DO DRINKING SURVEYS PREDICT CHANGES IN POPULATION-BASED ALCOHOL PROBLEM INDICATORS?

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Abstract — We examined per capita alcohol consumption and survey-based measures of alcohol use in Ontario in relation to indicators of alcohol problems for the period 1977–1997. Per capita consumption and percentage of daily drinkers were significantly related to problem indicators, but percentage of drinkers and percentage of heavy drinkers were not. Of the measures we examined, per capita consumption was the strongest indicator of alcohol problems.

INTRODUCTION

Per capita alcohol consumption and measures of various alcohol-related problems have been shown to be highly correlated (e.g. Ledermann, 1956; Seeley, 1960; Bruun et al., 1975; Smart and Mann, 1987; Mann and Anglin, 1990; Corrao et al., 1997; Corrao, 1998). Consequently, per capita consumption has proved to be a useful indicator for aggregate levels of alcohol problems. However, it has been argued that per capita alcohol consumption figures may no longer be the best estimates for some alcohol-related problems. Recent research shows that it is possible to influence population levels of alcohol-related problems by means which do not appear to influence per capita consumption levels (Mann et al., 1988; Holder and Parker, 1992; Smart et al., 1996). Some studies have also suggested that patterns of drinking may be more important than overall consumption as indicators of some problem levels (see Grant and Litvak, 1998 for a review). These patterns cannot be obtained from per capita consumption figures, but, instead, must be derived from drinking surveys. Increased attention is now being paid to research on heavy drinking occasions (e.g. Single and Wortley, 1993; Midanik et al., 1994; Stockwell et al., 1994) and how these are associated with alcohol-related problems.

No previous studies have compared the relative ability of per capita alcohol consumption data and survey-derived information on patterns of alcohol consumption to predict aggregate levels of alcohol-related problem indicators. In Ontario, Canada, 12 surveys of alcohol consumption among adults have been conducted over the period 1977 to 1997. This creates a unique opportunity to compare how well per capita alcohol consumption figures and survey-derived measures of alcohol use relate to alcohol problem measures. The present paper addresses such a comparison.

METHODS

In this paper, we report data from 12 surveys of adults in Ontario, conducted over a 20-year period (Adlaf et al., 1991, 1998). In all 12 surveys, persons aged 18 years and over were interviewed. However, several changes in sample design have been made since the surveys were initiated.

In the years 1977 to 1991, six surveys were conducted using face-to-face interviews in households. The sample design, devised by Gallup, used a stratification system based on population and census data to create a modified probability sample in all centres with 1000 or more people, and a quota sampling in rural areas. The sampling procedure was intended to provide an approximation of the adult population of Ontario, except for people living in institutions and in the far north. Across the six surveys, there were very few differences in the age, sex, or regional composition of the respondents. However, there were increases in the percentages reporting a professional occupation and decreases in the proportions of housewives, changes that were probably reflective of what was happening in the general population. Interviewers were instructed to interview one person per household, preferably the youngest adult male, but, if he was not at home, the youngest adult female was interviewed. Resulting sample sizes varied from 1041 to 1101.

In 1992, a switch was made to telephone interviewing, using random digit dialling and Computer-Assisted Telephone Interviewing. A sampling frame of all active area codes and exchanges in Ontario was used to select telephone numbers at random. Within households, the household member with the most recent birthday was selected. Twelve callbacks were made. Six surveys were performed between 1992 and 1997 using this system. In the years 1992 to 1995, the survey was conducted yearly with sample sizes of 994 to 2022. In 1996 and 1997, there was a monthly sampling and sample sizes increased, ranging from 2721 to 2776. The other aspects of the design remained the same. Available response rates over the years ranged from 62 to 71%, and these are comparable to response rates found in similar surveys.

A comparison was made in 1991 between the household sampling and telephone sampling methods (E. M. Adlaf and F. Ivis, under review). In that year, 1041 people were interviewed face-to-face and 1047 were interviewed by telephone using the same questions. The telephone method provided a better participation rate, but over-represented young people and those with higher incomes. There were no differences in the proportions of respondents in the two surveys reporting alcohol use in the past year, drinking five or more drinks at a sitting, or experiencing various harms associated with their
drinking. However, fewer people in the telephone survey vs the face-to-face survey (5.0% vs 6.9%) reported daily drinking. For other frequency of drinking categories, there were no differences between the two types of surveys.

The survey questions used in this paper address frequency of drinking in the past year, daily drinking and drinking five or more drinks at a sitting on a weekly basis. There were minor variations between the face-to-face and telephone surveys in how the questions on drinking frequency and five or more drinks at a sitting were asked. However, these variations appeared to have no effect on the outcomes in the 1991 comparison between the two methods (E. M. Adlaf and F. Ivis, under review).

Data on per capita alcohol consumption in Ontario were obtained from Statistics Canada, which derives this information from beverage sales figures. Per capita consumption figures were expressed as litres of absolute alcohol for the population aged 15 years and over.

Liver cirrhosis mortality figures were also obtained from Statistics Canada publications and were expressed as rates/100 000 population aged 20 years and over. Hospital separation (equivalent to discharge) rates/100 000 total population were estimated for cases with a diagnosis of ‘alcohol-dependence’ syndrome and were based on information available for 1982 to 1993 from Statistics Canada publications. Information on charges for driving while impaired and on drink-drivers involved in fatal accidents came from Statistics Canada publications and from Ministry of Transportation and Communication (1998) reports. These were also expressed as rates/100 000 total population.

Pearson product-moment correlations were computed among all the measures.

