most frequent state of consciousness at the mission was clear state of consciousness for both groups and then it was in the order of state of confusion, then state of unconsciousness. Usage of gastric leverage and charcoal solutions was more frequent in intentional substance poisoning group compared to unintentional substance poisoning group. For both groups, the most frequent poisoning substances were in the order of sleeping pills, herbicide and pesticide.

Third, the time of arrival for admission was in the order of morning, afternoon, then evening for the intentional substance poisoning group and for the unintentional substance poisoning group, it was in the order of afternoon, morning and evening. For season, spring was the most frequent for both groups. The highest frequency in the intentional substance poisoning group was in April and it was the highest in May and December for the unintentional substance poisoning group.

Fourth, in the result of emergency treatment, it was in the order of hospitalization, transfer and recovery for intentional substance poisoning group and hospitalization and transfer was the highest and then recovery for the unintentional substance poisoning group.

### **SUGGESTIONS**

Based on the results, there is urgent need for emotional support within families and suicide prevention programs in the social level to prevent elderly suicide. There is also great need for supervision of sales of pesticides and medication such as sleeping pills used for the purpose of suicide. Both governmental and institutional supports are strongly needed to prevent suicide in Korea.

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