

The impact of alcohol exposure on clinical feature in patients with acute poisoning

Seung Hwan Seol

Catholic University of Korea Incheon Saint Mary's Hospital

SEON HEE WOO (✉ drme@catholic.ac.kr)

Incheon St. Mary's Hospital, College of Medicine, The Catholic University of Korea

<https://orcid.org/0000-0001-8914-1640>

Dae Hee Kim

Catholic University of Korea Incheon Saint Mary's Hospital

June Young Lee

Catholic University of Korea Incheon Saint Mary's Hospital

Woon Jeong Lee

Catholic University of Korea Incheon Saint Mary's Hospital

Primary research

Keywords: Poisoning, Emergencies, Alcohol drinking

Posted Date: March 24th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-18551/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Title

The impact of alcohol exposure on clinical feature in patients with acute poisoning

Author List

Seung Hwan Seol M.D.: seunghwan.seol@gmail.com

Seon Hee Woo, M.D., PhD.: drme@catholic.ac.kr

Dae Hee Kim, M.D.: md.kim.daehee@gmail.com

June Young Lee, M.D.: jovim@hanmail.net

Woon Jeong Lee, M.D., PhD: limleem@catholic.ac.kr

All Author Affiliations

Department of Emergency Medicine, Incheon St. Mary's Hospital, College of Medicine, The Catholic University of Korea

Corresponding Author

Seon Hee Woo, M.D., PhD

Department of Emergency Medicine, Incheon St. Mary's Hospital, College of Medicine, The Catholic University of Korea, #56 Dongsu-ro, Bupyeong-gu, Incheon, 21431, Republic of Korea.

Tel: 82-32-280-6116

E-mail: drme@catholic.ac.kr

ORCID: 0000-0001-8914-1640

The impact of alcohol exposure on clinical feature in patients with acute poisoning

Abstract

Background: Alcohol is one of the most commonly co-ingested agents in acute poisoning patients visiting the emergency department (ED). The aim of this study was to compare the outcomes and clinical features of acute-poisoning patients with and without co-ingestion of alcohol.

Methods: We retrospectively investigated poisoning patients who visited in the ED from January 2010 to December 2016 in a single center, Republic of Korea. Patients were classified into two groups: with or without alcohol co-ingestion. Data on clinical variables, outcomes, and poisoning severity score (PSS) were collected and compared. Primary outcomes analyzed were admission to the general ward or intensive care unit (ICU) from ED and discharge against medical advice (AMA).

Results: A total of 730 patients were included in the study, with 285 (39.0%) in the alcohol co-ingestion (ALC+) group. The patients who had also co-ingested alcohol, more were male, the peak age distribution was 45-54 years old, more had arrived at the ED at night. The rate of discharge against medical advice (AMA) was higher in the ALC+ group (136; 47.7%) than the ALC- group ($p = 0.001$). In multivariate analysis of DSP, the absence of alcohol co-ingestion (odds ratio [OR]1.41; 95% confidence interval [CI] 1.01-1.96), poisoning severity score (OR 1.74; 95% CI 1.34-2.27), previous MDD history (OR 1.57; 95% CI 1.13-2.19) and GCS score < 13 (OR 2.09; 95% CI 1.48-2.95) were shown to be independent predictive factors of admission ($p = 0.042$, $p < 0.001$, $p = 0.008$, $p < 0.001$).

Conclusion: Alcohol co-ingestion in poisoning patients was a factor affecting admission to the general ward or ICU in the ED. Therefore, emergency physicians assessing the disposition of poisoning patients should be aware that poisoning patients who have co-ingested alcohol may be uncooperative and be at high risk for the AMA discharge.

Keywords: Poisoning, Emergencies, Alcohol drinking

Background

Alcohol is one of the most commonly co-ingested agents in acute poisoning patients visiting the emergency department (ED)[1]. Acute poisoning includes unintentional poisoning and deliberate self-poisoning (DSP). The majority of adult poisoning patients who visit the ED are DSP patients, which has become a global problem related to suicide attempts [2,3]. Alcohol ingestion is also associated with a high risk of committing suicide, with approximately 16 times more suicide attempts in drinkers than in non-drinkers [4]. However, a recent study reported no significant relationship between co-ingestion of alcohol and repeated DSP episodes [5]. DSP is considered a low-lethality suicide method compared to other methods, but there is limited analytical research on patient outcomes or severity of acute poisoning according to alcohol co-ingestion status during poisoning [6].

Poisoning patients who co-ingest alcohol are often uncooperative to treatment in clinical situations, and demonstrate irritability and aggressive behavior, demanding to be discharged. In cases of DSP, patients who co-ingest alcohol may often refuse psychiatric interviews and psychological interventions by psychiatrists. Moreover, the patient's consciousness may change depending on interactions of poisonous substances and alcohol [7]. This can hinder treatment if the patient is unable to provide information on the type and amount of a substance ingested during poisoning, delaying the diagnosis of poisoning. However, there is little information on the effects of alcohol co-ingestion on the clinical outcomes and severity of acute poisoning.

It can be challenging to classify the severity of different types of poisoning substances in patients. The poisoning severity score (PSS) was developed to account for the wide variety of types, amounts, and combinations of substances that may have been ingested by acute-poisoning patients [8]. The PSS ranks poisoning patients on a score of 0 to 4 based on clinical symptoms, and is used to determine the severity of the poisoning and whether the patient should be transferred to a poisoning center for specialized treatment [8].

This study included three main components. First, we analyzed the initial clinical characteristics according to alcohol co-ingestion status in acute-poisoning patients visiting an emergency medical center. Second, the PSS was analyzed for all poisoning patients to compare the severity of poisoning between those who had co-ingested alcohol and those who had not. Third, we explored the clinical outcomes, such as the rate of discharge against medical advice (AMA), the admission rate to the general ward or intensive care unit (ICU), and discharge, as well as cooperativeness to neuropsychiatric consultation, in the co-ingestion group.

Method

We conducted a retrospective study of acute-poisoning patients from January 2010 to December 2016 in the ED at Incheon Saint Mary's Hospital, South Korea. Patients who were older than 15 years of age and had visited the ED after poisoning were included in the study. A total of 808 such poisoning patients visited the ED during the study period. Of these, 32 were excluded due to unclear or missing data regarding alcohol co-ingestion. In addition, the study excluded 45 subjects who experienced inhalation poisoning and 1 subject transferred to our hospital after admission at another hospital. Therefore, 730 subjects were included (Figure 1).

