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[原著]

Japanese Alcohol Prevention Education during Early Education as a Protective Factor against Potentially Lethal Drinking among Students at a Women's University.

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Summary

Few studies have determined whether the effects of the Japanese alcohol prevention education during compulsory education persist even after entering college. We investigated drinking behavior among women's university students to determine whether the alcohol prevention education was still effective in preventing life-threatening alcohol consumption. A questionnaire survey was conducted for students in their third or fourth academic year at a women's university. Five hundred and six students who reported alcohol use were included in the analysis. We defined potentially lethal drinking as that causing memory loss, falling asleep, or being taken to a hospital by ambulance due to acute alcohol poisoning and described such cases as "high-impact drinking". A multivariable logistic regression analysis was used to determine factors associated with high-impact drinking. Among the 506 students, 112 reported high-impact drinking. A multivariable logistic regression analysis revealed that protective factors for high-impact drinking were alcohol prevention education during elementary school (adjusted odds ratio [AOR], 0.47), being a flusher (AOR, 0.38) and being involved in student clubs for cultural activities (AOR, 0.35). Involvement in inter-university club activities was a major risk factor for high-impact drinking (AOR, 3.52) and it was very strongly associated with forced drinking at club welcome parties for new students (phi = 0.54). For students in women's university, Japanese alcohol prevention education in elementary school (5^{th} and 6^{th} grade) suppresses high-impact drinking during one's late teens and early 20s, probably by keeping them away from high-impact drinking opportunities, such as welcome parties for new students hosted by inter-university clubs.

Keywords: alcohol education, alcohol-induced blackout, female college students, harmful alcohol use, protective factors

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Introduction

School-based alcohol prevention programs have been reported to be effective in preventing underage alcohol use (1, 2). The prevalence of alcohol consumption among adolescents is gradually decreasing in Japan (3) and alcohol prevention education in elementary, middle, and high schools may have contributed to this. However, some students who did not drink during high school start drinking once they became college students, which leads to life-threatening alcohol consumption. Few studies have determined whether the effects of the Japanese alcohol prevention education in elementary, middle, and high schools persist even after entering college. Women and men exhibit different drinking behaviors. In the present study, we investigated drinking behavior among exclusively women's university students and determined whether alcohol prevention education provided before entering university was still effective in preventing life-threatening alcohol consumption, using a multivariable logistic regression analysis of risk factors and protective factors for potentially lethal drinking.

Materials and Methods

Subjects

The survey was conducted among 589 female students in their third or fourth academic year who belonged to the Faculty of Nursing or Faculty of Arts and Letters at a Women's University in Japan. The study was approved by the Research Ethics Committee of K******* Women's University (Approval number: KWU-IRBA #18012). One week before the survey, the authors distributed an explanatory document concerning the research to the subjects, in which the purpose and outline of the study were written, and it was explained that participation in the study was voluntary and would not confer any disadvantages due to non-participation in the study; their responses would remain anonymous; withdrawal from the study was possible until the time of posting the questionnaire in the collection box; those who did not agree to participate in the research could leave the questionnaire form blank and drop it in the collection box.

On the day of the survey, the questionnaires were distributed by research assistants during a break after the lecture. The explanatory document was explained verbally by the assistant to the subjects at the beginning of the survey. After completing the questionnaire, the participants consented to participate in the study by posting the questionnaires in the collection box. The questionnaires were collected by the assistants on the day they were distributed, using the collection box set up in the lecture room, in an environment without lecturer supervision.

The survey was conducted in July 2018. We eliminated from the study any college students ≥ 25 years old and those with no alcohol use.

Questionnaires

An anonymous, self-administered questionnaire was used for the survey. The survey included questions on age; faculty; academic year in the university; drinking experience; age at first alcohol use; smoking experience; presence and timing of facial flushing after drinking alcohol; attendance of lectures on alcohol prevention education during elementary school (5th and 6th grade), middle school, and high school; involvement in student clubs for sports activities, all-round

activities, and cultural activities; involvement in inter-university clubs; drinkers in the subject's family; persons with whom the subjects drink; experience with *ikki* drinking; experience with binge drinking; experience with forced drinking at a welcome party of a student club for new students; and experience with harmful short-term effects of alcohol. Furthermore, the survey included an Alcohol Use Disorders Identification Test (AUDIT) (4). We regarded subjects who showed facial flushing immediately after alcohol drinking as flushers.

