ORIGINAL ARTICLE

Osong Public Health Res Perspect 2017;8(6):405–414
https://doi.org/10.24171/j.phrp.2017.8.6.08
eISSN 2233-6052

Relationship between Alcohol Purchasing Time and Alcohol Use Disorder in South Korea

Narcie Faith Amista[a,b], Sungsoo Chun[a,b], Mieun Yun[b,c]

[a]Department of Health-Bio Convergence, Graduate School, Sahmyook University, Seoul, Korea
[b]Korean Institute on Alcohol Problems, Sahmyook University, Seoul, Korea
[c]Department of Food and Nutrition, Sahmyook University, Seoul, Korea

Objectives: Currently, time of alcohol purchase is not part of the policies to regulate alcohol consumption in South Korea. This study was conducted to determine the relationship between alcohol purchasing time and alcohol use disorder.
Methods: The survey for this study was conducted in geographically diverse regions of South Korea in 2012. Respondents' purchasing behaviors for both on-licensed (i.e., allows for consumption within the premises) and off-licensed (i.e., where alcohol is consumed off the premises) outlets and time of alcohol consumption were collected. Alcohol consumption patterns were examined using the Rapid Alcohol Problem Screen 4 (RAPS4). Data were also analyzed by age, gender and purchasing time.
Results: Results showed that among the off-licensed premises, supermarkets appear to be the most popular venue while for on-licensed premises; alcohol was generally consumed inside hotels/pubs regardless of age and gender of the purchaser. Purchasing of alcohol was highest during the day and early evening period (9:00 a.m. to 9:59 p.m.). Females are most likely to abuse alcohol than males during the early morning period and is that period after 12:00 midnight.
Conclusion: Analysis suggests that the survey instrument used in the International Alcohol Control Study is being used to collect data on alcohol purchasing time consumption; therefore, the potential is there to provide accurate results to contribute appropriate policy responses to reduce alcohol related-harm.

Key Words: alcohol, alcohol availability, purchasing time, Rapid Alcohol Problem Screen 4

Corresponding author: Mieun Yun
E-mail: meyun@syu.ac.kr

Received April 7, 2017.
Revised September 3, 2017.
Accepted November 27, 2017.

INTRODUCTION

Alcohol abuse, which is a form of substance use disorder, is increasing worldwide and consequently having adverse social and economic effects on individuals. According to the World Health Organization (WHO) in 2004 and the National Collaborating Center for Mental Health, certain factors are predominant, such as the quantity of alcohol that an individual consumes and the frequency of consumption. The age of first consumption, length of drinking behavior, consumer's gender, and health status vary across cultures and nationalities [1,2].

Some studies report that when alcohol is more readily available in society, there appears to be a higher average rate of consumption among its population. In Australia, freestanding "bottle shops" were gradually introduced and alcohol consumption increased markedly. At the same time, grocery stores and some convenience stores have been allowed to sell alcohol in many parts of the country [3]. Recent studies have found that higher levels of drinking are associated

with the higher density of off-licensed alcohol outlets [4,5]. Thus, these studies highlight the possible implications of alcohol outlets being proximally available.

Many countries have increased the availability and affordability of alcohol products as the level of consumption rises to historically high quantities. For example, in the United Kingdom, an increase of nearly 65% in alcohol affordability was recorded between 1980 and 2006 [6–8].

Lower alcohol prices are expected to lead to higher consumption, which is detrimental to health [9]. Records also show that the increased affordability of alcohol over recent years has been a major reason for the constant rise in drinking and health problems [10,11]. For example, in South Korea, "soju" has an alcohol-by-volume level of 30% to 35%. Moreover, it has a relatively low price; that is, a typical 375 mL bottle of soju retails for 1,000 to 3,000 Korean Won (USD 0.88 to 2.65) [12]. Consequently, its popularity has ranked South Korea as fourteenth among the Organization for Economic Cooperation and Development (OECD) countries regarding the total alcohol consumption per capita in liters of pure alcohol according to the WHO in 2015 [12]. However, while alcohol consumption is regulated by a required legal age to purchase it, there are no existing policies regarding the time that it can be purchased [13]. Korea's retail licensing system for the sale of alcohol is inadequate. Small stores are allowed to sell alcohol 24 hours a day.

A study in Sweden analyzed the effect of the extension of the selling period in alcohol retail shops in both selected trial areas and the entire country from 1995 and 2011 [14]. It was found that when the time of sale was adjusted, resulting in an increased accessibility to alcohol; there was a similar increase in alcohol consumption.

With regard to the social impact of alcoholism, a study focusing on the Brazilian city of Diadema [15] investigated whether limiting the hours of alcoholic beverage sales in bars had an effect on the incidence of crimes and violence. Using a time-series analysis, the investigators found that restrictions on drinking hours led to a dramatic decrease in murders and assaults, specifically those against women. Other studies have shown that alcohol use, which may include excessive drinking or binge drinking, is related to risky sexual behaviors, suicide, use of illicit drugs, being a victim of dating violence, and other adverse consequences [16,17]. Thus, limiting accessibility of alcohol in terms of purchasing time has very significant implications for protecting the sense of safety, especially in areas where violence is commonplace, and women's well-being is in danger.