The protocol was approved by the Institutional Review Board of the Catholic Medical Center. Clinical measurements were included in routine patient management in the ED, the need for informed patient consent was waived. This Hospital is a tertiary teaching hospital that treats 55,000 patients annually in the ED. Informed consent was waived due to the retrospective nature of the study, as confirmed by the Institutional Review Board.

After reviewing the patients' medical charts, the demographic data and clinical characteristics of the patients were collected. Subjects were divided into two groups: patients who had ingested poisonous substances with or after consuming alcohol (ALC+) and those who had not (ALC-). History of alcohol co-ingestion was collected from the patient or their guardian (e.g., parent, friend, sister, brother, or witness) during the ED visit. Information on age, sex, poisonous substances consumed, alcohol co-ingestion, psychiatric history, reason for poisoning, time since ingestion of a substance(s), and previous history of attempting suicide were collected. A previous suicide attempt was defined as past self-injurious behavior with failed results, or a plan or an idea by the patient to kill himself/herself. In addition, initial vital signs (systolic blood pressure [SBP], diastolic blood pressure [DBP], heart rate [HR], and respiratory rate [RR]) in the ED, final diagnosis, discharge, AMA discharge, ICU admission, general ward admission, duration of ICU stay, endotracheal intubation, and death were recorded. The severity of acute poisoning was ranked based on the PSS, as follows: (0) no symptoms or signs (none), (1) mild, transient, and spontaneously resolving symptoms or signs (minor), (2) pronounced or prolonged symptoms or signs (moderate), (3) severe or life-threatening symptoms or signs (severe), and (4) death (fatal) [8]. The PSS was confirmed at the time of discharge from the hospital. Primary outcomes analyzed were admission to the general ward or intensive care unit (ICU) from ED and discharge against medical advice (AMA).

Statistical analyses

Statistical analyses were performed using SPSS ver. 16.0 (SPSS, Chicago, IL, USA). Differences between the two groups were compared using Student's *t*-test, and the Mann–Whitney U test was used to analyze continuous variables expressed as the median (interquartile range). The chi-square and Fisher's exact tests were used to assess categorical variables and expressed as frequencies with percentages. All variables that were significant on univariate analysis were subjected to multivariate logistic regression; we calculated odds ratios (ORs) with 95% confidence intervals. P values < 0.05 were considered statistically significant.

Results

Of the 730 subjects included in the study, 264 were male (36.2%) and 466 were female (63.8%). Hypnotosedatives and benzodiazepines were the most common substances in acute drug poisoning and were consumed by 232 (31.8%) patients (Table 1). There were 285 subjects (39.0%) in the ALC+ group and 445 (61.0%) in the ALC– group. The mean ages of the subjects were 45.0 ± 15.5 and 46.9 ± 20.7 years old in the ALC+ and ALC– groups, respectively ($p = 0.154$). In the ALC+ group, the peak age distribution was 45–54 years old (76; 26.7%). There was a greater proportion of males in the ALC+ group than in the ALC– group (43.9% vs. 31.2%, respectively) ($p = 0.001$). Intentional poisoning was observed in 689 subjects (94.4%). More than half of the ALC+ group visited the ED within 1 h of poisoning ($p = 0.001$). Of the initial vital signs, there were no differences in SBP, DBP, and RR, but HR was higher in the ALC+ group (93.6 ± 19.0 bpm; $p = 0.002$). There were no differences between the two groups in the proportion of patients with a Glasgow coma scale (GCS) score < 13 ($p = 0.503$). In addition, more patients in the ALC+ group arrived at the ED at night (18:00–06:00) than during the day ($p < 0.001$). Both groups had a high percentage of patients who arrive via emergency medical services (EMS) ($p = 0.065$). More patients in the ALC– group were admitted than patients in the ALC+ group, and 136(47.7%) in the ALC+ group had a higher AMA discharge rate ($p = 0.036$, $p=0.001$)(Table 2). Finally, there were no differences between the two groups in terms of PSS ($p = 0.187$) (Figure 2A).

Analyses of the deliberate self-poisoning subgroup

Among the 689 DSP patients, there were no significant differences in the number of substances taken during the poisoning event between the two groups. Moreover, the distribution of patients who had attempted suicide previously did not differ between the two groups ($p = 0.161$). Similar to the results of the total group analyses, the majority (140; 52.2%) of DSP ALC+ patients were visited to the ED within 1 h of poisoning and most arrived at night (Table 4). In the ALC+ group, the peak age distribution was 45–54 years old (74; 27.2%), while only 4.8% of patients were 75 years and older. By contrast, the ALC– group did not show a distinct peak frequency within any age range ($p < 0.001$) (Figure 3).

Of the DSP patients, 122 (44.9%) ALC+ patients and 189 (45.3%) ALC– patients underwent psychiatric interviews ($p = 0.903$) (Table 5). After neuropsychiatric consultation, 42 patients in the ALC+ group and 48 in the ALC– group were newly diagnosed with depressive disorder. More patients in the ALC– group were admitted than patients in the ALC+ group, and 130 (47.8%) in the ALC+ group had a higher AMA discharge rate ($p = 0.020$, $p=0.001$). There were no significant differences in PSS between the two groups ($p = 0.223$) (Figure 2B). A

total of five patient deaths occurred in the DSP group. Four were due to poisoning severity, and the final one was a 74-year-old female with a PSS of 3 who passed away 13 days after admission due to pneumonia.

Multivariate logistic regressions were used to evaluate possible predictors of DSP related admissions. In univariate logistic regression, the absence of alcohol co-ingestion, PSS, previous MDD history and GCS < 13 were significantly associated with admission of DSP. In multivariate logistic regression, the independent factor associated with admission of DSP were the absence of alcohol co-ingestion (odds ratio [OR] 1.41; 95% confidence interval [CI] 1.01-1.96), poisoning severity score (OR 1.74; 95% CI 1.34-2.27), previous MDD history (OR 1.57; 95% CI 1.13-2.19) and GCS score < 13 (OR 2.09; 95% CI 1.48-2.95)($p = 0.042$, $p < 0.001$, $p = 0.008$, $p < 0.001$) (Table 5).

