

The effect of alcohol advertising and promotion on alcohol consumption and alcohol related road accidents

A systematic review

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Introduction

Vietnam is currently one of the leading beer consumer countries in the world. The consumption of beer and wine in Vietnam has increased alarmingly in recent years. According to WHO, the average per capita alcohol consumption by adult Vietnamese for the period 2003-2005 was 3.8 liters [32], a significant increase from 0.75 liters in 1990 [5]. The total consumption of beer in Vietnam increased from 2.8 billion liters in 2012 to more than 3 billion liters in 2013, becoming the 3rd highest beer consumption in Asia after Japan and China. And the consumption of wine grew up by 7,5% for just one year, from 63 million liters in 2012 to nearly 68 million liters in 2013 [15].

Alcohol abuse contributes significantly to road accidents in Vietnam. According to Vietnam's National Committee for Road Safety, 6%-8% of all road accidents are related to alcohol use. Some hospital registration records showed that around 60% of individuals hospitalized for road accidents had a blood alcohol level above the limit [18].

According to WHO, the most effective measures to control the harmful use of alcohol, as documented by international best practice include: limiting access through licensing and sales bans to minors; anti-drunk driving policies, high taxes and prices, marketing and advertising bans, education, and addiction treatment [31]. In European Union, taxation, restricted access, and advertising bans were the most cost-effective policy options in reducing harmful alcohol use [4].

Healthbridge foundation of Canada conducts a literature review on the link between the advertisement and promotion with the consumption and the link between restriction of alcohol advertisement and promotion with the reduction of road accidents, to identify evidences for advocacy purpose.

The review covered the 44 relevant articles from 1990 to 2014 on alcohol advertisement and promotion in Vietnam and other countries.

Findings

Abundant evidences on the relationship between alcohol advertising, drinking behavior and traffic accidents were collected from various studies of different methodologies, including:

- Longitudinal studies which measure exposure at time A, and how this relates to drinking at future time B could provide the best indication for cause-effect relationships.
- Cross-sectional studies could provide a snapshot of advertising exposure and the status and levels of drinking, and look for correlations.
- Experimental studies investigate the causal effects that short term exposure to alcohol advertising has on drinking beliefs and behaviors under controlled conditions.
- Case control study is a type of retrospective studies that in which two existing groups differing in outcome are identified and compared on the basis of some supposed causal attribute. This permits estimation the risk of crash/injury for drinking populations compared to those with non-drinking.
- Meta-analysis study is used to assess the effectiveness of healthcare intervention by combining data from independent studies.

I. The effects of alcohol advertising on alcohol consumption

1.1. Alcohol advertisements increase the initiate to drink alcohol

Evidences from longitudinal studies

We identified 10 longitudinal studies that investigated the impact of alcohol advertising and promotion on decisions to drink of young people.

Collins et al. (2007) carried out a school-based longitudinal survey in South Dakota, USA, that evaluated the impact of exposure of alcohol marketing on beer use amongst 1786 grade 6 students (11- to 12-year olds) and follow up for 1 year later. The study found that exposure to multiple sources of alcohol advertising at Grade 6 (television advertisements, radio advertisements, beer promotional merchandise, beer advertisements in magazines) was strongly predictive of Grade 7 drinking and Grade 7 intention to drink. For particular, the risk of starting drinking at grade 7 increases by 19% if having exposure to sport TV beer advertisement (OR=1.19); increases by 13% if having exposure to other TV beer advertisement (OR=1.13), increase by 17% if exposure to radio listening beer adv (OR=1.17); and increase by 76% if ownership of beer promotion items (OR=1.76). The risk of having intention to drink also increases by 65% if ownership of beer

promotion items (OR=1.65); and increases by 25% if exposure to other TV beer advertisement (OR=1.25). The joint effect of exposure to advertisements from all sources: $F(8, 28) = 8.36, P < 0.0001$, and from three TV sources: $F(3, 33) = 3.35, P < 0.05$. Twenty percent of youth in the 75th percentile of alcohol marketing exposure at grade 6 reported past year beer drinking at grade 7, compared with 13% in the 25th percentile (Figure 1) [21].

