ABSTRACT

Purpose: Underage drinking is strictly prohibited by law, nevertheless, adolescents report having access through social supply from family, friends and other members of the society. The aim of this study was to determine the primary suppliers of alcohol to Korean teenagers.

Design: Cross-sectional study.

Setting: Data were collected from 21 high schools in geographically diverse regions in South Korea from June to July 2012 as part of the International Alcohol Control Study.

Participants: Data were analysed from 247 high schoolers aged 16–18 years old as part of the International Alcohol Control Study.

Primary and secondary outcome measures: Social supply to high school students.

Results: More than 56% of high schoolers who participated in the International Alcohol Control Survey had been supplied alcohol at least once. Of this number, approximately 59% were males. Parents (especially fathers) and friends were the main suppliers, with friends contributing greater volumes (205 g) of alcohol. Of the number of students provided by mothers, 52% of them were females while 73% of respondents provided by friends were males. The most significant place for alcohol supply was at special events. Males were at higher odds for risky drinking. Although adolescents drink less often than adults, reports indicate that adolescents usually drink more when they engage in risky drinking.

Conclusions: These results support previous findings about the role of parents and friends in underage drinking in South Korean high school drinkers.

INTRODUCTION

Adolescent alcohol consumption is a source of increasing concern in a number of countries. This concern stems from the fact that underage drinking is associated with a number of negative health and social consequences such as impaired brain development and poor academic performance, loss of memory, high-risk sexual behaviour, addiction, suicidal ideation, risky behaviours, alcohol-related injury and deaths. The reasons adolescents drink may differ in relation to culture and the circumstances in which they find themselves. Teenagers report that alcohol is an important ingredient in social interactions, permitting the drinker to lower their inhibitions while feeling more relaxed in social situations, fostering courage and increasing a sense of power, reducing worry and tension. Although adolescents drink less often than adults, reports indicate that adolescents usually drink more when they engage in risky drinking.

Although most countries have a set legal drinking age, underage drinking is still on the rise—of the 73 countries, which responded to the 2008 WHO Global Survey on Alcohol and Health, 71% reported an increase during the 5 years prior to the survey (WHO). The first use of alcohol (defined as drinking a whole drink) typically occurs in early adolescence (at 13–14 years of age). In South Korea where the legal drinking age is 19 years, statistics from the 2011 Korean Adolescent Health Behavior Online Survey showed that the age of first drinking experience was 13 years, whereas overall report of alcohol consumption among teenagers (13–18 years) trended downwards over the period of 2005–2011 from 54.1% to 51%; alcohol consumption is still high among older teenagers aged 16 (57.2%), 17 (67.15) and 18 (75.5%) years.

Parental attitudes and peer influence have been cited as two of the most influential mediating factors of underage drinking. Previous studies have shown parental alcohol use as an important determinant of adolescents’ drinking. Parents’ consumption patterns,
especially the father’s, have been found to affect adolescents’ drinking habits. Recent research, however, shows that this relationship decreases once other factors are taken into account. A vast body of research has documented a strong association between friends’ and adolescents’ alcohol use especially when adolescents had a higher level of peer pressure.

In South Korea, previous studies have examined the effects that parents’ and friends’ consumption patterns have on adolescents in South Korea, but none has provided an overview of the impact of social supply on underage drinking. The aim of the present study was, thus, to examine the social supply among Korean high schoolers, the characteristics of primary suppliers, places where alcohol is usually supplied and the odds of risky drinking (report of drinking more than four drinks on a usual drinking occasion in the past 6 months).

METHODS
Survey instrument
The survey instrument used for this study was the International Alcohol Control (IAC) study questionnaire. The IAC study is a collaborative cohort study across seven countries. It measures the impacts of key national level alcohol policies. Alcohol consumption measures included in this instrument include availability, pricing and taxation, social supply, marketing and drunk driving interventions. For the purposes of the present study, variables under social supply were assessed.

