Recent Trends in Alcohol Outlet Density, Distances from Educational Institutions and Sales Campaigns in Chiang Mai Municipality (Metropolitan), Thailand: Should We Be Worried for Our Youths?

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Abstract

Aims: Since 2008, alcohol control policies in Thailand have been considered quite comprehensive. The study aimed to investigate the subsequent changes in alcohol outlet density and patterns of sales promotion, which may be useful for monitoring the effectiveness of policies and helpful for planning prevention strategies to reduce alcohol-related harms.

Methods: All accessible routes in the Chiang Mai Municipality (Metropolitan: CMM) were surveyed in 2009, 2011 and 2014. During each round of survey, the geographical coordinates of alcohol outlets and educational institutions in the CMM were recorded using the Global Navigation Satellite System (GNSS). In addition, alcohol sales campaigns were documented.

Results: Three main trends emerged by 2014. The first was that alcohol outlet density had increased. Second, the average distances between alcohol outlets and educational institutions decreased with evidence of clustering near educational institutions. Lastly, increased advertising of alcohol promotions and new sales campaigns not previously seen in 2009 and 2011 promoted high volume drinking in Chiang Mai Municipality (CMM).

Conclusion: Our study reflects the potential gaps between some of the intended consequences of alcohol control policies and the actual trends emerging in Chiang Mai, Thailand. Young people in CMM may be at a particularly high risk for alcohol-related problems due to high exposure to alcohol outlets and sales campaigns near their educational institution.

INTRODUCTION

Excessive alcohol consumption with its health consequences is considered to be one of the leading global burdens of disease and is the third leading risk factor for premature death and disability (Lim et al., 2015). A report by the World Health Organization estimated that 3.3 million deaths every year were caused by the harmful use of alcohol (World Health Organization, 2014). A significant proportion of the burden attributed to alcohol-related harms (such as injuries,
violence and suicides) occurs in young people (Jernigan, 2001). It appears that a youth culture of excessive drinking has been spreading globally (World Health Organization, 2006; Sanchez et al., 2011). Monitoring alcohol-related problems and establishing strategies and policies to reduce harmful use of alcohol in young people is a priority for many countries and organizations (Anderson et al., 2012; World Health Organization, 2014). Strategies include monitoring alcohol outlet density and establishing alcohol-free zones for certain areas such as schools and universities (Wetzman et al., 2003; Livingston et al., 2007; Campbell et al., 2009). Sales restrictions in certain areas and during certain times, along with regulation on advertisements, are accepted ways to reduce accessibility and change the acceptability of alcohol drinking in young people (Anderson et al., 2012; World Health Organization, 2014).

However, the marketing of alcoholic beverages is sophisticated. Advertisements and new promotion techniques are aimed to adjust the attitudes and beliefs of alcohol drinking such as associating alcohol consumption with self-confidence, building stronger relationships with friends and promoting social responsibility (Kuntsche et al., 2005; Moeller and Crocker, 2009; World Health Organization, 2014). One strategy is to offer low prices and quantity deals (Kuo et al., 2003; World Health Organization, 2004, 2014). Evidence has suggested that young people and adolescents in developing countries are being targeted because alcohol control/regulation policies may not be strictly enforced and civil society may be less involved in regulating enforcement than in developed countries (Center for Alcohol Studies, 2013; World Health Organization, 2014).

For Thailand, the government has implemented policies to control the accessibility of alcohol to young people by limiting the hours when alcohol can be purchased, raising the legal purchasing age of alcohol to 20 and by banning the sales of alcohol in certain public areas such as within educational institutions (Thai Health Promotion Foundation, 2010). However, the number of young drinkers has not declined. While older age groups actually saw a 2.1% decrease in the prevalence of alcohol consumption between 2003 and 2012, a national survey found that the prevalence of alcohol drinking in young people increased by 9.5% (Center for Alcohol Studies, 2013). Another study from Southern Thailand, conducted between 2003 and 2009, found an increasing trend in alcohol use among high school male students (Tantirangsee et al., 2014). This has raised doubts about the effectiveness of such control policies on young adults and raised questions about whether such policies are lacking implementation and enforcement in Thailand. A recent publication documented the interactions and ties between alcohol producing companies and the Thai political system, especially in the application of alcohol taxation in Thailand (Sornpaisarn and Kaewmungkun, 2014). The study found that large national and international alcohol companies had significant political influences, enabling them to receive favorable tax policies and ability to stockpile products before taxation increases. In recent years, the Thai government has considered banning sales of alcohol and alcohol outlets within 300–500 m of an educational institute; however, such policies have not yet materialized (Thai Health Promotion Foundation, 2010).