Ellickson et al. (2005) studied the impact of exposure to different forms of alcohol advertising on the initiation of alcohol use and the frequency of drinking among US adolescents aged 12–13 years. A total of 3111 seventh-graders (seventh-grade non-drinkers ($n = 1206$) and (2) seventh-grade drinkers ($n = 1905$)) were followed through grade 9. Results showed that 48% of grade 7 non-drinkers consumed alcohol during the previous year at grade 9, and 77% of grade 7 drinkers consumed alcohol in the previous year at grade 9. Bivariate analysis found a significant impact of all types of alcohol advertisement exposure on initiation of drinking. Exposure to beer concession stands at sports or music events increase the likelihood of drinking onset for non-drinkers in the previous 12 months by 42% ($P < 0.05$), whereas no relationship has been established with the exposure to TV, magazines and in-store advertisements. Exposure to beer concession stands at sports or music events predicted the frequency of drinking amongst existing drinkers in the previous 12 months (coefficient = 0.09, $P < 0.05$), as did exposure to magazines with alcohol advertisements (coefficient = 0.10, $P < 0.05$), whereas exposure to TV beer adverts (coefficient = $-0.01, P > 0.05$) and exposure to in-store advertisements (coefficient = 0.02, $P > 0.05$) did not. [3].

Sargent *et al.* (2006) conducted a school-based cross-sectional survey ($N=4655$), with longitudinal follow-up among 2406 non-drinkers aged 10-14 years at baseline 12–26 months later, examine the association of viewing depiction of alcohol use in popular contemporary movies with early-onset drinking in an adolescent sample. Exposure increased the risk of alcohol use during the follow-up period (OR = 1.15, 95% CI: 1.06–1.25). The analysis also showed that the relationship between exposure to image of alcohol use in motion pictures and initiation of alcohol use was stronger among adolescents in lower exposure categories. The study suggested that the exposure to movie alcohol use is an independent risk factor for early-onset alcohol use [26].

Pasch *et al.* (2007) conducted a longitudinal study to examine the association between exposure to outdoor alcohol advertisements within 1500 feet (457 m) in sixth grade and student alcohol behavior, intentions, norms and attitudes in eighth grade of 63 Chicago school sites. On average, each school site had 14.8 alcohol advertisements within 1500 feet (457 m). Participants included 2,586 sixth-grade students in the 2002-2003 school year. Of those, 2027 (78%) students were non-users of alcohol at baseline. The exposure to alcohol advertisements at sixth grade was found to predict alcohol intentions at the end of eighth grade. [19].

Hanewinkel and Sargent (2008) conducted a longitudinal study to investigate the impact of exposure to movie alcohol depictions on onset of drinking alcohol and binge drinking amongst 2708 German adolescents aged 10 to 16 years who had never drunk alcohol. Estimated mean movie alcohol exposure was 3.2 h (SD:2.9) from the 398 movies, subsequently divided into four quartiles. Compared with the group with lowest level of exposure (quartile 1), the adjusted risk for drinking without parental knowledge were 42% higher in group Q2; 94% higher for the group Q3, and 100% higher for the group Q4; The risk for binge drinking is 44% higher on group Q2, 95% higher for group Q3, and 123% higher for group Q4. [22].

Stacy *et al.* (2004) studied the impact of TV alcohol commercials on alcohol use amongst 2250 adolescents aged 12 to 13 year old in California. At 1-year follow-up, each one standard deviation increase in viewing television programs containing alcohol commercials in seventh grade was associated with a 44% increase in odds of beer drinking (OR=1.44, 95% CI: 27–61%), a 34% increase in odds of wine/liquor drinking (OR=1.34, 95% CI: 17–52%) and a 26% increase in odds of consuming three or more drinks on one occasion (OR=1.26, 95% CI: 8–48%) during the previous 30 days in eighth grade, controlling for covariates related to drinking behavior [28].