We defined potentially lethal drinking causing a rapid rise in the blood alcohol concentration (BAC) over a short period of time as high-impact drinking, including drinking resulting in blackout; falling asleep while at the place where drinking occurred, at transportation facilities, or on the road; and being taken to a hospital by ambulance due to acute alcohol poisoning.

Binge drinking for Japanese women is defined as consumption of 40 g ethanol (4 drinks) or more in a 2-h period, with one drink equivalent to 10 g ethanol for Japanese individuals.

Ikki drinking in Japan is defined as drinking a full cup of alcohol in a short period of time, typically seen at a drinking party or on other occasions while other attendees watch (5).

Statistical analyses

Statistical analyses were conducted using the R software program, version 4.2.2 (6), mainly via the graphical user interface EZR (Easy R) (7). For the Hosmer–Lemeshow goodness of fit test, the R package ResourceSelection version 0.3-5 (8) was used. To calculate the phi coefficient of correlation, the R package psych version 2.2.9 (9) was used. A p-value of < 0.05 was considered statistically significant.

Normally distributed data for continuous variables were expressed as the mean (standard deviation), and non-normally distributed data were summarized using the median (1st quartile–3rd quartile). Continuous variables were compared between the two groups using the Mann–Whitney U-test when data were non-normally distributed. Categorical variables were compared between the two groups using Fisher's exact test. The phi coefficient was used to measure the association between two binary variables.

Basic characteristics and drinking behavior in those with a history of high-impact drinking (high-impact drinking group) were compared to those without a history of high-impact drinking (no-high-impact drinking group). We investigated each relationship between involvement in inter-university club activities and the following factors: involvement in student clubs (i.e. cultural, sports, and all-round activities), forced drinking at welcome parties of student clubs for new students, and *ikki* drinking, namely being forced to drink an entire glass of alcohol in one gulp, respectively. Furthermore, the relationship between forced drinking at a club welcome party for new students and *ikki* drinking was also studied.

A univariable logistic regression analysis was used to analyze variables associated with high-impact drinking, in which variables with $p < 0.15$ were considered for inclusion in the multivariable logistic regression model. To reduce multicollinearity, one of the two correlated variables was omitted. To prevent overfitting, the number of explanatory variables was reduced to meet the rule of 10 events per variable. To detect multicollinearity of explanatory variables entered into the multivariable logistic regression model, generalized

variance inflation factor (GVIF) and GVIF^(1/(2*Df)), where Df stands for "degrees of freedom", were calculated. If GVIF^(1/(2*Df)) was 2 or higher, existence of multicollinearity was considered.

To determine independent factors associated with high-impact drinking, a multivariable logistic regression analysis was performed in an explorative manner. Backward elimination with a p-value criterion of 0.05 was used to obtain the final multivariable logistic regression model. The adjusted odds ratio (AOR) with the 95% confidence interval (CI) of each explanatory variable in the final model was calculated. The area under the receiver operating characteristic curve (AUC) with the 95% CI was calculated for the final logistic regression model to measure the discrimination ability of the model. The Hosmer–Lemeshow goodness-of-fit test was used to assess the calibration of the final logistic regression model.

Results

Of the 589 students to whom questionnaires were distributed, 552 responded (response rate: 93.7%), and 35 participants were excluded from the study due to non-completion of items that were essential for the analysis, such as the age, academic year in the university, drinking experience, presence of flushing after drinking alcohol, and experience with harmful short-term effects of alcohol. The final valid response rate was 87.8%. All students who answered their age were under 25 years old. After excluding 11 students without alcohol use, 506 participants were available for the analysis.

Of the 506 female students analyzed, 160 belonged to Faculty of Nursing, and 346 belonged to the Faculty of Arts and Letters; 249 were in their third academic year, and 257 were in their fourth academic year. The median age (1st-3rd quartile) was 21.4 (20.8–21.9) years old, with a minimum of 20.3 years old and maximum of 24.3 years old. Participants reported their attendance at lectures on alcohol prevention education in elementary school (n = 96, 19.0%), middle school (n = 238, 47.0%), and high school (n = 259, 51.2%). Of the 506 students with alcohol consumption, 70 (13.8%) had started drinking before graduating from high school, and 183 (36.2%) had started drinking before 20 years old (the age of legal alcohol consumption in Japan) after graduating from high school. High-impact drinking was reported by 112 students (high-impact drinking group), of whom 101 had lost their memory, 30 had fallen asleep at the place where drinking occurred or in transportation facilities or on the road, and 2 had been taken to a hospital by ambulance due to acute alcohol intoxication.