It can be observed from this literature that affordability, location, and time of purchase are elements impacting alcohol consumption. When alcohol consumption is greater, there is similarly a greater number of excessive drinkers in a population and consequently, greater adverse health and social problems occur [18,19]. Furthermore, along with cultural variables, and genetic and physiological risk factors, environmental elements, such as availability and pricing, have also been identified as prognostic factors for alcohol use disorder (AUD) [20].

While numerous studies on alcohol policy have been conducted, mostly in Western countries [21–24], not many studies have explored the relationship between alcohol purchasing time and AUD in Asian countries, including South Korea. Thus, this study intended to determine the effects of alcohol purchasing time and its relationship as a predictive factor to AUD in Koreans. This study aimed to provide additional data and information for responsible policy-making to address the issues of alcohol over-consumption.

MATERIALS AND METHODS

1. Study design and sampling

A cross-sectional design was used in June to July 2012 by the researchers from the Korean Institute on Alcohol Problems as part of the International Alcohol Control Study. A representative sample of 2,031 alcohol consumers (male, 1,079; female, 941), aged 15 to 65 years, who live in geographically-diverse regions of South Korea completed the questionnaires and interview process. This study was approved by the institutional review board of Sahmyook University (SYUIRB 2011-018).

Information about the location, quantity, frequency, and estimated volumes of alcohol consumed within the past six months, as well as the typical time of the day when purchasing occurred, were collected and measured as determinants of the underlying relationship between purchasing time and alcohol use disorder. The location was categorized into two different premises: confined or on-licensed premises and off-licensed premises. Confined or on-licensed premises are those where alcohol is bought and consumed within the same establishments (e.g., hotels: includes pubs; clubs: nightclubs, sports clubs other clubs, groups or meetings such as RSA, Rotary, hobby groups or committee meetings; restaurants: cafés or coffee shops are included in the restaurants; other venues: other clubs, groups or meetings such as RSA, Rotary, hobby groups or committee meetings; convenience stores). On-licensed premises include outlets or shops in which alcoholic beverages are permitted to be sold and consumed. Off-licensed premises refer to locations where alcohol is purchased, which includes liquor stores, supermarkets, and grocery stores, and then taken to another venue for consumption.

Purchasing time was divided into three periods throughout

the day: day and early evening, late night, and early morning. The "day-to-early evening" (9:00 a.m. to 9:59 p.m.) refers to when everyday activities are performed for regular responsibilities, such as a job, and relates to when people take part in joint activities that are usually for pleasure, like having dinner gatherings with coworkers and supervisors. The "late night" (10:00 p.m. to 11:59 p.m.) refers to attending extended school or job-related activities, a night out with friends and close family time, and preparing for sleeping. The "early morning" (12:00 a.m. to 8:59 a.m.) is when ordinary activities are performed, during the earliest part of the morning and before going to work, including sleeping and preparing for work and other occupational activities.

2. Instruments

Rapid Alcohol Problem Screen 4 (RAPS4) is a four-item version of the RAPS. It was intended to maximize sensitivity in detecting alcohol dependence in the past 12 months. It improved the effectiveness of the original (RAPS) instrument because it is succinct and the respondents need not be asked additional items after screening positive on any of the four items, with the exception of gender or ethnicity [25,26].

The behaviors of those who have alcohol problems were identified with the following questions: (1) During the last year, have you had a feeling of guilt or remorse after drinking? (Remorse); (2) During the last year, has a friend or family member ever told you about things you said or did while you were drinking that you could not remember? (Amnesia, also called blackouts); (3) During the last year have you failed to do what was normally expected of you because of drinking? (Perform); and (4) Do you sometimes have a drink in the morning when you first get up? (Starter also called an eye-opener). The four questions are considered positive on the RAPS4: which means that a "yes" response to any one of these four items indicates the respondent has alcohol use disorder [26].

3. Statistical analyses

The data gathered from the respondents were subjected to analysis using the Statistical Package for the Social Sciences (version 20.0; IBM Co., Armonk, NY, USA). Cross-tabulation and logistic regression analyses were used to determine the strength of the relationship between the factors, and chi-squre test was used to examine whether the differences between the specific variables were statistically significant, at $p < 0.001$ and $p < 0.05$, respectively.

RESULTS

The demographic characteristics and other descriptors of the respondents are presented in Table 1. There were 2,031 participants, with 1,079 (53.13%) males, 941 (46.33%) females, and 11 (0.54%) missing who live in geographically-diverse regions of South Korea. More than half of those who purchased their alcohol from off-licensed premises had usually bought it at a supermarket (60.27%), while 772 (31.40%) had purchased it from small grocery stores, and 205 (8.34%) had purchased it from bottle shops. Less than one in 10 respondents had purchased it from a winery, a dairy, or duty-free, or on the Internet or phone, which is a negligible percentage of off-licensed premise sales.