Henriksen *et al.* (2008) used a non-random longitudinal survey to investigate the influence of alcohol advertising and promotions on the initiation of alcohol use amongst 1080 non-drinking students of 6th, 7th, and 8th graders at baseline and 12-month follow-up. Approximately 29% of adolescents who were never drinkers at baseline had initiated alcohol use at follow-up; 13% reported drinking at least 1 or 2 days in the past month. The study showed that the students with high receptivity (owned or wanted to use an alcohol branded promotional item) to alcohol marketing has the risk of initiation increased by 68% (OR=1.68 (1.20-2.35)) and the risk of current drinking increased by 62% (OR=1.62 (1.01-2.60)) as compared with those were not receptive [7].

Fisher *et al.* (2007) conducted a non-random, prospective cohort study to investigate the impact of ownership of or willingness to use an alcohol promotional item on the initiation of alcohol use and binge drinking (five or more alcohol drinks over a few hours at least once over the past year). A total of 5511 participants aged 11 to 18 years in 1998 participated in the study. Between 1998 and 1999, 611 girls (19%) and 384 boys (17%) initiated alcohol use. The risk for alcohol initiation during the 12-month period was 74% higher for girls and 78% higher (1.36–2.33) for boys for those who owned or were willing to use an alcohol promotion item compared with those who did or would not. Out of 611 drinking girls, 149 (24%) and out of 384 drinking boys, 112 (29%) engaged in binge drinking. The risk of involving in binge drinking amongst drinkers was 79% higher for girls for those who owned or were willing to use an alcohol promotion item compared with those who did or would not [6].

McClure *et al.* (2006) carried a longitudinal study to examine the impact of ownership of alcohol branded merchandise (ABM) on initiation of alcohol use amongst 2406 never drink students of

5th- through 8th-grade from 15 middle schools in Northern New England at baseline and follow up for 1 to 2 year later ABM items consisted primarily of articles of clothing such as t-shirts and hats. The final analysis showed that students who owned an ABM item were 1.5 times significantly more likely to have initiated alcohol use compared with students who did not own one (adjusted OR=1.5 (1.1–2.0)) [17].

The other longitudinal study of McClure et al (2009) studied the association between ownership of alcohol-branded merchandise (ABM) with attitudinal susceptibility, initiation of alcohol use, and binge drinking amongst 6522 adolescents aged 10 to 14 years in US at baseline survey (4309 of whom were never-drinkers at 8 months) found that ABM ownership (88% of ABM are clothing items and headwear) and attitudinal susceptibility to drinking (was determined at the 8, 16, and 24 month surveys using 3 items that assessed response to peer offers, intentions, and positive expectancies) predicted both initiation of alcohol use and binge drinking . Owning ABM at 8 months increases the risk of trying alcohol at 8 to 16 months by 41% (OR=1.41 (0.98-2.01)); increases the risk of trying alcohol at 16 to 24 months by 57% (OR=1.57 (0.99-2.50)); increases the risk of susceptible to alcohol use at 8 to 16 months by 66% (OR=1.66 (1.15-2.40)); and increases the risk of trying binge alcohol at 8 to 16 months by 80% (1.80 (1.28-2.54)). [1].

Gordon et al. (2011) conducted a two-stage cohort study to examine whether awareness of, and involvement with alcohol marketing (which was assessed by showing participants eight cards with examples of different forms of alcohol promotional activities including: Free samples, Free branded gifts, Price promotions, Promotional mail/e-mails, Branded clothing, Websites, Mobile phone/computer screensavers, Social networking sites and asking them to indicate whether or not they had participated in each) at age 13 is predictive of initiation of drinking, frequency of drinking and units of alcohol consumed at age 15. The study included 920 students from secondary schools in the West of Scotland, UK at baseline; a cohort of 552 was followed up 2 years later. Results showed involvement with alcohol marketing at baseline increased 31% of their chance/risk of initiation of drinking (adjusted OR = 1.31, $P < 0.05$), 33% of their chance/risk of take up at least monthly drinking (adjusted OR = 1.33, $P < 0.05$); and 43% of their chance/risk of uptake of fortnightly drinking (adjusted OR = 1.43, $P < 0.05$). Initiation of drinking and uptake of fortnightly drinking were also more likely among those with greater appreciation of alcohol advertising at baseline (adjusted OR = 1.272, 95%, $P < 0.05$ and adjusted OR = 1.295, 95%, $P < 0.05$) [23]