The basic characteristics and drinking behavior of the subjects in the high-impact drinking group (n = 112) and the no-high-impact drinking group (n = 394) are summarized in Tables 1 and 2, respectively. In comparison with the no-high-impact drinking group, a higher proportion of subjects in the high-impact drinking group had experienced forced drinking at a club welcome party for new students (45.9% vs. 10.9%, $p < 0.0001$), *ikki* drinking (68.8% vs. 22.1%, $p < 0.0001$), and binge drinking (59.6% vs. 16.3%, $p < 0.0001$) (Table 2). High-impact drinking was very strongly associated with forced drinking at club welcome parties for new students (phi = 0.37), *ikki* drinking (phi = 0.41), and binge drinking (phi = 0.41) (Table 2). Subjects in the high-impact drinking group had higher

Table 1. Characteristics of subjects with and without experience of high-impact drinking.

	High-impact drinking group (n = 112)	No-high-impact drinking group (n = 394)	p-value
Age (years)	21.5 (20.8–22.0)	21.3 (20.8–21.8)	0.11
Academic year in university			0.010
3rd year	43 (38.4)	206 (52.3)	
4th year	69 (61.6)	188 (47.7)	
Faculty			0.011
Nursing	47 (42.0)	113 (28.7)	
Arts and Letters	65 (58.0)	281 (71.3)	
Flusher	20 (17.9)	140 (35.5)	0.0003
Attendance of lectures on alcohol prevention education [a]			
During elementary school	13 (11.8)	83 (21.4)	0.028
During middle school	43 (39.1)	195 (50.4)	0.040
During high school	54 (49.1)	205 (53.0)	0.52
Age at first alcohol use			< 0.0001
After 20 years old	28 (25.0)	225 (57.1)	
Under 20 years old and after graduating from high school	52 (46.4)	131 (33.2)	
During high school	20 (17.9)	17 (4.3)	
During middle school or earlier	12 (10.7)	21 (5.3)	
Drinker in family [b]			
Mother	78 (69.6)	233 (59.3)	0.048
Father	94 (83.9)	292 (74.3)	0.043
Siblings	42 (37.5)	150 (38.2)	0.91
Smoking experience	20 (17.9)	16 (4.1)	< 0.0001
Involvement in student clubs inside and outside of the women's university [c]			
Cultural activities	17 (15.2)	142 (36.2)	< 0.0001
Sports activities	49 (43.8)	73 (18.6)	< 0.0001
All-round activities	17 (15.2)	13 (3.3)	< 0.0001
Involvement in inter-university clubs	68 (60.7)	107 (27.2)	< 0.0001

Median (1st quartile – 3rd quartile) are shown for continuous variable; numbers (percentages) are shown for categorical variables.

[a] n = 110 in "High-impact drinking" group, n = 387 in "No-high-impact drinking" group.

[b] n = 393 in "No-high-impact drinking" group.

[c] n = 392 in "No-high-impact drinking" group.

Table 2. Drinking behavior of subjects with and without experience of high-impact drinking.

	Total (n = 506)	High-impact drinking group (n = 112)	No-high-impact drinking group (n = 394)	p-value [a]	phi [b]
Person with whom to drink [c]					
Friends	417	98 (87.5)	319 (81.4)	0.16	
Fellow in student club	96	35 (31.3)	61 (15.6)	0.0004	
Colleague in part-time job workplace	119	32 (28.6)	87 (22.2)	0.17	
Senior of university	46	16 (14.3)	30 (7.7)	0.04	
Parents and siblings	158	23 (20.5)	135 (34.4)	0.0054	
Drink exclusively by oneself	77	10 (8.9)	67 (17.1)	0.037	
Forced drinking at club welcome party for new students [d]	94	51 (45.9)	43 (10.9)	< 0.0001	0.37
Ikki drinking	164	77 (68.8)	87 (22.1)	< 0.0001	0.41
Binge drinking [e]	128	65 (59.6)	63 (16.3)	< 0.0001	0.41
AUDIT score [d]		10 (6–15.5)	2 (1–4)	< 0.0001	
AUDIT risk level [d]				< 0.0001	
1	394	34 (30.6)	360 (91.4)		
2	82	49 (44.1)	33 (8.4)		
3	16	15 (13.5)	1 (0.3)		
4	13	13 (11.7)	0 (0)		

Median (1st quartile – 3rd quartile) are shown for continuous variable; n (%) are shown for categorical variables.