Sampling
Of the 2617 individuals who participated in the IAC study (June–July 2012), 438 (16.7%) were high school students aged 16–18 years. A total of 21 high schools (urban 7, suburban 8 and rural 6) were randomly selected from geographically diverse regions of Korea. Two hundred forty-seven (56.4%) high schoolers self-identified as drinkers. This number constituted the sample for the present study. Institutional review board (IRB) permission was obtained and approved this study (SYUIRB 2011-018). Participants in the study received a coded packet that contained the questionnaire and a copy of the informed consent, which delineated the proposed use of the data, benefits and risks of participating in the study as well as confidentiality rights. Completion of the questionnaire took approximately 30 min. All participants completed the questionnaire at the time given and received a gift.

Variables
1. Social supplier This variable referred to persons who could at one time or the other (in the past 6 months) provide alcohol to teenagers. The present study considers fathers, mothers, siblings, other relatives, friends, partner (boyfriends and girlfriends), fellow schoolmates and strangers as the social suppliers of adolescents.
2. Frequency of secondary supply The frequency with which alcohol was socially supplied within the past 6 months was analysed using time periods, which included weekly (once or more during the week), once a month, more than once monthly (several times in a month) and at least once in the past 6 months.
3. Absolute alcohol volume The absolute alcohol volume was calculated for all brands under study. This was to determine the standard amount of pure ethanol (12 g of ethanol) per glass and estimate the total quantity (in grams) of alcohol provided to teenagers by social suppliers on a usual drinking occasion. Volume of absolute alcohol intake (in milliliters) was computed as (% pure alcohol)×(drink size)×(number of drinks consumed) for each beverage consumed on any usual occasion in the past 6 months. The sum of the various beverage types determined the total absolute alcohol. The brands included beer, home-brewed beer, low-alcohol beer, wine, spirits, mixed cocktail, soju, takju, yakju and Korean traditional wine.
4. Place Places cited in the analysis included own home, another home, pubs, other clubs, restaurants, workplace (part-time jobs), special events and other places.
5. Risky drinking Risky drinking in this analysis refers to the consumption of more than four standard drinks of alcohol on a single occasion for male and female high schoolers.

Methods of data analysis
SPSS V18.0, $\chi^2$ and Fisher’s exact tests were used to determine differences between demographic variables and supply of alcohol variables. A p value <0.05 was accepted as statistically significant. Logistic regression analysis was used to determine the associations between risky drinking (drinking more than four drinks on a usual occasion), demographic and social supply variables.

RESULTS
Of the total sample of 2617 Korean drinkers and nondrinkers recruited for the IAC Study in 2012, almost 16.7% (438) were high school students aged 16–18 years. Of the 438 students, 247, representing 56.4%, self-identified as drinkers. More than half of all age groups reported ever drinking alcohol. With the exception of suburban respondents, more than 60% of teenagers from urban and rural communities had consumed alcohol at least once in their lifetime. Characteristics of the sample are shown in table 1. Generally, 125 respondents representing more than half of all respondents (54.8%) had been provided alcohol more than once in the past 6 months. A higher number of males (13.7%) had been supplied alcohol more frequently than females (7.2%) in the past 6 months. Older teenagers aged 18 years (13%) received alcohol more frequently compared with their juniors. Urban dwellers reported more frequent supply of alcohol in the past 6 months compared with suburban and rural dwellers (see table 2).
Table 3 examines the supplier of alcohol to high school students in the past 6 months. Stratified by gender, statistical significance at p<0.05 was found when mothers and friends were suppliers. Mothers were the main supplier to female respondents while friends supplied alcohol to male students. With increase in age, supply shifted from mothers and friends to siblings, other relatives and schoolmates (table 3).

Self-report of places where alcohol was usually provided in the past 6 months were generally higher in own home, others’ home and at special events. Significant differences were reported between gender at other home, pubs and other places. At p=0.035, 60.7% and 48% of male and female respondents, respectively, received alcohol at other homes. In total, 46.5% of male respondents and 28% of females received alcohol at pubs (p=0.003). Supply at special events was significantly different between the different age groups with a greater percentage in the 16-year-olds. Among the different places of residence, significant differences were found for supply of alcohol at other places (see table 4).