Discussion

The poisoning patients displayed distinct differences in sex, age distribution, and timing of ED arrival according to alcohol co-ingestion status. In addition, among DSP patients, more ALC+ patients were male, middle-aged (45–54 years old), and arrived at the ED at night compared to the ALC– group. Moreover, 94.4% of all poisoning patients who visited the ED were acute DSP patients, and 39.0% had co-ingested alcohol. The percentage of unintentional poisonings was likely low because most such poisonings occur in children, and the subjects included in this study were 15 years or older. These results are similar to those observed by Chitty (36.2%) and Hendrix (36%) [2,9]. Meanwhile, 69% of ALC– patients were female in this study, higher than the proportion (56%) in the ALC+ group. Similarly, there were more female patients overall as well as in the DSP subgroup. Females generally consider and attempt suicide more frequently than males, but males have higher rates of success and physical self-harm [10-12].

Regarding patient outcomes, there were no differences between the ALC+ and ALC– groups in terms of PSS, ICU admission rate, endotracheal intubation, and mortality. However, more were admitted to the general ward or ICU in the ALC– group, and the ALC+ group had a higher the AMA discharge rate. Similar results were found over the entire population and in the DSP subgroup and the absence of alcohol co-ingestion in DSP was an independent factor associated with admission (OR 1.41). Thus, alcohol co-ingestion in poisoning patients was a factor affecting admission to the general ward or ICU in the ED. Among DSP patients, the mean age was 45.0 ± 15.5 and 46.9 ± 20.7 years in the ALC+ and ALC– groups, and more than 65% of patients were <55 years old. The DPS patients in this study were older than those reported in international data, in which the average age of presentation of DSP ranges from 30 to 44 years [2,3,9,13]. The present study was based on 7 years of data from one teaching hospital in South Korea; therefore, this difference may have been due to regional demographics and cultural drinking patterns, which also resulted in a significant difference in the age distribution according to alcohol co-ingestion. The time of ED arrival differed markedly between the ALC+ and ACL- groups. Approximately 35% of ALC+ DSP patients visited the ED between 18:00 and 00:00, similar to a previous study [2, 13-15]. In that study, an alcohol co-ingestion group showed a significant peak in poisoning later in the evening (~20:00) compared to poisonings that did not involve alcohol. This trend was likely associated with the timing of exposure to poisonous substances. The ALC+ group showed a different daily pattern of suicidal behavior compared to the ALC– group and had a lower percentage of patients with a previous psychiatric history. This implies that DSP in the ALC+ group might not have been attempted in the absence of alcohol ingestion. Interestingly, 52.2% of ALC+ patients visited the ED within 1 h of poisoning, which could be explained by a variety of factors, including their suicide

attempt being impulsive under the influence of alcohol, attempting suicide when someone was nearby, leaving clues for friends and family, or calling for help. This is in line with Oh *et al.*, who reported a high rescue attempt rate in DSP cases [10].

The PSS has been proposed to be an effective grading scale for acute-poisoning patients [8,16,17]. Along with GCS scores, it has proven useful for predicting mortality among organophosphate poisoning patients. Continuous monitoring and treatment is required for patients with a GCS score < 13 [16]. In this study, no differences in PSS, endotracheal intubation, or mortality were found between the ALC+ and ALC- groups, and there were no differences between the two groups in terms of the proportion of patients with a GCS < 13. However, in this study, no differences in PSS or the proportion of patients with a GCS < 13 were found. Peter [16] reported that PSS was a poorer discrimination tool than APACHE-II and SAPS-II scores for monitoring acute organophosphate poisoning. APACHE-II and SAPS- II are useful tools for analyzing the severity of DSP patients who require intensive care. Because our study had a retrospective design, prospective studies using such clinical scoring systems are necessary to further explore the differences in the severity of acute-poisoning patients according to alcohol co-ingestion.

Many acute-poisoning patients ingest poison or substances for the first time as an impulse or as a suicide attempt with no previous diagnosis of depression; however, some patients that ingest medications as a suicide attempt have a previous psychiatric history. In this study, 295 DSP patients (42.8%) had a previous psychiatric history, and 232 poisoning patients (33.7%) were admitted after taking hypnotosedatives and benzodiazepines. Overall, 47% of ALC- patients had a previous psychiatric history, significantly higher than the proportion of ALC+ patients. A previous study on intentional self-poisoning found that the likelihood of alcohol co-ingestion was lower in patients prescribed antidepressants and antipsychotics, which suggests that psychotropic medication may reduce alcohol co-ingestion during times of acute distress [9]. However, hypnotosedatives and antipsychotic drugs are easily accessible to patients with a previous psychiatric history, which would enable suicide attempts via prescription medication overdose. Therefore, it is important for emergency physicians to ask poisoning patients who visit the ED and their families detailed questions related to previous psychiatric history and medication. Among our DSP patients, approximately 45% of both groups underwent psychiatric interviews, with no significant differences between the two groups, which indicates that alcohol co-ingestion had no effect on the patient's or guardian's willingness to cooperate with a psychiatric interview or psychiatric risk intervention. Thus, proactive psychiatric counseling and intervention for follow-up observation are necessary to prevent subsequent repeated DSP regardless of whether alcohol has been co-ingested during acute poisoning in the ED.

Finally, there was a high AMA discharge rate among all poisoning patients (47.7%), with a greater AMA discharge rate in the ALC+ group and more admissions in the ALC– group. The same trend was observed in the DSP subgroup. Because impulsive poisoning occurs relatively frequently under the influence of alcohol, many patients and guardians do not realize the need for admission. Therefore, it is important to actively explain the need for admission and treatment to the patient and thoroughly explain the patient's condition and complications due to poisoning to both the guardian and patient.

This study had several limitations. First, the subjectivity of researchers could not be eliminated in the process of calculating the PSS according to alcohol ingestion. Second, there were limitations related to the categorization of poisoning patients into only two groups (ALC+ and ALC–), when various types and different amounts of substances have significant effects on the clinical condition of patients. Third, the mortality analyses only included in-hospital mortality, because there was no long-term follow-up of discharged patients. Thus, telephone consultations and outpatient observations of the AMA discharge patients in poisoning cases are necessary in future research. Therefore, prospective studies of alcohol co-ingestion and severity of poisoning that subdivide patients by poisoning substance are required.

Conclusion

Poisoning patients who co-ingested alcohol had lower admission rates and higher the AMA discharge rates in the ED. Alcohol co-ingestion in poisoning patients was a factor affecting admission to the general ward or ICU in the ED. Therefore, emergency physicians assessing the disposition of poisoning patients should be aware that poisoning patients who have co-ingested alcohol may be uncooperative and be at high risk for the AMA discharge.

Acknowledgements and Funding

The authors report this study did not receive any outside funding or support.