Evidences from cross sectional survey

A cross sectional survey of Chen et al. found the evidences of how alcohol advertising attracts and influences young people. The study investigates the effective responses of youth toward specific elements featured in television alcohol advertisements among 253 children and adolescents (aged 10-17) in California. Respondents were shown a stimulus tape containing television advertisements for beer and soft drinks. The tape was stopped at the end of each advertisement to allow respondents

to answer questions about that advertisement before viewing the next. Results found that underage youth are drawn to music, animal and people characters, story and humor in alcohol advertising. Liking of these specific elements featured in beer advertisements significantly contribute to the overall likeability of these advertisements and subsequently to advertising effectiveness indicated by intent to purchase the product and brand promoted by the advertisements [16].

Sandra et al. (2011) conducted a cross sectional survey to examine the effect of exposure to different types of alcohol advertising and alcohol consumption among Australian adolescents. A total of 1113 adolescents aged 12-17 years old participated in the survey. Participants answered a series of questions assessing adolescents' exposure to alcohol advertising across eight media (including television, magazine, newspaper, internet, billboard, bottleshop, bar, promotional). Alcohol consumption was assessed using three questions (initiation, recent consumption and frequency of consumption in the previous 12 months). They found that, the initiated alcohol was significantly associated to exposure with alcohol advertisements in a magazine (AOR = 1.69: 1.20–2.38), bottle shop (AOR = 1.49: 1.04–2.14), pub/bar (AOR = 1.49: 1.10–2.01) or on promotional materials (AOR = 1.36: 1.00–1.84). The regular alcohol consumption (in the previous 12 months) was significant associated to alcohol advertising exposure in a pub/bar (AOR = 1.69: 1.27–2.25). Exposure to alcohol advertisements in a bar/pub predicted greater alcohol consumption among females aged 12–15 years (AOR = 2.73: 1.29–5.76) consumption. For recent alcohol consumption (drink in past 4 weeks), it was significant associated with exposure to alcohol advertising in a magazine (AOR = 1.54: 1.11–2.14), on the Internet (AOR = 1.36: 1.03–1.79) or in a pub/bar (AOR = 1.44: 1.09–1.91). When the analyses were broken down by age and sex, alcohol advertising in magazines (AOR = 2.38: 1.03–5.61) and on the Internet (AOR = 3.05: 1.45–6.40) was associated with alcohol consumption among males aged 12–15 years. In females aged 12–15 years, advertisements in newspapers (AOR = 2.15: 1.12–4.13) and bars/pubs (AOR = 2.11: 1.08–4.10) were associated with recent alcohol consumption [25].

1.2. Alcohol advertisements effects the level of consumption

We identified 3 longitudinal studies and 2 experimental studies that investigated the effect of alcohol advertising on the level of alcohol consumption.

Evidences from longitudinal studies

Van den Bulck and Beullens (2005) studied the impact of exposure to alcohol depiction TV and music video on the consumption of alcohol whilst going out amongst 2546 first- and fourth-year secondary school students in Flanders, Belgium. Data were collected in two waves (February 2003 and February 2004). Self-reported general TV viewing and music video exposure at time 1 and the quantity of alcohol consumed while going out at time 2 were measured. The quantity of alcohol

consumed while going out at follow-up period related to overall TV viewing ($\beta = 0.068$, $t = 3.46$, $P = 0.001$) and music video exposure ($\beta = 0.073$, $t = 3.05$, $P = 0.004$) [29].

Snyder *et al.* (2006) conducted a longitudinal study to examine the impact of alcohol advertising expenditures and the degree of exposure to alcohol advertisements (TV, radio, billboards, and newspapers) on alcohol use amongst 15- to 26-year olds in 24 Nielsen local geographical media markets. For those aged <21 years, youth who saw more alcohol advertisements on average drank more: each additional alcohol advertisement seen increased the number of drinks consumed in the previous month by 1% (event rate ratio = 1.01, 95% CI: 1.001–1.021). Youth in markets with greater alcohol advertising expenditures drank more: each additional dollar per capita spent on alcohol advertisements increased the number of drinks consumed in the previous month by 2.8% (event rate ratio = 1.028, 95% CI: 1.002–1.056) [27].