People drinking in on-licensed premises purchased the alcohol they consumed in hotels or pubs (35.84%), about 21.42% bought drinks in restaurants, and 19.84% bought alcohol in clubs, where the alcoholic beverages were bought and consumed on site. Of the participants, 12.12% bought alcohol and drank it in convenience stores, and 10.78% bought alcohol and consumed it in other venues.

Table 1. General characteristics of respondents and other measures related to alcohol consumption (n = 2,031)

Variable	Number of respondents
Gender	
Male	1,079 (53.40)
Female	941 (46.60)
Age (y)	
16–19	325 (16.00)
20–29	521 (25.60)
30–44	557 (27.40)
≥ 45	628 (30.80)
Off-premises[a]	
Liquor store	205 (8.33)
Supermarket	1,482 (60.27)
Grocery	772 (31.40)
On-premises[a]	
Hotel/pubs	1,293 (35.84)
Restaurant	773 (21.42)
Convenience store	437 (12.12)
Clubs	716 (19.84)
Other venues	389 (10.78)

Values are presented as number (%).
[a]Multiple responses: respondents provided multiple responses to on/off premises.

The proportion of respondents by gender who purchased alcohol from off-licensed premises and the time that they purchased the alcohol are shown in Table 2. Regarding gender, females (n = 688) and males (n = 788) were more likely to buy alcohol from supermarkets (n = 1,476) during the day-to-early evening time (9:00 a.m. to 9:59 p.m.). Among the off-licensed premises, supermarkets had the highest amount of alcohol purchases by participants, followed by small grocery stores (n = 769) and liquor or bottle shops (n = 205). The day-to-early evening time duration was observed to have the highest purchasing time of alcohol across all premises.

For the on-licensed premises, the majority of respondents consumed alcoholic drinks in hotels (n = 1,282), followed by restaurants (n = 767), clubs (n = 648), convenience stores (n = 433), and other venues (n = 346). Female (n = 565) and male (n = 717) participants preferred to consume alcoholic beverages inside hotels and pubs. The results revealed that consumption of alcohol decreases as the length of time duration also decreases, which was found for participants who drank in hotels and convenience stores alone. However, for such locations as clubs, restaurants, and other venues, the most frequently purchasing was found in the day-to-early evening time, followed by late-night time and early-morning time alcohol purchases. The comparative analysis of buying time by gender in terms of location was profoundly

Table 2. Time of alcohol purchase at off/on-licensed premises by gender

Location	Gender		Day-to-early evening	Late night	Early morning	χ^2	*p*-value
Off-premises							
Liquor shop	Male	123	96 (78.05)	17 (13.82)	10 (8.13)	0.118	0.943
	Female	82	65 (79.27)	10 (12.20)	7 (8.54)		
	Total	205	161 (78.54)	27 (13.17)	17 (8.29)		
Supermarket	Male	788	662 (84.01)	98 (12.44)	28 (3.55)	10.880	0.004**
	Female	688	612 (88.95)	50 (7.27)	26 (3.78)		
	Total	1,476	1,274 (86.31)	148 (10.03)	54 (3.66)		
Small grocery	Male	437	249 (56.98)	131 (29.98)	57 (13.04)	13.450	0.001**
	Female	332	232 (69.88)	71 (21.39)	29 (8.73)		
	Total	769	481 (62.55)	202 (26.27)	86 (11.18)		
On-premises							
Hotel/pubs	Male	717	509 (70.99)	168 (23.43)	40 (5.58)	9.167	0.010**
	Female	565	443 (78.41)	97 (17.17)	25 (4.42)		
	Total	1,282	952 (74.26)	265 (20.67)	65 (5.07)		
Clubs	Male	307	203 (66.12)	42 (13.68)	62 (20.20)	6.485	0.039*
	Female	341	198 (58.06)	71 (20.82)	72 (21.11)		
	Total	648	401 (61.88)	113 (17.44)	134 (20.68)		
Restaurants	Male	425	332 (78.12)	33 (7.76)	60 (14.12)	1.936	0.380
	Female	342	273 (79.82)	18 (5.26)	51 (14.91)		
	Total	767	605 (78.88)	51 (6.65)	111 (14.47)		
Convenience store	Male	267	112 (41.95)	113 (42.32)	42 (15.73)	6.736	0.034*
	Female	166	84 (50.60)	69 (41.57)	13 (7.83)		
	Total	433	196 (45.27)	182 (42.03)	55 (12.70)		
Other venues	Male	156	87 (55.77)	37 (23.72)	32 (20.51)	1.399	0.490
	Female	190	104 (54.74)	38 (20.00)	48 (25.26)		
	Total	346	191 (55.20)	75 (21.68)	80 (23.12)		

Values are presented as number only or number (%); the sum of the percentages does not equal 100% because of rounding.
p-values were from significance tests for gender differences and not for the differences among various periods according to activity level; *$p < 0.05$, **$p < 0.001$.