Table 5 examines the association between risky drinking, demographic and supplier variables. On a usual drinking occasion, boys were seven times more likely to report risky drinking at statistically significant levels (p<0.001). The odds of risky drinking was significantly greater for high schoolers provided alcohol by friends (OR 5.67; 95% CI 2.54 to 12.68) compared with other suppliers. Those who drank in pubs had higher odds of risky drinking (OR 1.99; CI 1.09 to 3.65).

DISCUSSION

Despite the existence and enforcement of prohibition laws against purchasing of alcohol by minors (<19 years), alcohol remains accessible to teenagers through alternate channels. The focus of this study was to examine the various sources of alcohol to Korean high school drinkers. Major findings include (1) among high school drinkers, an adult (person aged 19 and above) was the most common source of alcohol, (2) while mothers were the main supplier to females, friends supplied more alcohol (in greater volumes) than parents and (3) high schoolers who consumed alcohol in pubs and clubs were more likely to engage in risky drinking.

A significant factor contributing to underage drinking is social supply of alcohol to teenagers. One of the mechanisms by which this supply may influence alcohol-related problems is by decreasing the age of onset of drinking. Korean high school drinkers reported obtaining alcohol from multiple sources including parents, siblings, other relatives, friends, fellow students, partners and even strangers. Of these sources, persons older than 19 years were the main sources. Adults, especially parents, have an important role in the socialisation of their children on the issue of alcohol use. Contrary to medical reports of the problems associated with early initiation of drinking, some parents are of the view that providing alcohol to their children teaches responsible drinking and controls the quantity consumed.

Results from our analysis showed that among South Korean parents, fathers were more likely to supply alcohol to their children than were mothers (30.4% vs 21.1% of adolescents).
The assumption is that when parents provide alcohol to
their children, it may serve a protective effect for alcohol
abuse. However, conflicting knowledge exists regarding
the protective effect of parental approval of underage
alcohol consumption. While some studies indicate that
parents who provide alcohol to their children are more
likely to have children who never abuse alcohol,24 others
show that consuming alcohol at home leads to increased
drinking among teenagers.25 Our research supported the
former assumption that teenagers supplied alcohol by
their parents were more likely to consume lower amounts
(122 g and 115 g by mothers and
fathers, respectively, compared with friends) and less
likely to be involved in risky drinking (OR 0.92; CI 0.49 to
1.74). Research has proven that providing alcohol to an
adolescent indicates approval of underage use. This
disregard of underage drinking may, however, lead
to future substance abuse.26 Parental approval of under-
age drinking is, however, rife as 13% of American youth,
aged 11–17 years, have drunk alcohol with their
families.27 28 Our results showed that the volume of
alcohol provided by friends exceeded that of parents
(205 g of absolute alcohol). At the same time, teenagers
who were supplied alcohol by friends (OR 5.67; CI 2.54
to 12.68) and those who drank at locations other than
their own homes, that is, at pubs (OR 1.99; CI 1.09 to
3.65) were at higher odds of risky drinking. We speculate
that high schoolers may have had access to alcohol at
pubs, special events and other places without age identi-
fication. South Korean laws that require suppliers to ascer-
nitate the age of a youth (under the age of 19) before
supply of any harmful drugs need to be enforced to
decrease supply of alcohol to teenagers at pubs, special
events and other places. Although the influence of peers
on alcohol use is of greater magnitude, contradictory
research indicates that a positive family environment
could attenuate the negative impact of peers on adoles-
cent drinking.29