Evidences from experimental studies

Experimental study of Koordeman *et al.* (2011) investigated the effects of movie alcohol portrayal on alcohol consumption of young adults while watching a movie. A total of 122 young adults (ages 18-29 years) were exposed to a movie with alcohol or no portrayal of alcohol. Participants watched a contemporary movie in a semi-naturalistic living room setting. Their actual alcohol consumption while watching was examined. Assignment to movie with alcohol increased alcohol consumption during the movie for men but not women. Young men who watched the original version of the film "What happens in Vegas, including alcohol, drank almost twice as much alcohol as men who watch a censored version of the same film, in which the alcohol slots had been removed [14].

Using the same methodology, the other experimental study of Koordeman (2011) studied the effects of alcohol commercials shown in movie theaters on the alcohol consumption of young adults (age:16-28 years) who see these commercials. Participants included 184 young adults (designed by two groups including high weekly alcohol consumption (>7 glasses per week) vs. low weekly alcohol consumption) were exposed to a movie that was preceded by either alcohol commercials or non-alcohol commercials. Their actual alcohol consumption while watching the movie (Watchmen) was examined. High weekly alcohol consumption users drank 2.5 times more alcohol in the cinema after seeing several alcohol commercials preceding the film (Watchmen) compared with low weekly alcohol consumption users who saw several neutral commercials. No differences were found in alcohol consumption between commercial conditions among low weekly alcohol drinkers [13].

II. The effects of alcohol advertising restriction

2.1. Link between the restriction of alcohol advertisement with the reduction of alcohol consumption

We identified 3 meta analysis studies that investigated the relationship between alcohol advertisement ban and the reduction of alcohol consumption.

Henry Saffer (1991) analyzed data from 17 countries for the period 1970 to 1983 to examine the effect of banning broadcast advertising of alcoholic beverages on alcohol abuse. The empirical results show that countries with bans on spirits advertising have about 10 percent lower alcohol consumption and motor vehicle fatality rates than countries with no bans. The results also show that countries with bans on beer, wine and spirits advertising have about 23 percent lower alcohol consumption and motor vehicle fatality rates than countries with only bans on spirits advertising [8].

The other study of Henry Saffer (2000) which used data of 20 countries for the years 1970 through 1995 to examine the relationship between alcohol advertising bans and alcohol consumption concluded that alcohol advertising bans decrease alcohol consumption. In defining the advertising bans, if only spirits are banned in a media, then the ban is defined as partial, and if all alcohol advertising is banned in a media, then the ban is considered total. The first alcohol advertising ban is defined as the number of partial alcohol advertising bans. This ban variable counts the number of advertising bans on beer and wine or on spirits, by media. Since there are three media included, and two beverage groups, this variable can take on values from zero to six. The second alcohol advertising ban is defined as a total ban since it measures the number of media that ban spirits and ban beer and wine advertising. The results indicate that an increase of one more partial ban on beer and wine or on spirits could reduce alcohol consumption by 5% and one more total ban on all alcohol advertising in a media would reduce consumption by 8% [10].

Looking at alcohol advertising expenditure data including spot television expenditures, spot radio expenditures, outdoor expenditures, magazine expenditures and newspaper expenditures across the United States, Saffer & Dave (2003) found: a competed ban on all alcohol advertising could reduce adolescent monthly alcohol participation by about 24 percent and binge participation by about 42 percent [11].