Availability of data and materials

This study's data would not be provided in order to protect patients' anonymity of the emergency department, but this data are available from the corresponding author on reasonable request.

Author contributions

JYL and WJL performed data analysis and drafted the manuscript. DHK and SHS acquired data and critical revisions to the manuscript. SHW managed the data and revisions to the manuscript. All authors have read and approved the final manuscript.

Ethics approval and consent to participate

All procedures performed in studies involving the patients were in accordance with the ethical standards of the institutional and/or national research. The protocol was approved by the Institutional Review Board of our Hospital (OC18RESI0031). As the clinical measurements were part of routine patient management in the emergency department, informed consent was unnecessary, which was confirmed by the institutional review of board.

Conflicts of interest

The authors do not have any financial or other relationships that might pose any conflicts of interest.

References

1. Boenisch S, Bramesfeld A, Mergl R, Havers I, Althaus D, Lehfeld H, et al. The role of alcohol use disorder and alcohol consumption in suicide attempts--a secondary analysis of 1921 suicide attempts. *Eur Psychiatry*. 2010 ;25(7):414-20.
2. Hendrix L, Verelst S, Desruelles D, Gillet JB. Deliberate self-poisoning: characteristics of patients and impact on the emergency department of a large university hospital. *Emerg Med J*. 2013;30(1):e9.
3. Teo AI, Cooper JG. The epidemiology and management of adult poisonings admitted to the short-stay ward of a large Scottish emergency department. *Scott Med J*. 2013;58(3):149-53.
4. Bagge CL, Lee HJ, Schumacher JA, Gratz KL, Krull JL, Holloman G Jr. Alcohol as an acute risk factor for recent suicide attempts: a case-crossover analysis. *J Stud Alcohol Drugs*. 2013;74(4):552-8.
5. Borruso LD, Buckley NA, Kirby KA, Carter G, Pilgrim JL, Chitty KM. Acute Alcohol Co-Ingestion and Hospital-Treated Deliberate Self-Poisoning: Is There an Effect on Subsequent Self-Harm? *Suicide Life Threat Behav*. 2019;49(1):293-302
6. Runeson B, Tidemalm D, Dahlin M, Lichtenstein P, Långström N. Method of attempted suicide as predictor of subsequent successful suicide: national long term cohort study. *BMJ*. 2010 13;341:c3222.
7. Weathermon R, Crabb DW. Alcohol and medication interactions. *Alcohol Res Health*. 1999;23(1):40-54.
8. Persson HE, Sjöberg GK, Haines JA, Pronczuk de Garbino J. Poisoning severity score. Grading of acute poisoning. *J Toxicol Clin Toxicol*. 1998;36(3):205-13.
9. Chitty KM, Dobbins T, Dawson AH, Isbister GK, Buckley NA. Relationship between prescribed psychotropic medications and co-ingested alcohol in intentional self-poisonings. *Br J Psychiatry*. 2017;210(3):203-8.
10. Oh SH, Kim HJ, Kim SH, Kim YM, Park KN. Which deliberate self-poisoning patients are most likely to make high-lethality suicide attempts? *Int J Ment Health Syst*. 2015 7;9:35.
11. O'Loughlin S, Sherwood J. A 20-year review of trends in deliberate self-harm in a British town, 1981-2000. *Soc Psychiatry Psychiatr Epidemiol*. 2005;40(6):446-53.
12. Michel K, Ballinari P, Bille-Brahe U, Bjerke T, Crepet P, De Leo D, et al. Methods used for parasuicide: results of the WHO/EURO Multicentre Study on Parasuicide. *Soc Psychiatry Psychiatr Epidemiol*. 2000;35(4):156-63.
13. Kristinsson J, Palsson R, Gudjonsdottir GA, Blondal M, Gudmundsson S, Snook CP. Acute poisonings in Iceland: a prospective nationwide study. *Clin Toxicol (Phila)*. 2008;46(2):126-32.

14. Spiller HA, Appana S, Brock GN. Epidemiological trends of suicide and attempted suicide by poisoning in the US: 2000-2008. *Leg Med (Tokyo)*. 2010;12(4):177-83.
15. Chitty KM, Kirby K, Osborne NJ, Isbister GK, Buckley NA. Co-ingested alcohol and the timing of deliberate self-poisonings. *Aust N Z J Psychiatry*. 2018;52(3):271-8.
16. Peter JV, Thomas L, Graham PL, Moran JL, Abhilash KP, Jasmine S, et al. Performance of clinical scoring systems in acute organophosphate poisoning. *Clin Toxicol (Phila)*. 2013;51(9):850-4.
17. Akdur O, Durukan P, Ozkan S, Aysarogullari L, Vardar A, Kavalci C, et al. Poisoning severity score, Glasgow coma scale, corrected QT interval in acute organophosphate poisoning. *Hum Exp Toxicol*. 2010;29(5):419-25.

