

ORIGINAL ARTICLE

ALCOHOL CONSUMPTION BEHAVIOR MODIFICATION OF UNDERGRADUATE STUDENTS IN THAILAND: A QUASI EXPERIMENTAL STUDY

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ABSTRACT

Under-age drinking and the overconsumption of alcohol among undergraduate students result in unnecessary physical, emotional, and intellectual problems, as well as economic losses for individuals. Research has shown that health literacy is a causal factor in the alcohol consumption behavior of undergraduates in Thailand. This quasi-experimental research studied the effectiveness of an alcohol consumption behavior modification program on undergraduate students from 2 universities in Thailand based on 47 samples in each of the experimental and comparison groups. The intervention was designed to enhance health literacy and change alcohol consumption behavior. Data collection based on a self-questionnaires was conducted in the pre-experimental, post experimental and follow-up periods. Repeated measure ANOVA was used to analyze the data. After implementing the alcohol consumption behavior modification program, the experimental group had better health literacy and alcohol consumption behavior, compared to before the implementation and it was sustained during the follow-up phase. The results also showed that the health literacy and alcohol drinking behavior in the experimental group were better than those in the comparison group at the .05 significance level. The implementation of an alcohol consumption behavior modification program designed for undergraduate students would be a useful educational institute and public health initiative.

Keywords: *Alcohol Consumption Behavior, Health literacy, Alcohol Behavior Modification Program*

INTRODUCTION

Today, alcohol consumption behavior tends to be higher in every age range. Alcohol consumption among the Thai population aged 15 years and over, compared to the amount of pure alcohol consumption of other countries across the world, seems quite high and tends to always be increasing¹. Each year Thailand records around 250,000 new drinkers, including children and adolescent, who represent a 70% higher proportion of regular drinkers within 3 years (2008-2010)².

A study conducted by overseas researchers³ on alcohol consumption behavior revealed that 56.8% of college students had harmful alcohol consumption behavior. This is consistent with a study conducted by Buasorn and Ratchadapunnathiku (2012)⁴ on the alcohol consumption behavior of undergraduate students as their study found that most students (73.8%) had risky alcohol consumption behavior at a high level. Students having risky alcohol consumption behavior tend to drink more alcohol and they will exhibit risky alcohol consumption behavior 25 times more than general students⁵⁻⁶. The results from a study on behaviors and factors related to alcohol consumption at the Thailand National

Sports University showed that 49.5% of athletes had alcohol consumption behavior, consisting of drinking alcohol every day, 1-2 times per week, and 3-4 times per week accounting for 3.8%, 27.2%, and 18.5%, respectively⁷.

The data were consistent with a recent survey finding that the mean age of Thai people starting to drink alcohol appeared to be getting progressively younger. This survey found that the mean age of people starting to drink alcohol was 20.4 years when many are usually studying in educational institutions. This is consistent with overseas research studies indicating that colleges and universities were places where new students learn and experience alcohol drinking behavior for the first time⁸. Therefore, every sector needs to mutually seek solution guidelines regarding alcohol consumption among undergraduate students.

Though agencies relevant to solving problems related to alcohol consumption behavior among undergraduate students have attempted to seek appropriate problem solution guidelines, the results of other studies have indicated that the problems have not been effectively solved⁹, probably because alcohol consumption behavior among graduate students consists of various

causal factors many of which are multi-causal^{5,10-11}, most likely coming from individual internal factors and external factors or from the physical environment and social environment. Based on an analysis of causal factors leading to actual and sustainable behavior modification, individual internal factors are very important since these are constantly changing in a dynamic society. Therefore, exploring the causal factors of alcohol drinking behavior triggered by individual internal factors will lead to designing behavior modification to the target group in a sustainable manner.

Consequently, the researcher conducted a literature review to identify causes of alcohol consumption behavior among undergraduate students from related documents, textbooks, and research studies, while also highlighting causal factors that were individual internal factors. Today, health literacy is a major important factor identified in other research studies showing that adolescents with a high level of health literacy will have desirable behaviors¹¹⁻¹⁴. The literature review on an efficient and effective alcohol consumption behavior modification program among undergraduate students showed that an alcohol consumption behavior modification program in higher education institutions is not available in Thailand, where emphasis is placed on solving problems related to individual factors (via an individual level program) in a tangible and effective manner.