[a] p-value using Fisher's exact test.
[b] phi coefficient of correlation.
[c] n = 392 in “No-high-impact drinking” group.
[d] n = 111 in “High-impact drinking” group.
[e] n = 109 in “High-impact drinking” group”, n = 386 in “No-high-impact drinking” group.

AUDIT scores than those in the no-high-impact drinking group ($p < 0.0001$) (Table 2).

Data concerning involvement in inter-university club activities are summarized in Table 3. Involvement in inter-university club activities was very strongly associated with involvement in student clubs for sports activities and/or for all-round activities (phi = 0.67). Furthermore, involvement in inter-university club activities was very strongly associated with forced drinking at club welcome parties for new students (phi = 0.54) and *ikki* drinking (phi = 0.37) (Table 3). Forced drinking at club

Table 3. A comparison between subjects with and without experience of involvement in inter-university club activities.

	Total (n = 506)	Inter-university club activities (n = 175)	None of inter-university club activities (n = 331)	p-value [a]	phi [b]
Student clubs inside and outside of the university [c]					
Cultural activities	159	46 (26.6)	113 (34.1)	0.087	-0.077
Sports activities	122	101 (58.4)	21 (6.3)	< 0.0001	0.58
All-round activities	30	26 (15.0)	4 (1.2)	< 0.0001	0.28
Sports activities and/or all-round activities	149	124 (71.7)	25 (7.6)	< 0.0001	0.67
Forced drinking at club welcome party for new students [d]	94	83 (47.7)	11 (3.3)	< 0.0001	0.54
Ikki drinking	164	98 (56.0)	66 (19.9)	< 0.0001	0.37

Numbers and percentages are shown.

[a] p-value using Fisher's exact test.

[b] phi coefficient of correlation.

[c] n = 173 in "Inter-university club activities" group.

[d] n = 174 in "Inter-university club activities" group.

welcome parties for new students was very strongly associated with *ikki* drinking (phi = 0.33).

The variables listed in Table 1 are candidates for explanatory variables for the multivariable analysis. Of the variables "age" and "academic year in the university", "age" was omitted because the p-value in the univariable analysis was 0.15 for "age" and 0.0099 for "academic year". The variables "involvement in student clubs for sports activities" and "involvement in student clubs for all-round activities" were combined into the single variable "involvement in student clubs for sports activities and/or all-round activities", which was very strongly associated with the variable "involvement in inter-university club activities" (phi = 0.67) (Table 3). Among these variables, we chose "involvement in inter-university club activities" as the explanatory variable for the multivariable model.

Table 4. Univariable and multivariable logistic regression analyses for factors associated with high-impact drinking.

	Univariable analysis		Multivariable analysis	
	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Alcohol prevention education during elementary school	0.49 (0.26–0.92)	0.026	0.47 (0.23–0.97)	0.041
Alcohol prevention education during middle school	0.63 (0.41–0.97)	0.037		
Flusher	0.39 (0.23–0.67)	0.0005	0.38 (0.21–0.68)	0.0011
Involvement in student clubs for cultural activities	0.32 (0.18–0.55)	< 0.0001	0.35 (0.19–0.65)	0.0009
Involvement in inter-university club activities	4.15 (2.67–6.43)	< 0.0001	3.52 (2.14–5.78)	< 0.0001
Smoking experience	5.14 (2.56–10.30)	< 0.0001	3.30 (1.48–7.35)	0.0035
Mother's drinking	1.58 (1.00–2.47)	0.048		
Age at first alcohol use		< 0.0001		< 0.0001
After 20 years old	1 (reference)		1 (reference)	
Under 20 years old and after graduating from high school	3.19 (1.92–5.30)	< 0.0001	2.39 (1.36–4.21)	0.0024
During high school or earlier	6.77 (3.67–12.50)	< 0.0001	4.84 (2.38–9.86)	< 0.0001
Faculty				
Arts and Letters	1 (reference)			
Nursing	1.80 (1.16–2.78)	0.0081		
Academic year in university				
3rd year	1 (reference)		1 (reference)	
4th year	1.76 (1.14–2.70)	0.0099	1.82 (1.10–3.01)	0.019

OR, odds ratio; CI, confidence interval.