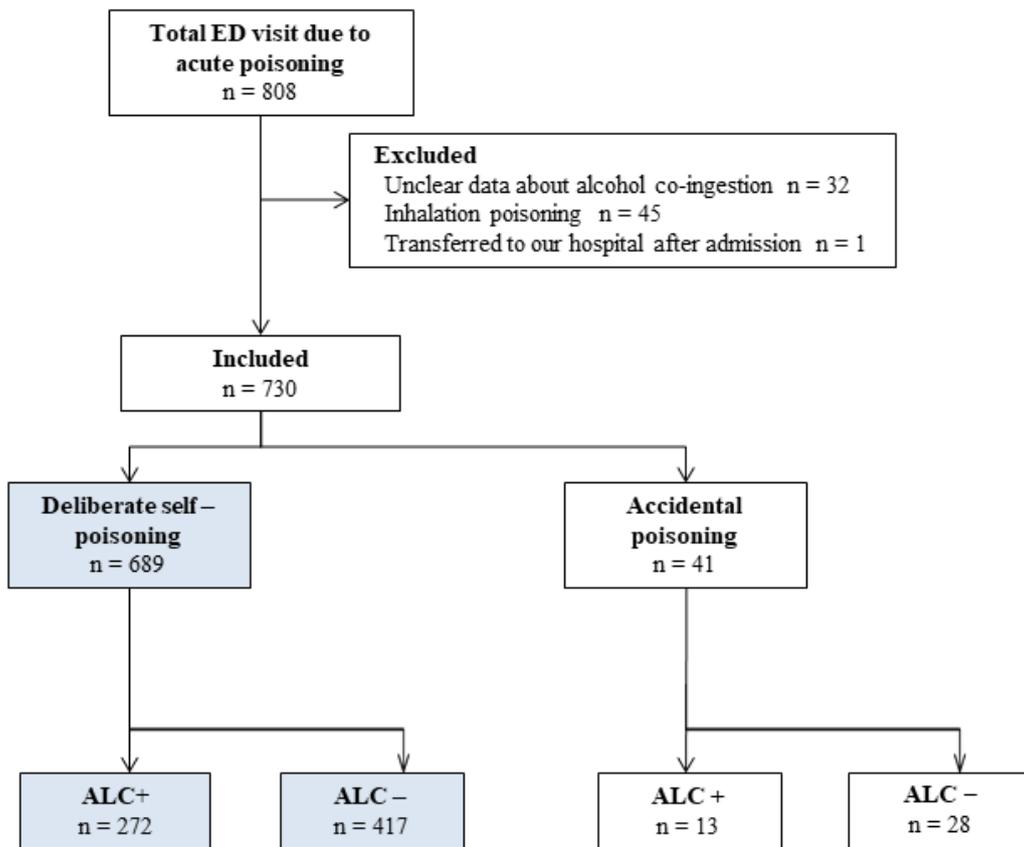


Figure 1. Inclusion criteria flowchart.

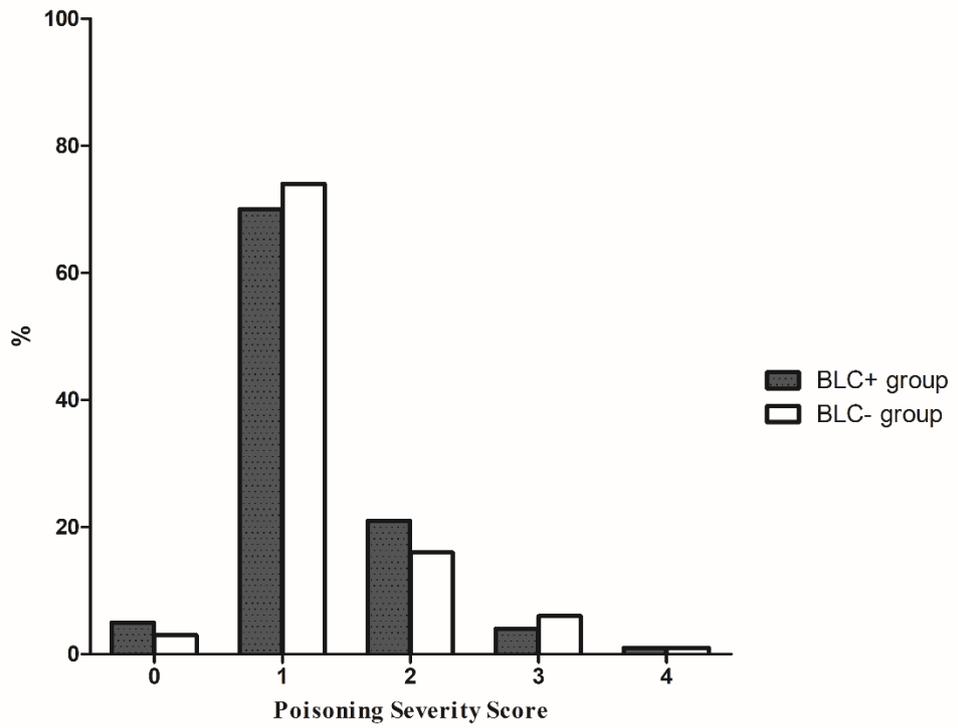
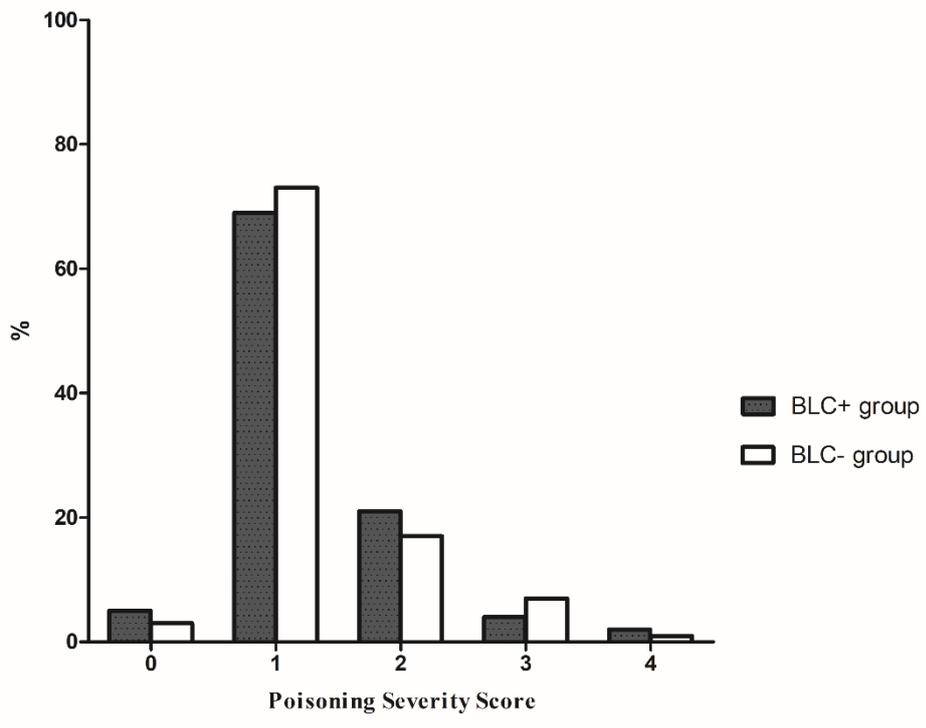


Figure 2. Poisoning severity score (PSS).

(A) Across all patients. (B) Among deliberate self-poisoning patients.