Therefore, this study aimed to investigate the effectiveness of an alcohol consumption behavior modification program among undergraduate students that could reduce the impact on undergraduate students from alcohol consumption in an efficient manner. The study results should be beneficial to the implementation of such a behavior modification program in higher education institutions, leading to alcohol consumption behavior modification among undergraduate students in a broad-scale and long-term manner.

METHODS

Sample size

The population in the study consisted of undergraduate students from 17 campuses of the Thailand National Sports University. The sample size was calculated to make a comparison of two independent population means for a one-tailed test¹⁵ and the rate of missing samples was increased by 25%¹⁶. Thus, the samples in both the

experimental and comparison groups comprised 47 persons. Campuses meeting the following criteria were selected for the sample: (1) campuses offering general education in the second semester in the 2018 academic year and (2) campuses not having previous activities related to alcohol consumption behavior modification in a tangible manner. A cluster random sampling technique was used and variables in the random sampling were campuses passing the two above selection criteria divided into regions, namely central region, north region, south region, and northeast region. A simple random sampling technique was used by drawing lots to divide the campuses into either experimental or comparison campuses. Inclusion criteria for the study were: (1) campuses not having held any alcohol drinking behavior modification program and (2) campuses allowing voluntary participation in the research study, which each participant signing a consent form in accordance with the ethical conduct of research involving humans.

Ethic approval

Ethical approval to conduct this study was obtained from the Human Research Ethics Committee, Kasetsart University, Bangkok, Thailand (COA No. COA59/003; approved February 16, 2018). All study participants were at least 18 years old and each one signed an informed consent form prior to participation.

Intervention

The program was developed by researchers to enhance health literacy, a causal factor of alcohol consumption behavior, which leads to alcohol consumption behavior modification, known as the WE CAN Program (**W**ay to **E**nhance **C**onsciousness about **A**lcohol literacy to **N**ormal life) based on 3-step active learning activities, where step 1 involves stimulating thinking, step 2 develops thinking, and step 3 summarizes thinking and reflective learning by enhancing health literacy related to 6 aspects of alcohol drinking, namely data accessibility (Access), knowledge and understanding (Cognitive), communication skill, self management, media literacy, and decision skills, comprising 6 learning management plans for 18 hours (class study for 6 hours and self study for 12 hours). The quality of the research instrument was assessed by 9 experts and the quality was determined to be at a very good level.

Measurements

Measurements were taken at the baseline, after intervention, and again after 1 month of

intervention. The study tool was a self-report questionnaire divided into 3 parts: (a) demographics data; (b) assessment of the participants' alcohol consumption behavior using, the Alcohol Use Disorder Identification (AUDIT) questionnaire¹⁷ as this measure has well-established psychometric properties and has been used in several countries around the world for decades, as well as having high sensitivity and specificity in diagnosing alcohol consumption; and (c) a Health Literacy Questionnaire¹¹, where the questionnaire attained a content validity index of .78-1.00, was verified by nine experts, and quality tested by 60 representative samples from the population using people who were not involved in the study sample. It achieved Cronbach alpha coefficient values in the range .70-.91, which indicated that this instrument satisfied the required standard of reliability necessary in research¹⁸.

Data analysis

After the experiment had finished, the researchers examined the completeness of the data. All collected data were analyzed and checked using statistical methods. The statistical significance level (α) was set at 0.05 with 95% confidence according to the following details: (1) descriptive statistics (frequency, percentage, and standard deviation) were used to describe demographic data; and (2) inferential statistics (repeated measure ANOVA and independent t-test) were used to compare differences of mean scores within the experimental group, the comparison group during the pretest, posttest, and follow-up period, and mean scores between the experimental group and the control group during the pretest, posttest, and follow-up period.

RESULTS

The sample consisted of 94 persons divided equally between the experimental and comparison groups. Each group had 41 men and 6 women. Most participants in the experimental group were aged 19 years, accounting for 51.1%, followed by those who were age 20 years or older, and then aged 18 years, accounting for 31.9% and 17.0%, respectively (mean age = 19.26 years, standard deviation = 0.896).