There was a strong association between the variables “mother's drinking habit” and “father's drinking habit” (phi = 0.20), so we chose the “mother's drinking habit” as the explanatory variable for the multivariable model. The number of

categories of the variable “age at first alcohol use” was reduced from four to three.

Finally, the following variables were entered into the multivariable logistic regression model associated with high-impact drinking: alcohol prevention education during elementary school, alcohol prevention education during middle school, flusher, involvement in student clubs for cultural activities, involvement in inter-university club activities, smoking experience, mother's drinking habit, age at first alcohol use, faculty, and academic year in university. We had an effective sample size which meets the rule of 10 events per variable, that is, 112 high-impact drinking cases for the 11 explanatory variables. Since each value of GVIF^(1/(2*Df)) for the explanatory variables entered into the multivariable logistic regression model was less than 2, where the values were in the range 1.02–1.07, the result indicated no evidence of multicollinearity among all explanatory variables.

The final model of the multivariable logistic regression analysis associated with high-impact drinking is shown in Table 4. The final model indicated that alcohol prevention education during elementary school, being a flusher, and being involved in student clubs for cultural activities were independent protective factors against high-impact drinking. Furthermore, involvement in inter-university club activities, smoking experience, alcohol use under 20 years old, and being in one’s fourth academic year (vs. third year) were independent risk factors for high-impact drinking. The AUC for the final logistic regression model was 0.81 (95% CI, 0.77–0.86). The Hosmer–Lemeshow goodness-of-fit test (chi-squared = 5.69, Df = 8, p = 0.68) showed that there was no evidence that the model provided a poor fit.

Discussion

Alcohol-induced memory impairment, known as blackout, resulting from hippocampal impairment by alcohol (10) occurs when the BAC reaches a certain level, i.e. 0.20–0.25 g/dL (11, 12, 13), after rising rapidly (11, 14). Falling asleep, which is seen as the sedative effect of alcohol on the central nervous system, occurs at a similar BAC of around 0.23 mg/dL in normal subjects (15). In contrast, lethal toxic effects of alcohol on the brainstem respiratory center occur at a BAC of 0.25–0.30 g/dL (16). Therefore, the BAC that causes either blackout or passing out is an almost life-threatening value in the acute phase. In this sense, we defined drinking that causes blackout, passing out, and acute alcoholic intoxication as high-impact drinking.

In the present study, blackout (n = 101, 90.2%) was seen in a significant portion of high-impact drinking (n = 112), but inquiring only about the subjects’ experience with blackout is not enough to detect experience with potentially life-threatening drinking.

Forced drinking at club welcome parties for new students is very strongly associated with high-impact drinking (phi = 0.37) (Table 2). Subjects who have experienced forced drinking at club welcome parties for new students were present in a significantly higher proportion in the high-impact drinking group than in the no-high-impact drinking group (45.9% vs. 10.9%, p < 0.0001) (Table 2). Furthermore, forced drinking at club welcome parties for new students is very strongly associated with involvement in inter-university clubs (phi = 0.54) (Table 3). This implies that participation in a welcome party of an

inter-university club for new students is dangerous for women's university students, as it may induce forced drinking and ultimately high-impact drinking. This was also shown in the multivariable analysis in our study, wherein involvement in an inter-university club was a major risk factor for high-impact drinking.

A common method of forced drinking at club welcome parties for new students in Japan is *ikki* drinking (chug-a-lug drinking). Acute alcohol intoxication due to *ikki* drinking among Japanese college students at welcome parties and other drinking parties has been a social problem since 1992 (17). Furthermore, among female college students, there have been numerous instances of students becoming victims of sexual crimes at drinking parties held by inter-university clubs hosted by male students from famous universities, as represented by the Super Free Club incident in 2003 (18). As a result, inter-university clubs are now wildly perceived as dangerous among female college students. However, there are a certain number of women's university students who wish to join these inter-university clubs hosted by male students while being cautious.

Protective factors for high-impact drinking in the present study were being a flusher, involvement in student clubs for cultural activities, and receiving alcohol prevention education during elementary school. Among these factors, being a flusher, i.e. a person who shows ethanol-induced facial flushing with feelings of discomfort, is a well-known protective factor against black-out drinking (19). Involvement in student clubs for cultural activities may keep women's university students away from involvement in inter-university clubs, which are mainly athletic.