RESULTS

Table 1 shows the data for per capita alcohol consumption, drinking survey measures and the various alcohol problem indicators for 1977 to 1997, the 20-year period during which the surveys of adults’ drinking habits have been conducted in Ontario. It can be seen that the percentage of drinkers and the percent drinking five or more drinks at a sitting have fluctuated during the 12 survey years. However, per capita alcohol consumption and the percentage of daily drinkers have both shown an overall decline across that time period. Liver cirrhosis mortality rates declined between 1977 and 1987 and then basically levelled off, showing relatively minor fluctuations until 1995, the last year for which data are currently available. Rates for drink-driving charges and drivers involved in fatal crashes declined considerably from 1977 to 1996. Information on rates of hospital separations for alcohol-dependence syndrome is available only from 1982 to 1993; during that time, these rates also declined substantially.

Table 2 shows the correlations for the various measures presented in Table 1. It can be seen that per capita alcohol consumption correlated strongly with the percentage of daily drinkers, but not with percentage of drinkers or percentage drinking five or more drinks at a sitting. Per capita consumption also correlated significantly and positively with all of the problem indicators (liver cirrhosis mortality rates, rates of hospital separations for alcohol-dependence syndrome, rates of charges for driving while impaired and rates of drink-drivers involved in fatal crashes), and all correlations among the problem indicators were significant. Of the survey measures, percentage of daily drinkers was significantly and positively associated with all problem indicators, whereas percentage of drinkers and percentage drinking five or more drinks at a sitting showed no significant correlations with any of the problem measures.

DISCUSSION

This study shows that per capita alcohol consumption correlates with the percentage of daily drinkers, but not with the

<table>
<thead>
<tr>
<th>Year</th>
<th>n</th>
<th>% Drinkers</th>
<th>% Daily drinkers</th>
<th>% Drinking 5+ drinks at a sitting</th>
<th>Per capita alcohol consumption</th>
<th>Rate of liver cirrhosis mortality</th>
<th>Rate of drink-drivers involved in fatal crashes</th>
<th>Rate of impaired driving charges</th>
<th>Rate of hospital separations for alcohol-dependence syndrome</th>
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<tr>
<td>1977</td>
<td>1059</td>
<td>79.9</td>
<td>13.4</td>
<td>8.9</td>
<td>11.32</td>
<td>18.7</td>
<td>6.4</td>
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<td>1040</td>
<td>77.6</td>
<td>10.7</td>
<td>8.3</td>
<td>10.73</td>
<td>14.3</td>
<td>5.6</td>
<td>485.7</td>
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<td>84.5</td>
<td>12.9</td>
<td>9.3</td>
<td>10.10</td>
<td>13.3</td>
<td>5.5</td>
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<td>8.7</td>
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<td>12.1</td>
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<td>10.0</td>
<td>9.5</td>
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<td>12.8</td>
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<td>8.4</td>
<td>7.33</td>
<td>11.6</td>
<td>2.8</td>
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<td>6.0</td>
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<td>7.47</td>
<td>NA</td>
<td>NA</td>
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</tbody>
</table>

*Per capita consumption, 1 of ethanol/year for population aged 15 years and over; †rate/100 000 population aged 20 years and over; ‡rates per 100 000 total population; NA = not available.

Sources: Adlaf et al. (1998); Timoshenko et al. (1998); Ministry of Transportation and Communication (1998); Smart and Mann (1995); Statistics Canada (various years).
percentage of drinkers nor with the percentage having regular heavy drinking occasions. Per capita consumption does correlate with all problem measures however. Only one survey measure, daily drinking, correlated with the problem indicators. Surprisingly, percentage of drinkers and percentage drinking five or more drinks at a sitting did not correlate with any problem indicators.

These results confirm the value of per capita alcohol consumption over survey results in predicting alcohol problems levels, such as liver cirrhosis mortality rates, alcohol-related hospital separation rates and rates of drink-driving charges and fatalities. No survey-based drinking patterns showed better correlations with problem indicators than did per capita alcohol consumption figures. However, daily alcohol consumption did correlate with all the problem indicators, albeit at slightly lower levels than did per capita consumption.

It is not clear why the heavy drinking measure (five or more drinks at a sitting) did not correlate with any of the alcohol problems. As a measure of short-term consumption, it may not be expected to correlate with liver cirrhosis mortality or hospital separations. However, heavy drinking per occasion was expected to correlate with the drink-driving problem measures. It may be that surveys underestimate the proportions of heavy drinkers more than they do the proportions of infrequent drinkers. Surveys also identify relatively few drinkers who consume five or more drinks at a sitting; usually the figure is less than 10% of those surveyed. This may be insufficient to locate large numbers of very heavy drinkers, for example those who drink 10 or more drinks per day. It is also possible that heavier drinkers are less likely to respond to surveys, although it seems unlikely that differential responding would have changed over time. Recent research suggests that the variance in alcohol consumption patterns is more related to acute problem levels, than are other measures of drinking behaviour (Treno et al., 1997).

The results of this study confirm the value of per capita alcohol consumption figures, as well as of survey-based data on daily drinking, in predicting population levels of alcohol problems. However, there is a need to replicate (using larger samples and more sophisticated analytical procedures) our observation that most survey-derived measures of drinking behaviour are not correlated with aggregate problem measures. A further concern is that collection of the problem measures may have been influenced by other factors (e.g. changes in drink-driving laws) in ways which have not yet been identified. Also, there is a need for studies examining the relationships among survey-derived consumption measures and acute alcohol problems, such as drunkenness, domestic and other types of violence and alcohol-related injuries.

**REFERENCES**