Most participants in the comparison group were aged 19 years, accounting for 48.9%, followed by those aged 20 years or older and then aged 18 years, accounting for 36.2% and 14.9% respectively (mean age = 19.30 years, standard

deviation = 0.907). The grade point average (GPA) values of the participants in the experimental group and the comparison group were in the ranges 2.50-3.00, accounting for 44.7%. The average GPA of the experimental group was 2.65 and the standard deviation was 0.430 while the average GPA of the comparison group was 2.91 and the standard deviation was 0.391. The mean age for first drinking alcohol was 15.77 years and the standard deviation was 1.822.

Most participants in the experimental group started drinking alcohol before 16 years of age, accounting for 63.8%. Similarly, most participants in the comparison group started drinking alcohol before 16 years of age, accounting for 66.0%. There was no difference between the experimental group and the comparison group in relation to sex, age, GPA, and age of first alcohol use based on the chi-square statistic. There were no differences in individual factors of the sample. Furthermore, both the experimental group and comparison group shared the same top-3 reasons for first use of alcohol, namely they wanted to try drinking alcohol by themselves, they were persuaded by their friends, and they were challenged to drink alcohol, respectively.

The top-3 favorite alcohol drinks among participants in the experimental group and the comparison group were beer, colored liquor/red liquor (including Thai and foreign brandy), and grape wine/champagne/fruit wine, respectively. These results reflected that the basic factors of alcohol consumption in the experimental group and the control group were very similar. Furthermore, the test of differences of levels of alcohol drinking between the experimental group and the comparison group using the chi-square statistic showed that before the experiment was conducted the experimental group and the comparison group had no significant differences in alcohol consumption behavior.

The mean score of alcohol consumption in the experimental group was 12.23 and the standard deviation was 5.623 while the mean score of alcohol consumption in the comparison group was 12.34 and the standard deviation was 5.986. There was no significant difference between the mean scores of levels of alcohol drinking between the experimental group and the comparison group using an independent t-test indicated. The results indicated that before the experiment was conducted, alcohol consumption behavior in the

experimental group and comparison group was not different.

The comparison of health literacy mean scores between the experimental group and the comparison group in the pretest, posttest, and 1-month follow-up periods using repeated measure ANOVA found that alcohol consumption behavior modification models had an influence on the health literacy mean scores at a statistical significance level of .05 ($F_{1, 92} = 53.277$; $p < .05$). The period of measurement in the pretest, posttest, and 1 month follow-up period had an influence on the health literacy mean scores with a statistical significance level of .05 ($F_{2, 184} = 79.624$; $p < .05$). The results showed that interaction between the alcohol consumption

behavior modification models and the period of measurement in the pretest, posttest, and 1-month follow-up periods had an influence on the health literacy mean scores with a statistical significance level of 0.05 ($F_{2, 184} = 62.688$; $p < 0.05$), as seen in Table 1.

Statistical analysis of the results of the health literacy mean scores in the pretest between the experimental group and comparison group found no differences. However, in the posttest and 1-month follow-up periods, the health literacy mean score of the experimental group was higher than that of the comparison group with a statistical significance level of .05, as seen in the Table 2.

Table 1: Comparison of health literacy mean scores between experimental and comparison groups for pretest, posttest, and follow-up periods

Source	Sum of Square	df	Mean square	F-test	p-Value
Between group					
Group	18971.521	1	18971.521	53.277*	.000
Error	32760.525	92	356.093		
Within group					
Time	15341.043	2	7670.521	79.624*	.000
Group×Time	12078.064	2	6039.032	62.688*	.000
Error	17725.560	184	96.355		

* Statistical significance at .05

Table 2: Comparison of health literacy mean scores between experimental and comparison groups for pretest, posttest, and follow-up periods

Health Literacy	Experimental Group		Comparison Group		t	p-Value
	\bar{x}	SD	\bar{x}	SD		
Pre-experimental	90.57	13.593	92.64	10.406	0.827	.411
Post-experimental	120.32	16.229	93.60	10.776	9.404*	.000
Follow-up period	119.81	16.766	95.26	11.994	8.165*	.000

* Statistical significance at .05

The data analysis identified interaction between the alcohol consumption behavior modification program and the period of measurement in the pretest, posttest, and 1-month follow-up periods that had an influence on the health literacy mean scores at significance level of .05. Consequently, pairwise comparison was undertaken using the Bonferroni method.