Table 3. Time of alcohol purchase in off/on-licensed premises by age group

Location	Age (y)		Day-to-early evening	Late night	Early morning	χ^2	*p*-value
Off-premises							
Liquor shop	16–19	27	20 (74.10)	4 (14.70)	3 (11.10)	40.689	0.584
	20–29	76	58 (76.30)	12 (15.80)	6 (7.90)		
	30–39	31	22 (71.00)	6 (19.40)	3 (9.70)		
	≥ 40	71	61 (85.90)	5 (7.00)	5 (7.00)		
	Total	205	161 (78.64)	27 (12.88)	17 (8.64)		
Supermarket	16–19	169	118 (69.80)	33 (19.50)	18 (10.70)	710.210	0.000**
	20–29	382	315 (82.46)	56 (14.70)	11 (2.90)		
	30–39	285	255 (89.47)	23 (8.10)	7 (2.50)		
	≥ 40	643	589 (91.60)	36 (5.60)	18 (2.80)		
	Total	1,479	1,277 (86.30)	148 (10.00)	54 (3.60)		
Small grocery	16–19	154	84 (54.50)	39 (25.30)	31 (20.10)	240.810	0.000**
	20–29	313	200 (63.90)	88 (28.10)	25 (8.00)		
	30–39	120	67 (55.80)	38 (31.70)	15 (12.50)		
	≥ 40	183	131 (71.60)	37 (2.20)	15 (8.20)		
	Total	770	482 (62.60)	202 (26.20)	86 (11.20)		
On-premises							
Hotel/pubs	16–19	134	77 (55.50)	43 (32.10)	14 (10.40)	34.402	0.000**
	20–29	416	295 (70.90)	95 (22.80)	26 (6.30)		
	30–39	253	195 (77.10)	50 (19.80)	8 (3.20)		
	≥ 40	488	393 (80.50)	78 (16.00)	17 (3.50)		
	Total	1,291	960 (74.40)	266 (20.60)	65 (5.00)		
Clubs	16–19	49	34 (69.40)	11 (22.40)	4 (8.20)	30.381	0.000**
	20–29	177	85 (48.00)	44 (24.90)	48 (27.10)		
	30–39	112	66 (58.90)	22 (19.60)	24 (21.40)		
	≥ 40	315	221 (70.20)	37 (11.70)	57 (18.10)		
	Total	653	406 (62.20)	114 (17.50)	133 (20.40)		
Restaurant	16–19	96	71 (74.00)	11 (11.50)	14 (14.6)	10.814	0.094
	20–29	184	141 (76.60)	15 (8.20)	28 (15.20)		
	30–39	130	98 (75.40)	11 (8.50)	21 (16.20)		
	≥ 40	361	299 (82.80)	14 (3.90)	48 (13.30)		
	Total	771	609 (79.00)	51 (6.60)	111 (14.40)		
Other venues	16–19	57	27 (47.40)	7 (12.30)	23 (40.40)	15.148	0.019*
	20–29	148	84 (56.80)	37 (25.00)	27 (18.20)		
	30–39	60	30 (50.00)	14 (23.30)	16 (26.70)		
	≥ 40	78	50 (61.70)	14 (17.30)	14 (17.30)		
	Total	343	191 (55.69)	72 (20.99)	80 (23.32)		
Convenience store	16–19	59	33 (41.30)	13 (16.30)	13 (16.30)	25.717	0.000**
	20–29	119	75 (40.80)	22 (12.00)	22 (12.00)		
	30–39	33	17 (29.80)	8 (14.00)	8 (14.00)		
	≥ 40	97	73 (64.00)	12 (10.5)	12 (10.5)		
	Total	308	198 (64.29)	55 (17.86)	55 (17.86)		

Values are presented as number only or number (%); the sum of the percentages does not equal 100% because of rounding.
*$p < 0.05$, **$p < 0.001$.

affected by those in hotels and pubs, and was statistically significant in such places as clubs and convenience stores, but was not significant in restaurants or other venues.

Table 3 shows the relationship between the off-licensed premises and age group and time of alcohol purchase. The age group of 16 to 19 years had the highest amount of purchases from supermarkets (n = 169), followed by drinks purchased from small grocery stores (n = 154) and liquor shops (n = 27). Those in their twenties, thirties, forties, and older had similar results to the youngest age group. Regardless of age and time period, the procurement of alcoholic beverages from supermarkets (n = 1,479) was the highest, followed by those from small grocery stores (n = 770) and liquor shops (n = 205). All purchases of alcohol were recorded according to the time divisions described in this study. Results revealed that the amount of purchases was the highest during day-to-early evening time, followed by purchases during late night and then early morning regardless of age and location.