### Table 3 Supplier of alcohol in the past 6 months, (N) %

<table>
<thead>
<tr>
<th>Supplier of alcohol (% in the past 6 months)*</th>
<th>Father</th>
<th>Mother</th>
<th>Siblings</th>
<th>Other relatives</th>
<th>Friends</th>
<th>Partner</th>
<th>Schoolmate</th>
<th>Stranger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>30.4</td>
<td>21.1</td>
<td>6.1</td>
<td>10.1</td>
<td>25.5</td>
<td>1.6</td>
<td>6.1</td>
<td>0.8</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=145)</td>
<td>29.7</td>
<td>17.2</td>
<td>5.5</td>
<td>11</td>
<td>31.7</td>
<td>1.4</td>
<td>7.6</td>
<td>0.7</td>
</tr>
<tr>
<td>Female (n=102)</td>
<td>31.4</td>
<td>26.5</td>
<td>6.9</td>
<td>8.8</td>
<td>16.7</td>
<td>2</td>
<td>3.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Age</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 (n=68)</td>
<td>32.4</td>
<td>22.1</td>
<td>4.4</td>
<td>8.8</td>
<td>29.4</td>
<td>1.5</td>
<td>4.4</td>
<td>1.5</td>
</tr>
<tr>
<td>17 (n=82)</td>
<td>25.6</td>
<td>22</td>
<td>6.1</td>
<td>11</td>
<td>24.4</td>
<td>2.4</td>
<td>6.1</td>
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<tr>
<td>18 (n=97)</td>
<td>33</td>
<td>19.6</td>
<td>7.2</td>
<td>10.3</td>
<td>23.7</td>
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<td>7.2</td>
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<tr>
<td>Residence</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban (n=145)</td>
<td>29.7</td>
<td>20.7</td>
<td>6.2</td>
<td>11.7</td>
<td>25.5</td>
<td>2.1</td>
<td>7.4</td>
<td>1</td>
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<td>Suburban (n=73)</td>
<td>28.8</td>
<td>23.3</td>
<td>6.8</td>
<td>8.2</td>
<td>26</td>
<td>1.4</td>
<td>6.2</td>
<td>2.7</td>
</tr>
<tr>
<td>Rural (n=28)</td>
<td>39.3</td>
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<td>3.6</td>
<td>7.1</td>
<td>25</td>
<td>–</td>
<td>7.1</td>
<td>–</td>
</tr>
</tbody>
</table>

*Percentages of positive responses do not add up to 100% as respondents selected more than one source. Italic figures show χ² significance at p<0.05.

### Table 4 Supply of alcohol at place (x) in the past 6 months, (N) %

<table>
<thead>
<tr>
<th>Places where alcohol is usually supplied (% in the past 6 months)*</th>
<th>Own home</th>
<th>Other home</th>
<th>Pubs</th>
<th>Other clubs</th>
<th>Restaurants</th>
<th>Meetings</th>
<th>Special events</th>
<th>Other places</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>56.3</td>
<td>35.4</td>
<td>5.6</td>
<td>4.2</td>
<td>3.9</td>
<td>46.6</td>
<td>25.1</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=145)</td>
<td>56.3</td>
<td>60.7</td>
<td>47.4</td>
<td>46.5</td>
<td>46.5</td>
<td>46.1</td>
<td>36.4</td>
<td></td>
</tr>
<tr>
<td>Female (n=102)</td>
<td>64.9</td>
<td>60.7</td>
<td>47.4</td>
<td>46.5</td>
<td>46.5</td>
<td>46.1</td>
<td>36.4</td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 (n=68)</td>
<td>59.1</td>
<td>60.3</td>
<td>47.4</td>
<td>33.8</td>
<td>33.8</td>
<td>47.1</td>
<td>32.4</td>
<td></td>
</tr>
<tr>
<td>17 (n=82)</td>
<td>60</td>
<td>58.2</td>
<td>47.4</td>
<td>37</td>
<td>37</td>
<td>31.7</td>
<td>18.1</td>
<td></td>
</tr>
<tr>
<td>18 (n=97)</td>
<td>60.5</td>
<td>49.5</td>
<td>47.4</td>
<td>44.1</td>
<td>44.1</td>
<td>38.1</td>
<td>28.7</td>
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<tr>
<td>Residence</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Urban (n=145)</td>
<td>63.7</td>
<td>53.2</td>
<td>47.4</td>
<td>42.9</td>
<td>42.9</td>
<td>45.4</td>
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<tr>
<td>Suburban (n=73)</td>
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<td>59.2</td>
<td>47.4</td>
<td>37</td>
<td>37</td>
<td>45.4</td>
<td>34.5</td>
<td></td>
</tr>
<tr>
<td>Rural (n=28)</td>
<td>55.6</td>
<td>59.3</td>
<td>47.4</td>
<td>21.4</td>
<td>21.4</td>
<td>38.6</td>
<td>7.1</td>
<td></td>
</tr>
</tbody>
</table>