2.2. Link between the restriction of alcohol advertisement with the reduction of road accidents

To estimate the effect of alcohol advertising on motor vehicle fatalities, Henry conducted a study which included 1200 observations for 75 advertising markets in the United States from 1986 to 1989. Two policies were examined include: the extension of the voluntary ban on broadcast advertising to include beer and wine; and the elimination of the tax deductibility of all alcohol

advertising expenses. The results found that: if a ban on broadcast alcohol advertising did not also include bans on other types of alcohol marketing (radio, print, and outdoor advertising), the effect on motor vehicle fatalities might be in the range of 2000 to 3000 lives saved per year; if eliminate the tax deductibility of alcohol advertising, the alcohol advertising could be reduced by about 27 percent, motor vehicle fatalities could be reduced by about 2300 deaths per year and raise about \$336 million a year in new tax revenue [9].

Smith and Geller examined the impact of prohibiting alcohol advertising to target minors law in United State by using statistics obtained from the Fatality Analysis Reporting System (FARS). This study examined only fatality data on drivers ages 15-20 who were killed in single-vehicle traffic fatalities. Results found that states possessing this law experienced 32.9% fewer drivers aged 15-20 killed in alcohol-related, single-vehicle traffic fatalities per million youth of this same age bracket than states where this legislation was not enacted. It was estimated that 400 youth lives could be saved annually if this type of legislation were adopted in all 26 states that do not prohibit targeting of minors with alcohol advertising [24].

2.3. Cost effectiveness of alcohol advertising restriction

Using World Health Organization's model, a comprehensive assessment of European Union found that banning alcohol advertising is one of three most cost-effective strategies in reducing alcohol-related illness health and premature death in the European Union (along with taxation and restricted sales policy). It was estimated that a ban on advertising implemented throughout the EU could prevent 5% of all alcohol related ill health or 202.000 years of disability and premature dead avoided, at the lowest implementation cost compared to the cost of other policy options included: brief advice, drink drive measures, current tax+25% and restricted sales. Advertising ban is defined as a total or partial legal prohibition of advertising for alcoholic beverages. Partial bans may relate to a particular type of alcoholic beverage, or a type of media, or may limit broadcast advertising to certain hours of the day [20].

A similar conclusion was reached by Doran et al. (2008), who tailored the WHO's generalized cost-effectiveness framework to accommodate the Australian context. This approach uses sophisticated modeling, comparing the net costs that would stem from the introduction of a new intervention with the net costs that would arise in the absence of any intervention. On the basis of this analysis, Doran et al. conclude, "banning of alcohol advertising should be a high priority for investment due to the high probability of cost-savings". Along with changes to the changing to volumetric taxation, comprehensive restrictions on alcohol advertising represent the most cost-effective strategy for reducing harms associated with alcohol misuse [2].

Hollingworth et al. estimated the impact of interventions to reduce the drinking prevalence among youth on subsequent drinking patterns and alcohol-attributable mortality among the cohort of

approximately 4 million US residents aged 20 in 2000. Results found that tax increase and advertising ban were the most effective interventions. In the absence of intervention, there would be 55,259 alcohol-attributable deaths over the lifetime of the cohort. A tax-based 17% increase in the price of alcohol of dollar 1 per six pack of beer could reduce deaths from harmful drinking by 1,490, equivalent to 31,130 discounted years of potential life saved or 3.3% of current alcohol-attributable mortality. A complete ban on alcohol advertising would reduce deaths from harmful drinking by 7,609 and result in a 16.4% decrease in alcohol-related life-years lost. A partial advertising ban would result in a 4% reduction in alcohol-related life-years lost [12].

A rigorous evaluation of different policy interventions indicated that an advertising ban on alcohol would not only improve health outcomes and provide a significant return on investment, but that it would also achieve net cost savings, resulting in direct economic returns to government [30].

Conclusion

There were significant evidences showing the effect of alcohol advertising on drinking behavior and alcohol related road accident, which are:

1. Exposure to alcohol marketing increases the likelihood that young people start to drink alcohol, and among people who have ever used alcohol, such exposure increases the frequency of drinking and the amount of alcohol consumed.
2. Advertising ban is one of the most cost-effective strategies in reducing alcohol consumption, alcohol-related illness health and traffic accidents
3. A complete ban on alcohol advertising is more effective than a partial advertising ban. But each the increase of one more partial ban would also be effective in reducing alcohol related harms.

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