The results for the time of alcohol procurement in on-licensed premises by age group showed that all age groups purchased their alcoholic drinks in similar locations, with the hotel and pubs ranking first, followed in order by restaurants, convenience stores, clubs, and other venues. Except for the youngest age group, the highest incidence of alcohol purchase, compared to late night, was found in the early morning when it was consumed in clubs and restaurants. These results were highly significant based on the statistical analysis.

Table 4. One-way analysis of variance of the total of absolute alcohol consumption within a six-month period

Variable	Subject (n)	Alcohol consumption (g)	*p*-value
Gender			0.000**
Male	1,079	193.45 ± 186.42	
Female	941	113.00 ± 138.84	
Total	2,020	155.97 ± 170.70	
Age (y)			0.000**
16–19	325	127.16 ± 131.55	
20–29	521	191.26 ± 191.90	
30–39	347	172.42 ± 189.64	
≥ 40	838	138.62 ± 156.89	
Total	2,031	156.06 ± 170.58	

Values are presented as number only or mean ± standard deviation.
**$p < 0.001$.

Table 5. Cross-tabulations for the Rapid Alcohol Problems Screen 4 by gender and age

Variable	Subject (n)	Negative	Positive	*p*-value
Gender				0.000**
Male	1,079	518 (48.01)	561 (51.99)	
Female	941	601 (63.87)	340 (36.13)	
Total	2,020	1,119 (55.40)	901 (44.60)	
Age (y)				0.046*
16–19	325	193 (59.38)	132 (40.62)	
20–29	521	264 (50.67)	257 (49.33)	
30–39	347	191 (55.04)	156 (44.96)	
≥ 40	610	252 (42.31)	358 (57.69)	
Total	2,031	1,128 (55.54)	903 (44.46)	

Values are presented as number only or number (%).
*$p < 0.05$, **$p < 0.001$.

Table 6. Logistic regression analysis predicting problem drinkers using the Rapid Alcohol Problems Screen 4 according to the off/on-licensed premises and age group

	Odds ratio	95% CI	*p*-value
Off-premises			
Gender			
Female	1.999	(1.631–2.450)	0.000**
Male		1.0 (Ref)	
Time of purchase from off-licensed premises			
10:00 p.m.–8:59 a.m.	1.546	(1.191–2.007)	0.001**
9:00 a.m.–9:59 p.m.		1.0 (Ref)	
Age (y)			
15–19	1.801	(0.719–4.508)	0.209
20–29	1.091	(0.343–3.474)	0.882
30–44	0.806	(0.315–2.060)	0.652
≥ 45		1.0 (Ref)	
On-premises			
Gender			
Female	2.227	(1.775–2.794)	0.000**
Male		1.0 (Ref)	
Time of purchase in on-licensed premises			
12:00 midnight–11:59 a.m.	1.296	(1.031–1.630)	0.026*
12:00 noon –11:59 p.m.		1.0 (Ref)	
Age (y)			
15–19	1.071	(0.795–1.443)	0.652
20–29	1.308	(1.024–1.669)	0.031*
30–35	1.132	(0.888–1.442)	0.316
≥ 45		1.0 (Ref)	

CI, confidence interval; Ref, reference.
*$p < 0.05$, **$p < 0.001$.

The average volume reported per drinker in the previous six months was 5,400 g for men and 3,600 g for women. Statistical analysis using the one-way analysis of variance (ANOVA) showed that males are heavier drinkers compared to females with a mean and standard deviation of 193.45 ± 186.42 (Table 4). All age groups showed statistically significant alcohol consumption patterns in the previous six-month period.

The results from the RAPS4 revealed that more males in South Korea have AUD than females. Those who belong to the 20 to 29 years age group were more likely to have AUD compared to the other age groups.

Tables 5 and 6 show the results of the logistic regression of those drinking in off-licensed premises (n = 2,459) and on-licensed premises (n = 3,608), in which respondents were allowed to give multiple responses. The group in their twenties showed a *p*-value of 0.045, indicating a significant difference, and showed a significant difference in the on-licensed odds ratio. Among those purchasing from off-licensed premises (liquor shops, supermarkets, and small grocery stores), females were about twice more likely to have AUD than males in the day-to-early evening time. The same scenario was found for those purchasing from on-licensed premises (hotels/pubs, clubs, restaurants, other clubs, and in front of convenience stores). Females were about 2.2 times more likely to have AUD than males in the late-night period.

DISCUSSION

This study is anchored in public policy changes regarding the main ways in which alcohol is supplied, promoted, and consumed, through these levels of consumption, and the related harm [27]. It could facilitate the behavioral assessment of alcohol drinkers regarding consumption, based on the International Alcohol Control Study [28].