*Percentages of positive responses do not add up to 100% as respondents selected more than one source. Italic figures show χ² significance at p<0.05.
establishments and providing any alcoholic beverages to children. These prohibitive laws against underage drinking do not, however, explicitly cover supply in private and off-licensed premises. The USA, on the other hand, has introduced initiatives aimed at restricting social sources of supply, including laws against adult provision of alcohol to minors and the creation of enforcement mechanisms that allow police to enter private premises where underage drinking is happening. There have also been efforts to register beer kegs so that police can trace the adult purchaser of alcohol provided to underage drinkers. Prohibitive laws in South Korea can be extended to cover not just purchase but supply of alcohol at all places including private premises.

Results from this research will pave the way in Korea for a more detailed exploration of all factors associated with the social supply of alcohol to teenagers as well as the long-term effects of this supply on adolescent development. This study, limited by its cross-sectional design is, however, strengthened by the use of the International Control Study questionnaire as an assessment tool. Generalisations of the whole population of South Korean teenagers cannot be made as the sample of this survey was limited by age and total sample size. However, the diversity of locations used is advantageous as results for the social supply of alcohol to teenagers as well as the full extent of social supply in South Korean teenage drinkers. Studies to determine the relationship between social supply and outlet density would be an interesting topic for future research.

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Collaborators Korean Institute on Alcohol Problems researchers.

Contributors SC is the Director of KIAP and is responsible for the study design. MY and LSA contributed to the study concept, analysis and interpretation. LSA was the lead writer while SC, MY and MN provided draft revisions with contributions to intellectual content. The manuscript was recirculated among all authors for critical revision. SC, LSA, MY and MN approved the final version of the manuscript.

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Competing interests None.

Ethics approval Sahmyook University IRB 2011-018.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available.

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REFERENCES

Table 5 OR of risky drinking on a usual drinking occasion in the past 6 months

<table>
<thead>
<tr>
<th>Covariate</th>
<th>% (SE)</th>
<th>OR (95% CI)</th>
<th>p Value</th>
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</thead>
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<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>74.36 (0.31)</td>
<td>7.38 (4.05 to 13.46)</td>
<td>0.000</td>
</tr>
<tr>
<td>Female</td>
<td>25.63 (0.31)</td>
<td>1</td>
<td></td>
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<tr>
<td>Age</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>26.86 (0.39)</td>
<td>1.26 (0.59 to 2.71)</td>
<td>0.555</td>
</tr>
<tr>
<td>17</td>
<td>34.38 (0.37)</td>
<td>0.84 (0.40 to 1.74)</td>
<td>0.637</td>
</tr>
<tr>
<td>18</td>
<td>38.75 (0.31)</td>
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<tr>
<td>Supplier</td>
<td></td>
<td></td>
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<tr>
<td>Parent</td>
<td>32.5 (0.32)</td>
<td>0.92 (0.49 to 1.74)</td>
<td>0.804</td>
</tr>
<tr>
<td>Friend</td>
<td>47.5 (0.37)</td>
<td>5.67 (2.54 to 12.68)</td>
<td>0.000</td>
</tr>
<tr>
<td>Other</td>
<td>18.75 (0.39)</td>
<td>1.26 (0.49 to 1.74)</td>
<td>0.557</td>
</tr>
<tr>
<td>Stranger</td>
<td>1.25 (0.21)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Place</td>
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<td></td>
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<tr>
<td>Own home</td>
<td>22.5 (0.30)</td>
<td>1</td>
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<tr>
<td>Another home</td>
<td>18.75 (0.29)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pubs/clubs</td>
<td>43.13 (0.31)</td>
<td>1.99 (1.09 to 3.65)</td>
<td>0.025</td>
</tr>
<tr>
<td>Special events</td>
<td>15.63 (0.41)</td>
<td>1.78 (0.80 to 3.96)</td>
<td>0.159</td>
</tr>
</tbody>
</table>
Social supply of alcohol to Korean high school students: a cross-sectional International Alcohol Control Study
Lydia S Asante, Sungsoo Chun, Mieun Yun and Maxine Newell

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