The experimental group had health literacy mean scores between the pretest and posttest, and between the pretest and 1-month follow-up

periods significantly different at the .05 level but not between the posttest and 1-month follow-up periods. This reflected that the alcohol consumption behavior modification program changed health literacy and this was sustained during the 1-month follow-up period.

The health literacy mean scores of the comparison group between the pretest and posttest, the pretest and 1-month follow-up periods, and the posttest and 1-month follow-up periods were not significantly different, as seen in the Table 3.

Table 3: Comparison of health literacy mean score between experimental and comparison groups for pretest, posttest and follow-up period

Comparison	Experimental Group		Comparison Group	
	\bar{Y} (S.E.)	p-Value	\bar{Y} (S.E.)	p-Value
Pre-experimental - Post-experimental	29.745* (2.377)	.000	0.957 (1.468)	1.000
Pre-experimental - Follow-up period	29.234* (2.357)	.000	2.617 (2.340)	.808
Post-experimental - Follow-up period	0.511 (0.668)	1.000	1.660 (2.346)	1.000

* Statistical significance at .05

The comparison of alcohol consumption behavior mean scores between the experimental group and the comparison group in the pretest, posttest, and 1-month follow-up periods using repeated measure ANOVA found that the alcohol consumption behavior modification program had an influence on the alcohol consumption behavior mean scores with a statistical significance level of .05 ($F_{1,92} = 32.140$; $p < .05$), and the measurement period in the pretest, posttest and 1-month follow-up periods had an influence on the alcohol consumption behavior mean scores with a statistical significance level of .05 ($F_{2, 184} = 22.164$; $p < .05$). Furthermore, interaction between the alcohol consumption behavior

modification program and the measurement period in the pretest, posttest and 1-month follow-up periods had an influence on the alcohol consumption mean scores with a significance level of .05 ($F_{2, 184} = 51.709$; $p < .05$), as seen in Table 4.

Comparison of results of the alcohol consumption behavior mean scores in the pretest between the experimental group and comparison group found no significant differences. However, in the posttest and 1-month follow-up periods, the alcohol consumption behavior mean score of the experimental group was higher than that of the comparison group with a statistical significance level of .05, as seen in Table 5.

Table 4: Comparison of alcohol consumption behavior mean scores between experimental and comparison groups for pretest, posttest and follow-up period

Source	Sum of Square	df	Mean square	F-test	p-Value
Between group					
Group	2151.918	1	2151.918	32.140*	.000
Error	6159.787	92	66.954		
Within group					
Time	445.511	2	222.255	22.164*	.000
Group×Time	1037.050	2	518.525	51.709*	.000
Error	1845.106	184	10.028		

* Statistical significance at .05

Table 5: Differences in alcohol consumption behavior mean scores between experimental and comparison groups for pretest, posttest and follow-up period

Alcohol Consumption Behavior	Experimental Group		Comparison Group		t	p-Value
	\bar{x}	SD	\bar{x}	SD		
Pre-experimental	12.23	5.623	12.34	5.986	0.089	.929
Post-experimental	5.26	4.260	13.70	6.241	7.663*	.000
Follow-up	5.79	4.722	13.81	5.211	7.819*	.000

* Statistical significance at .05

The data analysis found that the interaction between the alcohol consumption behavior modification program and the measurement period in the pretest, posttest and 1-month follow-up periods had an influence on the alcohol consumption behavior mean scores with a statistical significance level of .05. Consequently,

a pairwise comparison was undertaken using the Bonferroni method.

The experimental group had alcohol consumption behavior mean scores between the pretest and posttest, and between the pretest and 1-month follow-up periods that were significantly different at the .05 level but not for the posttest and 1-

month follow-up periods. This reflected that the alcohol consumption behavior modification program changed alcohol consumption behavior and this was sustained during the 1-month follow-up period.

The alcohol consumption behavior mean scores of the comparison group between the pretest and posttest periods, the pretest and 1-month follow-up periods, and the posttest and 1-month follow-up periods were not significantly different, as seen in the Table 6.