The results of the present survey of gender, age, and purchasing time reveal that a high proportion of females obtained alcohol from 12:00 p.m. onwards from supermarkets, followed by the young people aged 16 to 19 years. The analysis of the purchasing time in the on-licensed premises by gender and age demonstrated that males were more likely to buy alcohol from 12:00 p.m. onwards in hotels. Young people, aged 16 to 19 years, bought alcohol more frequently from midnight onwards in hotels and pubs, convenience stores, and other venues, while those aged 20 to 29 years more frequently bought alcohol in clubs during the same time period.

The results of the one-way ANOVA for the total of absolute alcohol volume consumption within six months suggest that males consumed a larger amount of alcohol than females, with the mean and standard deviation of 193.45 ± 186.42. Moreover, all age groups reached statistical significance with regard to alcohol drinking patterns during the previous six-month period. It was also suggested that males and all those in the age group of 20 to 29 years are more prone to alcohol use disorder than females. According to Wilsnack and Colleagues, high-volume drinking is more consistently prevalent among males than females. It is, therefore, evident that the gender difference in terms of alcohol consumption remains universal [29].

Based on this study, when the time of purchase is taken into consideration, alcohol consumption reflects the lifestyle and traditions of Koreans. Becoming aware of the effects and outcomes of alcohol use played an important role in the drinking behavior of those who participated in this study. As Korea has no policy for when people can legally drink, people may drink at any time during the day.

Moreover, this study found that there are more female drinkers after midnight. In South Korea, the national statistics show that the rate of drinking among women has increased from 33.0% in 1993 to 59.5% in 2001 [30]. As young women are expected to work outside of the home for financial reasons and for self-actualization, they attend company dinners that involve drinking [31]. Kim and Kim [31] discovered three phases of a woman's drinking behavior that are driven by certain motivations: (1) positive experiences, (2) coping with negative emotions, and (3) needing alcohol to function. This has resulted in traditional social values and norms changing to reflect the reality of the contemporary woman's role in society.

Some countries have found that controlling supply and availability, reducing demand, managing problem drinkers, law enforcement for irresponsible drinking, and other related means are required to intervene in, and mitigate, alcohol-related problems [32]. In the same way, the current study hopes that more efficient methods are implemented in response to the findings.

In Ireland, revisions have been made to their past laws regarding the time that liquor can be sold, through the 2000 Liquor Licensing Act, which allow outlets to serve alcohol until 2:30 a.m. plus 30 minutes of drinking-up time in nightclubs [33]. For example, on Monday, Tuesday, and Wednesday, licensed premises open from 10:30 a.m. to 11:30 p.m. On Thursday, Friday, and Saturday, the closing time is from 2:30 a.m. plus 30 minutes drinking-up time. On Sunday, the opening hours are from 12:30 p.m. to 11:00 p.m. Off-licensed premises open for sale at 8:00 a.m. on weekdays. During Christmas or Good Friday, is not allowed for alcohol to be sold [34,35].

Korea has no historical background regarding a drinking curfew. The lack of well-articulated policies to limit drinking reinforces the importance of publishing data and encourages re-

searchers to explore possible changes in alcohol use. Policies for prevention should target harmful drinking patterns. For instance, in Finland, stores may sell alcohol only between 9:00 a.m. and 9:00 p.m. and all of the leading grocery stores ask for identification if the customer appears to be under 30 years old while drinking in public is prohibited in Norway [36].

The WHO's global strategy recommends regulating the supply and sale of alcohol through legal and policy interventions [37]. In a liquor licensing system, licenses are granted by governments to a retailer or business for the selling and/or supply of alcohol [38]. Licenses operate as a form of contract between the government licensing authority and the license holder, in which the terms and conditions for the sale or supply of alcohol are established in liquor licensing legislation. Infringement of a license or licensing laws can be penalized by a loss of license or financial penalties [39]. A liquor licensing system is a common way to regulate the supply and sale of alcohol. Korea's retail licensing system for the sale of alcohol is ineffectual. Small stores are allowed to sell liquor; thus, alcohol is available 24 hours a day. In order to prevent alcohol problems, it is necessary to provide actual policies for the reduction of alcohol consumption [27]. This research strongly suggests that the Korean government must adopt the policy of a retail licensing system by national legislation.

Alcohol is not an ordinary commodity [27]. Constant awareness of the adverse effects should be encouraged in the community. Based on the results of this study, a conclusion can be drawn regarding the effect of alcohol consumption in on-licensed and off-licensed premises. Purchasing alcohol at later times in the day is a problem in South Korea. This preliminary analysis suggests that the survey instrument used in the International Alcohol Control Study for collecting valid data of the time of use can potentially be used to provide data [40] for an appropriate policy that will protect health, prohibit possible accident and disability, and address social problems consumed by a population, and the high-risk or harmful use of alcohol [27].

This issue deserves to be discussed by South Korea's policy-making body. Thus, Koreans have to consider the significant implications of the harmful effects of heavy alcohol intake. Furthermore, the findings of this study indicate that the suggestions of the relationship between the times that alcohol is purchased and consumed could have a substantial impact on making policy responsive to alcohol consumption and abuse. Therefore, this study recommends that the Korean government establish policies to adopt a retail licensing system in agreement with national legislation.