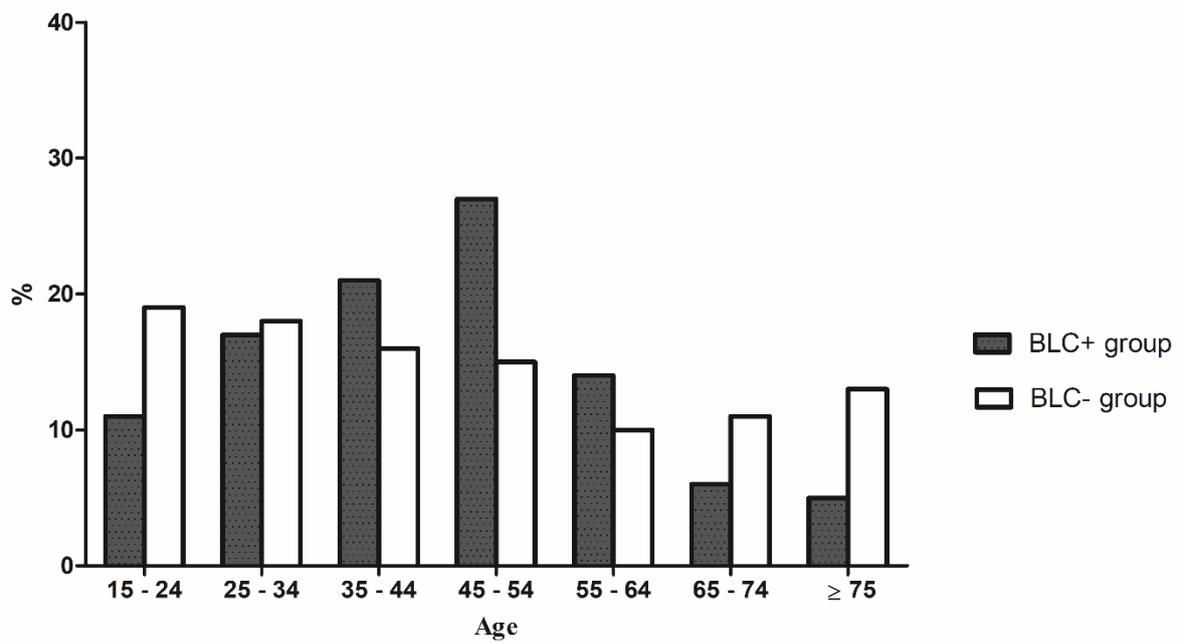


Figure 3. Age distribution of acute-poisoning patients.

The age distribution differed between the ALC+ and ALC- groups ($p < 0.001$).

Table 1. Substance exposure in acute-poisoning patients.

Substance	ALC+ (n = 285) (n [%])	ALC- (n = 445) (n [%])
Over-the-counter drug		
Antihistamine	16 (5.6)	25 (5.6)
Acetaminophen & Salicylates	28 (9.8)	28 (6.3)
Others	6 (2.1)	5 (1.1)
Antidepressants & Antipsychotics	33 (11.6)	35 (7.9)
Hypnotics & Benzodiazepine	80 (28.1)	152 (34.2)
Pesticides & Insecticides	38 (13.3)	45 (10.1)
Household products	19 (6.7)	41 (9.2)
Mixture of drugs (>3 types)	36 (12.9)	73 (16.4)
Others	29 (10.2)	41 (9.2)

Abbreviations: ALC+, alcohol co-ingestion group; ALC-, non-alcohol group.

Table 2. Clinical characteristics of poisoning patients who visited the emergency department.

Parameter	ALC + (n = 285)	ALC- (n = 445)	P value
Age (years)	45.0 ± 15.5	46.9 ± 20.7	0.154
Male (n [%])	125 (43.9)	139 (31.2)	0.001
Cause–Intentional (n [%])	272 (95.4)	417 (93.7)	0.322
Accidental (n [%])	13 (4.6)	28 (6.3)	
Initial vital signs at the ED			
Systolic blood pressure (mmHg)	123.3 ± 22.1	126.2 ± 26.4	0.121
Diastolic blood pressure (mmHg)	75.8 ± 14.5	76.1 ± 15.3	0.739
Pulse rate (pulse/min)	93.6 ± 19.0	88.8 ± 21.3	0.002
Respiratory rate (breaths/min)	19.5 ± 4.2	19.2 ± 2.5	0.354
GCS < 13 (score [%])	83 (29.1)	140 (31.5)	0.503
Time from the event to ED arrival (n = 717) (n [%])			
< 1 h	145 (51.6)	157 (36.0)	0.001
1–3 h	65 (23.1)	125 (28.7)	
3–6 h	25 (8.9)	52 (11.9)	
6–12 h	27 (9.6)	48 (11.0)	
> 12 h	19 (6.8)	54 (12.4)	
Time of ED arrival (n [%])			
00:00–06:00	83 (29.1)	88(19.8)	< 0.001
06:00–12:00	53 (18.6)	97 (21.8)	
12:00–18:00	51 (17.9)	130 (29.2)	
18:00–00:00	98 (34.4)	130 (29.2)	
Type of visit to the ED (n [%])			
EMS	206 (72.3)	290 (65.2)	0.065
Direct visit without EMS	67 (23.5)	121 (27.2)	
Transferred from a primary hospital	12 (4.2)	34 (7.6)	
Outcomes			
Admission	97 (34.0)	186 (41.8)	0.036
ICU admission	76 (26.7)	140 (31.5)	0.166
AMA discharge	136 (47.7)	157 (35.3)	0.001

Abbreviations: ALC+, alcohol co-ingestion group; ALC-, non-alcohol group; ED, emergency department; EMS, emergency medical services; GCS, Glasgow coma scale; ICU, intensive care unit; AMA, against medical advice.

Table 3. Clinical characteristics of deliberate self-poisoning patients who visited the emergency department.

Parameter	ALC+ (n = 272)	ALC- (n = 417)	P value
Age (years)	44.8 ± 15.4	46.6 ± 21.0±	0.193
Male (n [%])	119 (43.7)	128 (30.7)	< 0.001
Types of drug (n = 682) (n [%])			
1	154 (56.8)	228 (55.5)	0.182
2–3	72 (26.6)	93 (22.6)	
≥ 4	45 (16.6)	90 (21.9)	
Initial vital signs at the ED			
Systolic blood pressure (mmHg)	123.1 ± 22.0	125.4 ± 26.7	0.229
Diastolic blood pressure (mmHg)	75.7 ± 14.3	75.5 ± 15.4	0.998
Pulse rate (pulse/min)	93.7 ± 19.2	89.1 ± 21.6	0.004
Respiratory rate (breaths/min)	19.5 ± 4.3	19.3 ± 2.6	0.340
GCS < 13 (score [%])	80 (29.4)	139 (33.3)	0.280
Previous suicide attempt (n [%])	72 (26.5)	91 (21.8)	0.161
Previous MDD history (n [%])	83 (30.5)	149 (35.7)	0.157
Time from event to ED arrival (n [%])			
< 1 h	140 (52.2)	142 (34.8)	< 0.001
1–3 h	65 (24.3)	118 (28.9)	
3–6 h	23 (8.6)	50 (12.3)	
6–12 h	25 (9.3)	47 (11.5)	
>12 h	15 (5.6)	51 (12.5)	
Time of ED arrival (n [%])			
00:00–06:00	78 (28.7)	84 (20.1)	0.001
06:00–12:00	49 (18.0)	93 (22.3)	
12:00–18:00	50 (18.4)	120 (28.8)	
18:00–00:00	95 (34.9)	120 (28.8)	
Type of visit to the ED (n [%])			
EMS	200 (73.5)	285 (68.3)	0.083
Direct visit without EMS	61 (22.4)	98 (23.5)	
Transferred from a primary hospital	11 (4.0)	34 (8.2)	