Understanding the changes in alcohol outlet density and patterns of alcohol sales promotion may be useful for monitoring the effectiveness of policies aimed at reducing alcohol-related harms. Data can also help to inform prevention strategies. Data on alcohol outlet density from Thailand are mostly generated through cross-sectional studies conducted in Bangkok, which may limit interpretation and generalization of results. The Chiang Mai Municipality (CMM) of Thailand has undergone rapid development due to recent changes in political and socioeconomic developments. We explore this phenomenon and its potential impact on some of the intended consequences of Thailand’s alcohol control policy using results from three surveys in the CMM conducted between 2009 and 2014, showing trends in alcohol outlet density, outlet distances from educational institutions and sales campaigns.

**METHODS**

**Study area and survey procedure**

The study area, ‘Chiang Mai Municipality (CMM)’, was the first municipality to achieve ‘City/Metropolitan’ status outside of Bangkok and its suburbs (Goldstein, 1971). According to the 2014 census, the total population living in the 40.2 square-kilometers of the CMM is 132,635. This translates to a population density of ~3300 persons per square-kilometer. Guided by a 1-meter spatial resolution of IKONOS satellite imagery, all accessible routes in the CMM were detected and surveyed by a research team in 2009, 2011 and 2014. During each round of the survey, the geographical coordinates of alcohol outlets and educational institutions in the CMM were recorded using the Global Navigation Satellite System (GNSS) (Lechner and Baumann, 2000). Covering all accessible routes should have increased the detection of unlicensed alcohol outlets. In addition, alcohol sales campaigns at each on-premise alcohol outlet were photographed.

**Measures**

We considered any point where alcohol could be sold as an outlet. All licensed alcohol outlets were identified, because alcohol licenses are regulated by the Excise Department, Ministry of Finance of Thailand. However, unlicensed outlets accounted for <1% of all outlets in the survey. Alcohol outlets in this study can be categorized into two types: on-premise and off-premise outlets (Chinman et al., 2011). On-premise outlets consist of recreational venues (e.g. pubs and bars) and general restaurants, and may also include temporary outlets (e.g. mobile bars and street stalls). In contrast, off-premise outlets usually consist of small convenience stores and retail liquor shops.

A list of all schools (consisting of all kindergarten, elementary school, high school, vocational school and universities) registered as formal educational institution in the CMM was retrieved from the Ministry of Education. In order to estimate spatial distribution patterns of alcohol outlets, a method of nearest neighbor analysis (Berry and Marble, 1968) was employed for computing the shortest distance between an outlet and an educational institution. In terms of investigating density of alcohol outlets around the educational areas, a 300 m buffer zone was created around each educational institution using ArcGIS (Hillier, 2011). The 300 m buffer zone was chosen as it represented the distance a child could walk in ~5 min (Svastisalee et al., 2012) and has been used in other studies when investigating the environmental influence on health-related behaviors among children and adults (Wendel-Vos et al., 2004; Horst et al., 2008).

**Analysis**

Descriptive statistics were used to depict the changing patterns of alcohol outlet density, proximity of an alcohol outlet to the nearest educational institution and proportion of alcohol outlets within a 300-m radius of an educational institution. We further analyzed the changing patterns by subtypes of alcohol outlets (off-premise and on-premise) and the type of nearest educational institution (e.g. elementary school, high school). With respect to analyzing spatial distribution patterns,
we tested clustered or dispersed distributions of alcohol outlets around educational areas with the nearest neighbor index (Rn). The nearest neighbor index (Rn) varies from 0 to 2.15. The Rn value is <1 and closer to 0 if a clustered pattern appears. In a clustered pattern, it can be assumed that the points represent sites of economic activity (e.g. retail and service functions). In a dispersed pattern, the Rn value is commonly bigger than 1 (Rogerson and Sun, 2001).

RESULTS

Trends and density of alcohol outlets

The most common alcohol outlets in CMM were recreational venues (e.g. pubs and bars). These recreational venues along with retail liquor stores, restaurants and convenience stores make up over 90% of all alcohol outlets in the CMM. The ratio between on-premise and off-premise was relatively stable at 3 to 2 between 2009 and 2014. The total number of alcohol outlets and alcohol outlet density between 2009 and 2011 in CMM was also relatively stable at ~1000 outlets. However, an increasing trend in alcohol outlets and density of outlets was observed by 2014. The number of alcohol outlets rose by ~20% to 1244 outlets. Further, the number of alcohol outlets per square-kilometer rose from 25 in 2009 to 31 in 2014. Similarly, the number of alcohol outlets per 100,000 population rose from 738.6 in 2009 to 925.1 in 2104 (Table 1).