This study is limited by its cross-sectional design and lack of discrimination between weekday and weekends in the design. Drinking on weekends may include distinct behavior patterns that differ when drinking on regular weekdays. This can be another area of interest for future studies especially in cultures with more permissive alcohol use on certain days. However, it is strengthened by the use of the International Alcohol Control Study questionnaire, an internationally-validated assessment tool. For instance, the results for drinking rates (53.4% males and 46.6% females), derived from the assessment, are similar to data from the multinational Genacis project showing high-volume drinking was more prevalent among men than among women [41]. However, it should not be overlooked that this study has recorded certain times when women were much more likely than men to engage in drinking behavior making them more susceptible to AUD under certain conditions. This should also be included in future research focusing on women. Moreover, the diversity of locations where samples were randomly selected is another advantage as it would represent the entire Korean culture.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ACKNOWLEDGMENTS

The data used in this article are from the International Alcohol Control Study (IAC), led by Professor Sally Casswell. The IAC core survey questionnaire was developed by researchers at SHORE and the Whariki Research Centre, College of Health, Massey University, New Zealand, with funding from the Health Promotion Agency, New Zealand. Further development involved collaboration between British, Thai, Korean, and New Zealand researchers.

Collaborators are the researchers from the Korean Institute on Alcohol Problems.

This article was financially supported by the National Research Foundation of Korea (grant number NRF-2011-0030931).

REFERENCES

1. World Health Organization. Global status report on alcohol 2004. 2nd ed. Geneva: World Health Organization; 2004.
2. Pilling S, Yesufu-Udechuku A, Taylor C, et al; Guideline Development Group. Diagnosis, assessment, and management of harmful drinking and alcohol dependence: summary of NICE guidance. BMJ 2011;342:d700. https://doi.org/10.1136/bmj.d700
3. Rankin JG. Australia, a consumptive society. Drug Alcohol Rev 2017;36:270-7. https://doi.org/10.1111/dar.12388
4. Kypri K, Bell ML, Hay GC, et al. Alcohol outlet density and university student drinking: a national study. Addiction 2008;103:1131-8. https://doi.org/10.1111/j.1360-0443.2008.02239.x
5. Connor JL, Kypri K, Bell ML, et al. Alcohol outlet density, levels of drinking and alcohol-related harm in New Zealand: a national study. J Epidemiol Community Health 2011;65:841-6. https://doi.org/10.1136/jech.2009.104935
6. Heather N. Controlled drinking, harm reduction and their roles in the response to alcohol-related problems. Addict Res Theory 2006;14:7-18. https://doi.org/10.1080/16066350500489170
7. Leon DA, McCambridge J. Liver cirrhosis mortality rates in Britain from 1950 to 2002: an analysis of routine data. Lancet 2006;367:52-6. https://doi.org/10.1016/S0140-6736(06)67924-5
8. Anderson P. A safe, sensible and social AHRSE: new labour and alcohol policy. Addiction 2007;102:1515-21. https://doi.org/10.1111/j.1360-0443.2007.02000.x
9. Hilton S, Wood K, Patterson C, et al. Implications for alcohol minimum unit pricing advocacy: what can we learn for public health from UK newsprint coverage of key claim-makers in the policy debate? Soc Sci Med 2014;102:157-64. https://doi.org/10.1016/j.socscimed.2013.11.041
10. Rehm J, Mathers C, Popova S, et al. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. Lancet 2009;373:2223-33. https://doi.org/10.1016/S0140-6736(09)60746-7
11. World Health Organization. World report on disability. Geneva: World Health Organization; 2011.
12. World Health Organization. World Health Statistics data visualizations dashboard: harmful use of alcohol. Geneva: World Health Organization; 2016.
13. World Health Organization. Global status report on alcohol and health 2015. Geneva: World Health Organization; 2015.
14. Fredriksson C. Planning in the 'New Reality': strategic elements and approaches in Swedish municipalities [PhD dissertation]. Stockholm: KTH Royal Institute of Technology; 2011.
15. Duailibi S, Ponicki W, Grube J, et al. The effect of restricting opening hours on alcohol-related violence. Am J Public Health 2007;97:2276-80. https://doi.org/10.2105/AJPH.2006.092684
16. Cooper ML. Alcohol use and risky sexual behavior among college students and youth: evaluating the evidence. J Stud Alcohol Suppl 2002;(14):101-17. https://doi.org/10.15288/jsas.2002.s14.101
17. Miller JW, Naimi TS, Brewer RD, et al. Binge drinking and associated health risk behaviors among high school students. Pediatrics 2007;119:76-85. https://doi.org/10.1542/peds.2006-1517
18. Single E, Robson L, Xie X, et al. The economic costs of alcohol, tobacco and illicit drugs in Canada, 1992. Addiction 1998;93:991-1006. https://doi.org/10.1046/j.1360-0443.1998.9379914.x
19. Bongaerts BW, van den Brandt PA, Goldbohm RA, et al. Alcohol consumption, type of alcoholic beverage and risk of colorectal cancer at specific subsites. Int J Cancer 2008;123:2411-7. https://doi.org/10.1002/ijc.23774
20. American Psychiatric Association (ASA). Diagnostic and statistical manual of mental disorders : DSM-5. 5th ed. Arlington, VA: ASA; 2013.
21. Burstein P. The impact of public opinion on public policy: a review and an agenda. Polit Res Quart 2003;56:29-40. https://doi.org/10.1177/106591290305600103
22. Callinan S, Room R, Livingston M. Changes in Australian attitudes to alcohol policy: 1995-2010. Drug Alcohol Rev 2014;33:227-34. https://doi.org/10.1111/dar.12106
23. Greenfield TK, Karriker-Jaffe KJ, Giesbrecht N, et al. Second-hand drinking may increase support for alcohol policies: new results from the 2010 National Alcohol Survey. Drug Alcohol Rev 2014;33:259-67. https://doi.org/10.1111/dar.12131
24. Grube JW, Stewart K. Preventing impaired driving using alcohol policy. Traffic Inj Prev 2004;5:199-207. https://doi.org/10.1080/15389580490465229
25. Cherpitel CJ. A brief screening instrument for problem drinking in the emergency room: the RAPS4. Rapid Alcohol Problems Screen. J Stud Alcohol 2000;61:447-9. https://doi.org/10.15288/jsa.2000.61.447
26. Cherpitel CJ. Screening for alcohol problems in the U.S. general population: comparison of the CAGE, RAPS4, and RAPS4-QF by gender, ethnicity, and service utilization. Rapid Alcohol Problems Screen. Alcohol Clin Exp Res 2002;26:1686-91. https://doi.org/10.1111/j.1530-0277.2002.tb02471.x
27. Babor T. Alcohol: no ordinary commodity: research and public policy. Oxford: Oxford University Press; 2010.
28. Casswell S, Huckle T, Wall M, et al. International alcohol control study: pricing data and hours of purchase predict heavier drinking. Alcohol Clin Exp Res 2014;38:1425-31. https://doi.org/10.1111/acer.12359
29. Wilsnack RW, Wilsnack SC, Kristjanson AF, et al. Gender and alcohol consumption: patterns from the multinational GENACIS project. Addiction 2009;104:1487-500. https://doi.org/10.1111/j.1360-0443.2009.02696.x
30. Ministry of Health and Welfare. 2001 National health and nutrition survey: Health behavior. Sejong: Ministry of Health and Welfare; 2002.
31. Kim W, Kim S. Women's alcohol use and alcoholism in Korea. Subst Use Misuse 2008;43:1078-87. https://doi.org/10.1080/10826080801914212
32. Crombie IK, Irvine L, Elliott L, et al. How do public health policies