Alcohol prevention education performed during elementary school was found to be a protective factor against high-impact drinking in the present study, implying that effects of education during elementary school years (5^{th} and 6^{th} grade) persist for more than six years, into the university years. Alcohol prevention education programs in Japan were first implemented in elementary schools in 1998 and in middle and high schools in 1989 (20). As a result, alcohol use among 12- to 18-year-olds decreased, with reports of the proportion of alcohol use in the past 30 days decreasing from 38.6% in 1996 to 5.6% in 2017 (3). It may thus be concluded that the alcohol prevention education program implemented by the Japan Ministry of Education, Culture, Sports, Science and Technology (MEXT) had some degree of efficacy among adolescents. However, drinking during high school is less frequent among students who go on to attend university than among those who do not go on to attend university after high school. Specifically, only 1.8% of high school students planning to enter university reported consuming alcohol in the past 30 days, compared with 9.4% among students with no plans to pursue higher education (3). However, as soon as they become college students, these individuals have the chance to start drinking or drink more, although most college freshmen are underage. In our study, only 13.8% of women's university students with drinking experience had started alcohol use before graduating from high school, although 36.2% of students had started drinking before 20 years old after graduating from high school, even though drinking before 20 years old is prohibited by Japanese law.

Individual universities are expected to provide alcohol education to college

freshmen, but the execution is left to each university, and the enforcement power of the MEXT does not extend to universities. Therefore, not all students have the opportunity to receive alcohol education after entering university. Furthermore, some people drink during the period after graduating from high school and before entering university. Therefore, alcohol prevention education during elementary school may an effective way of keeping such students away from high-impact drinking opportunities.

Limitations

To secure a sufficient number of subjects for a multivariable analysis, we conducted a questionnaire survey among students from two different faculties: the Faculty of Nursing and the Faculty of Arts and Letters. The univariable analysis showed that the experience rate of high-impact drinking in the Faculty of Nursing was significantly higher than that in the Faculty of Arts and Letters. However, a multivariable analysis revealed that the type of faculty (namely, the faculty of Nursing vs. the faculty of Arts and Letters) was not an independent risk factor for high-impact drinking. Therefore, we believe that conducting the study at two different faculties did not have a significant impact on the research results.

Conclusions

For female college students, the greatest opportunity to experience high-impact drinking is at welcome parties for new students hosted by inter-university clubs, and alcohol prevention education during elementary school seems to have had the effect of keeping them away from such dangers. These findings may encourage MEXT to further promote its alcohol prevention education programs among elementary, middle and high school students.

Conflict of Interest

The authors declare no conflict of interest.

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女子大学生の潜在的致死的飲酒に対する アルコール健康教育の予防効果 –多変量モデルを用いた潜在的致死的飲酒の関連要因の分析–

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要旨

小・中・高校で受けたアルコール健康教育の効果が大学入学後も持続しているか否かについては、ほとんど明らかにされていない。女子大学生の飲酒行動を調査し、そうした教育が大学入学後の身体的危険飲酒の予防に有効であるかを検討した。女子大 3・4 年生を対象に自記式質問紙調査を実施した。飲酒の失敗経験のうち「記憶を失う、店や車、道で寝込む、救急車で病院に運ばれる」を、潜在的致死的飲酒と定義した。飲酒経験のある 506 人を分析対象とし、そのうち 112 人が潜在的致死的飲酒を経験した。「潜在的致死的飲酒経験の有無」に関連する要因を明らかにするため、ロジスティック回帰分析を行った。潜在的致死的飲酒に対する独立した予防因子は、「小学生でアルコール健康教育を受講」（調整オッズ比[AOR], 0.47）、「飲酒で顔が赤くなる人」（AOR, 0.38）、「文化系サークル活動の経験」（AOR, 0.35）であった。「インカレのサークル活動の経験」は、潜在的致死的飲酒の主要な危険因子 (AOR, 3.52) であり、「新入生歓迎会での強制飲酒」との間に非常に強い相関が認められた (phi = 0.54)。 女子大学の学生においては、小学校 5、6 年生におけるアルコール健康教育によって、インカレのサークルが主催する新入生歓迎会での潜在的致死的飲酒の機会から遠ざかることで、潜在的致死的飲酒が抑制されていると考えられる。

キーワード: アルコール健康教育、アルコール性ブラックアウト、女子大学生、有害な飲酒、予防因子