Trends in distances from educational institutions

The total number of educational institutions remained relatively stable between 2009 and 2011. The median distance was 279 m (IQR 177.4–427.0) in 2009 and 282.4 m (IQR 172.3–428.4) in 2011. By 2014, the median distance decreased by ~30 m to 249.4 (IQR 155.5–382.5). The decrease in distances was mainly driven by off-license outlets. The median distance for off-license outlets was 289.9 m (IQR 186.9–470.8) in 2009 and 291 m (188.2–476.9) in 2011. By 2014, the median distance decreased by ~60 m to 228.9 (IQR 136.2–355.6) (Supplementary Fig. S1). The shortest distance to an educational institution was, however, an on-premise outlet, situated only 3.6 m from the nearest educational institute. When sub-analyzed according the type of educational institute closest to the individual outlets, a pattern emerged that the number of outlets was decreasing near kindergartens but increasing near vocational schools and universities. By 2014, the distances between outlets and educational institutions had decreased particularly near high schools and universities (Supplementary Fig. S2). The proportion of outlets within 300 m of an educational institution also mirrored these trends in distances. Approximately 55% of all outlets were within 300 m of an educational institute between 2009 and 2011. This proportion rose by ~6% by 2014. In total, 61% of all outlets were within 300 m of an educational institute in 2014 (Supplementary Fig. S3).

Using different radiuses to create buffer zones, the nearest neighbor index suggested that on-premise outlets were clustered within a 100–200 m radius of an educational institution (Rn from 0.62 to 0.89). Using 300–500 m radiuses from an educational institution, both on-premise and off-premise outlets demonstrated clustering patterns (Table 2).

Trends in sales campaigns

Between 2009 and 2014, sales campaigns during ‘happy hour’ (early evening) were common. Other campaigns included special discounts on weekdays. The number of on-premise outlets with advertised sales campaigns rose from 35 in 2009 to 63 in 2014. Moreover, by 2014, newer sales strategies not documented between 2009 and 2011 emerged. These sales campaigns included ‘all-you-can-drink’ beer and wine buffets (within a 2–4 h timeframe) and special offers when buying in bulk. One offer consisted of ‘buy one box of beer (12 bottles, 630–640 cc each) before 7 pm, and get one box free’ (Supplementary Fig. S4).

DISCUSSION

The Chiang Mai Municipality, like in many areas in Thailand and developing countries, is facing rapid changes in socioeconomic and cultural environments which may influence alcohol use. While no

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Table 1. Trends and density of alcohol outlets in Chiang Mai Municipality between 2009 and 2014

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2011</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of educational institutions</td>
<td>84</td>
<td>84</td>
<td>85</td>
</tr>
<tr>
<td>Number of students enrolled</td>
<td>145,049</td>
<td>146,227</td>
<td>163,296</td>
</tr>
<tr>
<td>Population in Chiang Mai Municipality</td>
<td>142,970</td>
<td>137,797</td>
<td>134,471</td>
</tr>
<tr>
<td>Number of alcohol outlets</td>
<td>1056</td>
<td>1008</td>
<td>1244</td>
</tr>
<tr>
<td>By type (%), n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational venues (pubs, bars and karaoke)</td>
<td>40.6 (429)</td>
<td>37.0 (373)</td>
<td>32.9 (409)</td>
</tr>
<tr>
<td>Alcohol retailed stores</td>
<td>24.1 (254)</td>
<td>26.1 (263)</td>
<td>27.9 (347)</td>
</tr>
<tr>
<td>Restaurants</td>
<td>18.2 (192)</td>
<td>18.8 (190)</td>
<td>22.7 (282)</td>
</tr>
<tr>
<td>Convenience stores</td>
<td>10.1 (107)</td>
<td>10.8 (109)</td>
<td>8.4 (105)</td>
</tr>
<tr>
<td>Others</td>
<td>7.0 (74)</td>
<td>7.2 (73)</td>
<td>8.1 (101)</td>
</tr>
<tr>
<td>By type (%), n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of on-premise outlets</td>
<td>60.7 (641)</td>
<td>57.5 (580)</td>
<td>58.7 (730)</td>
</tr>
<tr>
<td>Percentage of off-premise outlets</td>
<td>39.3 (415)</td>
<td>42.3 (426)</td>
<td>41.0 (510)</td>
</tr>
<tr>
<td>Percentage of other types of outletsa</td>
<td>0</td>
<td>0.2% (2)</td>
<td>0.3% (4)</td>
</tr>
<tr>
<td>Outlets per square-kilometers</td>
<td>26</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td>Outlets per 100,000 population</td>
<td>738.6</td>
<td>731.5</td>
<td>925.1</td>
</tr>
</tbody>
</table>