Abbreviations: ALC+, alcohol co-ingestion group; ALC-, non-alcohol group; ED, emergency department; MDD, major depressive disorder; EMS, emergency medical services; GCS, Glasgow coma scale.

Table 4. Outcomes of DSP poisoning patients in the emergency department.

	ALC+ (n = 272) (n [%])	ALC- (n = 417) (n [%])	P value
Admission	94 (34.6)	181 (43.4)	0.020
ICU admission	76 (27.9)	139 (33.3)	0.135
AMA discharge	130 (47.8)	148 (35.5)	0.001
ICU length of stay (n = 215, days)	3 (2–4)	3 (2–4)	0.105
Endotracheal intubation	17 (6.3)	30 (7.2)	0.631
Psychiatric interview	122 (44.9)	189 (45.3)	0.903
Death	2 (0.7)	3 (0.7)	0.981

Abbreviations: ALC+, alcohol co-ingestion group; ALC-, non-alcohol group; AMA, against medical advice; ICU, intensive care unit.

Table 5. Multivariate analysis for prediction of admission in DSP

	Univariate odds ratio (95% CI)	p-value	Multivariate odds ratio (95% CI)	p-value
Absence of alcohol co-ingestion	1.45 (1.06-1.99)	0.021	1.41 (1.01-1.96)	0.042
Poisoning severity score	1.99 (1.55-2.56)	< 0.001	1.74 (1.34-2.27)	< 0.001
Previous MDD history	1.55 (1.13-2.14)	0.007	1.57 (1.13-2.19)	0.008
GCS < 13	2.53 (1.82-3.52)	< 0.001	2.09 (1.48-2.95)	< 0.001

Abbreviations: GCS, Glasgow coma scale.

Figures

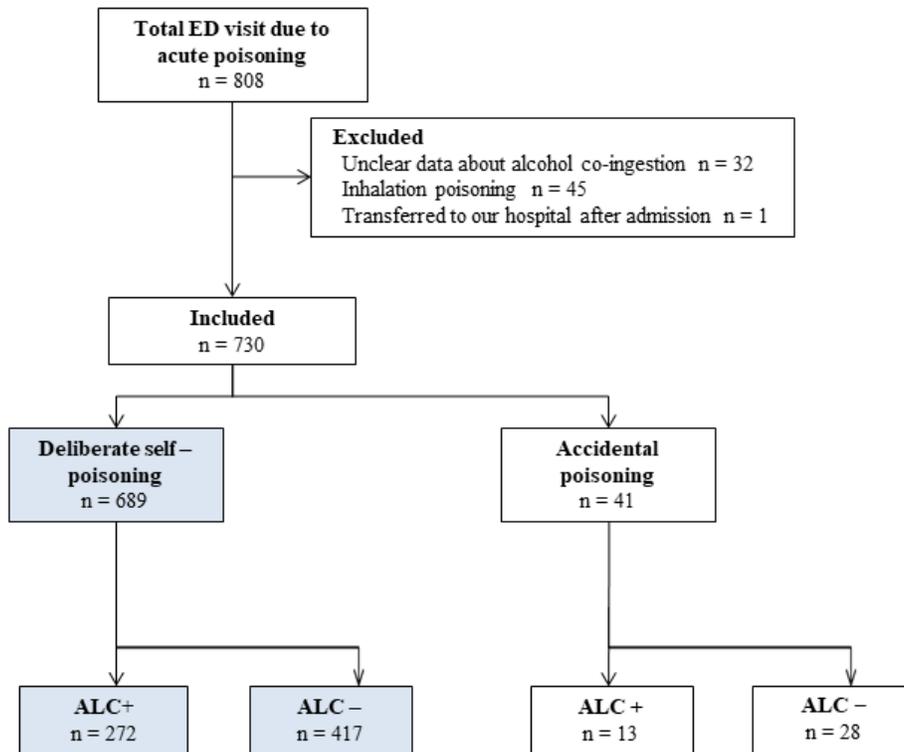


Figure 1

Inclusion criteria flowchart.