Table 6: Comparison of alcohol consumption behavior mean score between experimental and comparison groups for pretest, posttest and follow-up period

Comparison	Experimental Group		Comparison Group	
	\bar{Y} (S.E.)	p-Value	\bar{Y} (S.E.)	p-Value
Pre-experimental - Post-experimental	6.979* (0.669)	.000	1.362 (0.575)	.066
Pre-experimental - Follow-up period	6.447* (0.711)	.000	1.468 (0.714)	.136
Post-experimental - Follow-up period	0.532 (0.465)	.776	0.106 (0.743)	1.000

* Statistical significance at .05

DISCUSSION

The results of the alcohol consumption behavior modification program showed that the experimental group had changes in health literacy and alcohol consumption behavior in a better direction after they participated in the experiment and better than the control group, with sustained performance during the follow-up period. The reason was that the alcohol consumption behavior modification program focused on enhancing health literacy by using techniques and methods that apply active learning consisting of various processes such as group learning, educational games, case studies, role plays, brainstorming, and social media. Emphasis was placed on developing the 6 components (health literacy access, cognitive, communication skill, self-management, media literacy, and decision skills) through the 3-step active learning process. Step 1 involved stimulating thinking in lessons by encouraging attention and motivation in learning, generating challenge in thinking and the curiosity of undergraduate students that can lead to the next step.

Step 2 involved developing thinking and developing health literacy, where emphasis was placed on knowledge sharing and a variety of learning processes. The last step involved summarizing thinking and reflecting on learning, where emphasis was placed on enabling undergraduate students to summarize a body of knowledge so that they would be able to apply it in their daily lives. This is consistent with active learning that it is a process encouraging learners to be able to understand and remember learning outcomes more sustainably and for longer rather than through listening and passive learning¹⁹.

Health literacy enhancement using active learning processes at this time aimed to encourage undergraduate students to interact with their groups of friends, program users, and the environment impacting on their daily lives until they achieved higher-order thinking through reading, speaking, thinking, listening, testing, discussion, problem-solving, and interacting with the environment in terms of their friends and program users. This was in accordance with Bloom’s thinking taxonomy of remembering, understanding, applying, analyzing, evaluating, and creating²⁰, and consistent with Mayer’s concept that divided active learning activities into the 2 dimensions of cognitive activity and behavior activity²¹.

These processes are in line with the learning management in the current study, resulting in increased health literacy for the experimental group in the posttest period and maintaining it in the 1-month follow-up period. It reflected that the developed program promoted sustainability, since health literacy is an individual internal factor. As the undergraduate students achieve changes in the thinking process according to the components, they become able to draw on their thinking potential when encouraged by stimuli, making their health literacy sustainable and unchanged as time passes. This is consistent with the processes of developing behavior in reducing alcohol consumption at the international level, where emphasis is placed on changing individual internal factors, such as the Educational/Awareness Model, Cognitive Behavioral Approach or Motivational/Feedback-based Approach, using a variety of learning processes that meet the context of target groups and enable the target groups to reduce alcohol

consumption behavior or promote desirable alcohol consumption behavior and to reduce the adverse effects caused by long-term alcohol consumption²².

It is also consistent with the research results of a reduction model of binge drinking among undergraduate students that was designed by applying intervention mapping as a base to develop and focus on internal behavior modification of undergraduate students. The results of that study revealed that the program was effective, moving changes to alcohol consumption behavior in a better direction²³. In this regard, the comparison group in the current study received natural activities from institutions.

Activities that focus on enhancing individual factors in modifying the alcohol consumption behavior of the comparison group consisted of classroom activities integrated with subjects in conjunction with activities outside the classroom integrated with culture and society, such as religious holy days and polling days for elected government officials, when alcohol consumption behavior is forbidden. Emphasis can be placed on enhancing knowledge and understanding of the effects caused by alcohol consumption through using lectures from outside experts or personnel from educational institutions.

Therefore, it was found that as time passed, the health literacy and alcohol consumption behavior were not different in the pretest, posttest and 1-month follow-up periods. In contrast, there were significant positive changes in the behavior the experimental group that participated in the program enhancing individual internal factors and health literacy designed to meet the conditions of undergraduate students and the university context.

CONCLUSION

The research results reflected the effectiveness of the alcohol consumption behavior modification program for undergraduate students by bringing about positive changes in individual internal factors regarding health literacy that resulted in significantly reduced adverse alcohol consumption behavior. The research results indicated that to solve problems related to the alcohol consumption behavior of undergraduate students, importance must be given to developing and enhancing health literacy, a causal factor of alcohol consumption behavior, specific to the problems and context of undergraduate students

and universities, so that the process is more efficient.

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