aOutlets classified as ‘others’ were off-premise outlets with an on-premise drinking area; recreational venues and restaurants are classified as on-premise outlets; retail stores and convenience stores are classified as off-premise outlets.
changes in alcohol outlet density were seen between 2009 and 2011, three main trends emerged by 2014: an increase in alcohol outlet density, decrease in average distances between alcohol outlets and educational institutions (with evidence of clustering near educational institutions) and an increase in new sales campaigns promoting high volume drinking. As alcohol control policies in Thailand have been considered quite comprehensive since 2008, our study reflects the potential gaps between some of the intended consequences of alcohol control policies and the actual trends emerging in Thailand.

Table 2. Nearest neighbor index (Rn) between alcohol outlets and educational institutions by different radiuses

<table>
<thead>
<tr>
<th>Buffer zone radius (meters)</th>
<th>Nearest neighbor index (Rn)</th>
<th>Overall</th>
<th>On-premise outlets</th>
<th>Off-premise outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1.6</td>
<td>0.89</td>
<td>1.38</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>1.02</td>
<td>0.62</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>0.87</td>
<td>0.55</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>0.80</td>
<td>0.50</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>0.74</td>
<td>0.46</td>
<td>0.60</td>
<td></td>
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</table>

As for trends in sales campaigns, our findings were similar to other reports showing sales of large volumes of alcohol, low sale prices and frequent promotions (Wechsler et al., 2000; Kuo et al., 2003; Scribner et al., 2011). We found the increasing number of sales campaigns including ‘all-you-can-drink’ beer and wine buffets. Young adults may be more susceptible to alcohol advertisement that puts them at higher risk for harm from alcohol use than adults (Pechmann et al., 2005), especially when they are exposed to several different types and patterns of sales promotion and marketing campaigns (Kuo et al., 2003).

Our study had several limitations. One major limitation of our research was that we surveyed sales campaigns and alcohol outlet density without surveying drinking behavior. Although a survey from Thailand found that residents in high alcohol outlet density areas were 1.22 times more likely to have high risk drinking behavior than the those residing in low alcohol outlet density areas (Wongwatanakul et al., 2010) and a recent systematic review concluded that increased exposure to outlets and alcohol advertisement were likely to be associated with increased alcohol use, particularly in adolescents (Bryden et al., 2012), it was not possible to determine whether drinking behaviors were actually changing in our study. Another limitation of our study was that the three surveys were conducted during a 5-year time span, which may not represent the long-term trends in CMM. While efforts were made to survey all accessible routes in order to document all alcohol outlets, we may have underestimated the number of unlicensed and informal outlets.

Future research and implication for policies

Since 2008, alcohol control policies in Thailand have been considered to be quite comprehensive covering taxation measures, seller licences, strategies for controlling youth drinking and regulation of advertisements (World Health Organization, 2004; Thamarangsi, 2008). While our study was not designed to directly evaluate the effectiveness of such control policies, it does reflect the gaps between some of the intended consequence of such policies and the current trends. It should be further investigated whether such trends are due to lack of enforcement of such policies or other confounding factors associated with changes in socioeconomic and cultural environments. It would also be worth examining how these changes in environments are influencing drinking behaviors in Thailand. The current Thai alcohol licensing system does not use alcohol outlet density to restrict alcohol licenses. It may be worth investigating whether incorporating environmental indicators, such as alcohol outlet density, could be useful and implemented in Thailand. The current legislation on banning sales of alcohol could be better defined. Current Thai registration states that alcohol outlets cannot be ‘within’ and ‘next to’ educational institutions. From our study, this has not deterred new outlets from being situated very ‘near’ educational institutions. Further restrictions on alcohol advertisement and sales campaigns that may promote excessive drinking should also be considered. Lastly, educational programs for harmful drinking should be provided to young people early. Reinforcement of communities, school and parents may also play a crucial part (World Health Organization, 2004, 2006, 2014).

ETHICAL APPROVAL

No ethical approval was required as no human subjects were involved in these surveys.

SUPPLEMENTARY MATERIAL

Supplementary material is available at Alcohol and Alcoholism online.
ACKNOWLEDGMENT
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CONFLICT OF INTEREST STATEMENT
None declared.

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