tackle alcohol-related harm: a review of 12 developed countries. Alcohol Alcohol 2007;42:492-9. https://doi.org/10.1093/alcalc/agm001
33. Anderson P, Baumberg B. Alcohol in Europe: a public health perspective. London: Institute of Alcohol Studies; 2006.
34. Middleton JC, Hahn RA, Kuzara JL, et al. Effectiveness of policies maintaining or restricting days of alcohol sales on excessive alcohol consumption and related harms. Am J Prev Med 2010;39:575-89. https://doi.org/10.1016/j.amepre.2010.09.015
35. Popova S, Giesbrecht N, Bekmuradov D, et al. Hours and days of sale and density of alcohol outlets: impacts on alcohol consumption and damage: a systematic review. Alcohol Alcohol 2009;44:500-16. https://doi.org/10.1093/alcalc/agp054
36. World Health Organization. Violence, injury prevention. Global status report on road safety 2013: supporting a decade of action. Geneva: World Health Organization; 2013.
37. World Health Organization. Global status report on alcohol and health 2014. Geneva: World Health Organization; 2014.
38. Alcohol Policy Coalition. Review of liquor control reform act 1998. Victoria, Australia: Alcohol Policy Coalition; 2016.
39. Poppleston S. Licensing reforms in England and Wales and their likely impact on business and property. J Retail Leis Prop 2001;1:231-44.
40. Huckle T, You R, Fu J, et al. Alcohol policy in New Zealand: results from the general population survey, 2011 final report prepared for the Alcohol Advisory Council of New Zealand (ALAC). Auckland: SHORE and Whariki Research Centre, School of Public Health, Massey University; 2011.
41. Anderson P, Scafato E, Galluzzo L, et al. Alcohol and older people from a public health perspective. Ann Ist Super Sanita 2012;48:232-47. https://doi.org/10.4415/ANN_12_03_04