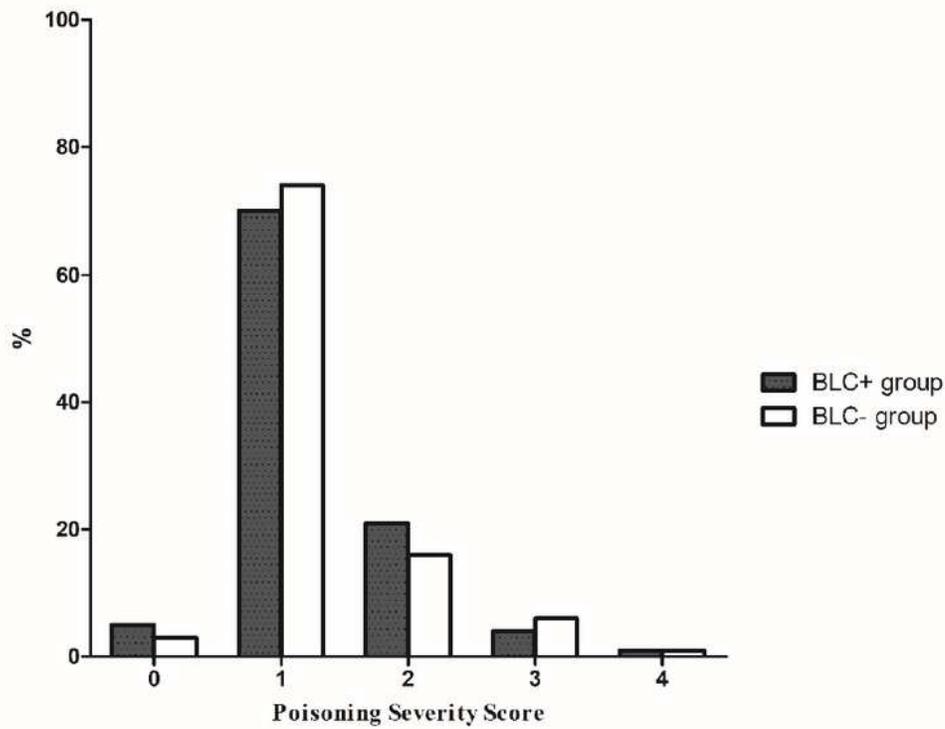
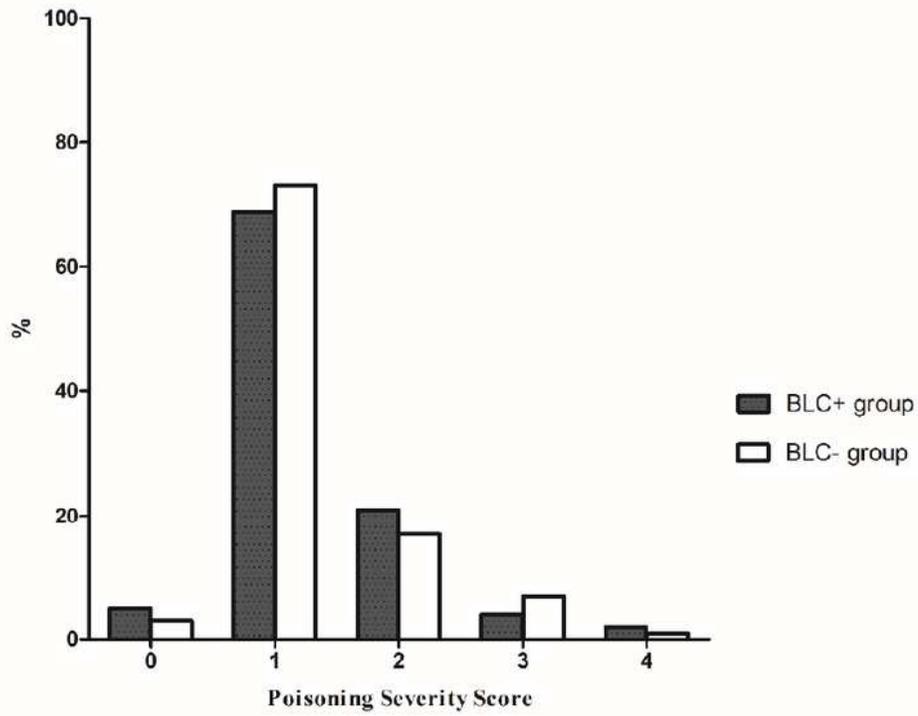


Figure 2

Poisoning severity score (PSS). (A) Across all patients. (B) Among deliberate self-poisoning patients.

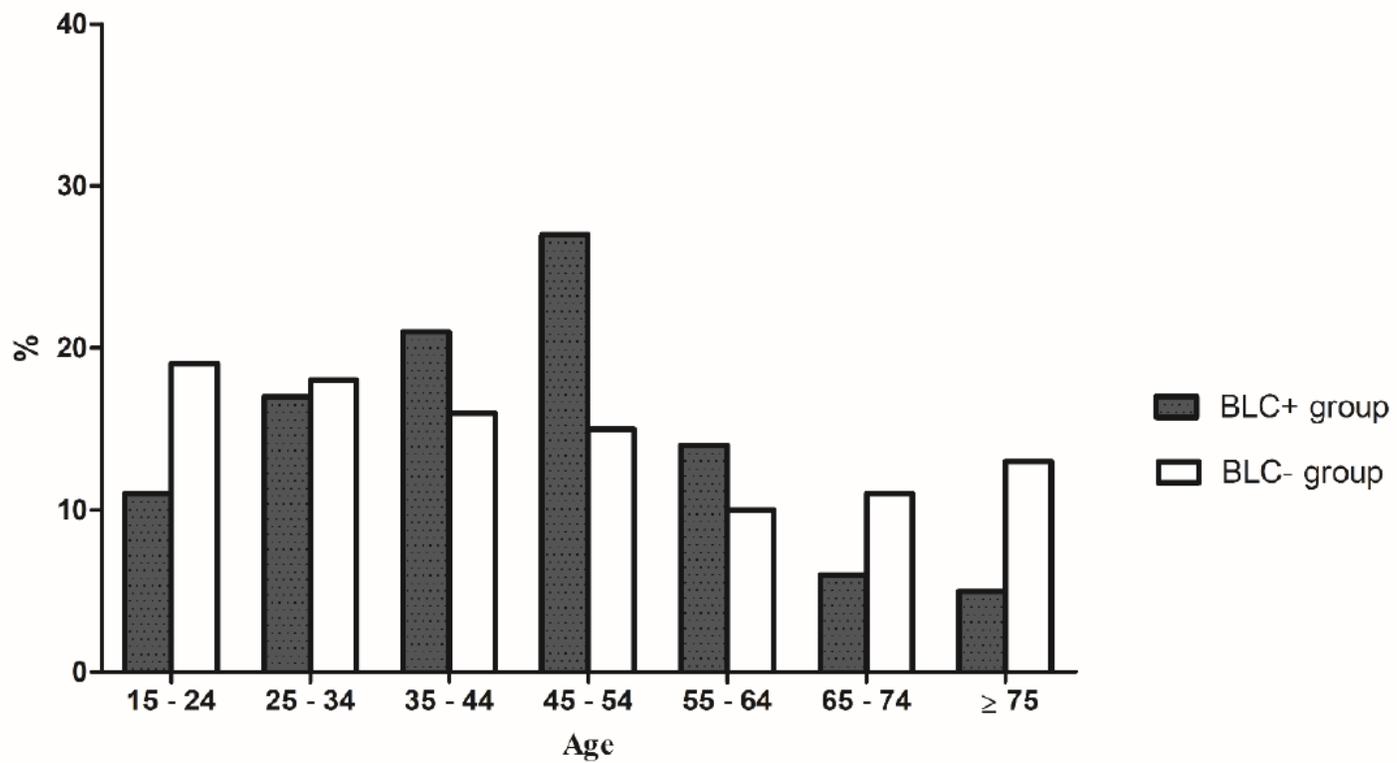


Figure 3

Age distribution of acute-poisoning patients. The age distribution differed between the ALC+ and ALC- groups ($p < 0.001$).