Drinking and acquisition of unrecorded alcohol across educational groups in Sweden

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Abstract

Introduction. It is estimated that 18.5% of total alcohol consumption in Sweden in 2018 was unrecorded. However, little is known about the socio-economic profile of consumers of unrecorded alcohol. The aim of this study was to elucidate this issue by analysing data from a unique Swedish national repeated cross-sectional alcohol use survey.

Methods. Individual-level information on alcohol consumption and socio-economic status (SES) for the years 2013–2018 was retrieved from the Monitoring Project; a nationally representative monthly alcohol use survey. The analytical sample comprised 64 375 respondents aged 25–74 years. SES was measured by educational level. We used three educational groups: (i) low (<10 years); (ii) intermediate (10–12 years); and (iii) high (13+ years). We included indicators of the following sources of unrecorded alcohol consumption: travellers’ import, smuggled alcohol, home production, internet and illicit home-distilling. We estimated adjusted SES-specific means of the various forms of unrecorded consumption. The means were adjusted for the effects of age, sex and region.

Results. There were no significant educational differences in the total of unrecorded alcohol consumption; the same holds true for home-production and internet. However, with respect to smuggled and home-distilling, a statistically significant educational gradient was observed with the lowest educational group scoring approximately four times higher than the highest.

Discussion and Conclusions. Our findings suggest that there are no differences across educational groups in the consumption of unrecorded alcohol as a whole. However, consumption of smuggled alcohol and illicitly distilled spirits is elevated in the low educational group.

Key words: education, socio-economic status, Sweden, unrecorded alcohol.

Introduction

Socio-economic differences in drinking have been the subject for a large number of studies [e.g. 1,2]. However, little is known about the socio-economic profile of consumers of unrecorded alcohol, that is alcohol that “… is produced, distributed, and sold outside of formal channels and, therefore, not registered by routine data collection”. [3]. The aim of this paper is to shed some light on this issue by analysing data from a unique Swedish national repeated cross-sectional alcohol use survey.

Unrecorded consumption makes up a fairly large share of total consumption; in 2016 this share was estimated at 25% globally and at 18% for Europe [4]. For Sweden in 2018 it is estimated that 18.5% of total consumption was unrecorded. The largest category of unrecorded alcohol in Sweden is travellers’ import (often referred to as cross-border shopping), that is, alcohol brought in legally from other countries (10.4% of total consumption), followed by the purchase of smuggled alcohol (4.4% of total consumption). The smallest sources of unrecorded alcohol consumption are home-production (legal production of wine and beer, 1.9%), purchase via internet, excluding via the retail sales monopoly Systembolaget (1.2%), and illicit home-distilling (0.6%) [5].

Research indicates that consumers of unrecorded alcohol have a more detrimental drinking pattern with an elevated prevalence of binge drinking [6,7]. Binge drinking, in turn, has proved to be a risk factor in itself (i.e. also when controlling for volume of alcohol) for a variety of alcohol-related outcomes [8]. Further, there is evidence to suggest that low-socio-economic status...
(SES) groups have a preference for buying low-priced alcohol [9], which is one of the characteristics of unrecorded alcohol [10]. Against this backdrop, it is of interest to get insights into the socio-economic profile of consumers of unrecorded alcohol. However, the literature in this area is quite sparse, which is witnessed in review articles [10,11], where the topic gets little attention. In fact, we have identified one single study in this area [12] which, however, was confined to travellers’ import. On the basis of general population surveys conducted in Denmark, Finland, Norway and Sweden in the beginning of the 2000s, the study found that ‘higher educated persons were more likely to be importers, but the amounts imported were smaller than those by people with lower education’. [12, p. 125]. However, the SES profile of consumers of unrecorded alcohol is likely to vary across types of unrecorded alcohol. For instance, travellers’ import is associated with the financial barrier of making a trip abroad, while low-priced smuggled alcohol should be especially attractive for people with a limited budget. In Sweden, the price of smuggled spirits is approximately 50% of the price at the alcohol monopoly stores (Systembolaget); the corresponding figure for strong beer is 25% [13].

The aim of the present study is thus to characterise the socio-economic profile of Swedish consumers across the main sources of unrecorded alcohol.

Methods

Individual-level data on alcohol consumption and SES were retrieved from a database collected within the Monitor Project; an ongoing monthly telephone survey, including questions about self-reported drinking habits and purchases of unrecorded alcohol (e.g. travellers’ imports and smuggling). A nationally representative sample of the Swedish general population aged 17–84 years is randomly drawn on a monthly basis. Interviews are then conducted until 1500 respondents have been interviewed each month, resulting in a repeated cross-sectional sample of approximately 18 000 respondents per year. The response rate ranges between 26% and 35% during the study period. Young people and inhabitants from larger cities are overrepresented in the drop-out. However, this is corrected for in the weighting procedure, where the respondents are weighted for age, sex and population density [5].

The analytical sample for the present study included the years 2013–2018 (the years that included indicators of the main sources of unrecorded consumption) and respondents aged 25–74 years, amounting to 64 375 individuals. (Note: To minimise the fraction of respondents who have not completed their education we excluded individuals below 25 years of age.)

Measures

Socio-economic status. Based on available measures in the Monitor data, we used self-reported education as an indicator of SES, categorised into three groups: (i) basic education (9 years or less); (ii) intermediary education (10–12 years); and (iii) high education (college or university education, 13+ years).

We included indicators of the following sources of unrecorded consumption: travellers’ import, smuggled alcohol, home production, internet and illicit home-distilling. Most of the sources of unrecorded alcohol were measured with a series of similarly framed questions. The questions begin with a question about whether the respondent:

- has brought any alcohol across the border when travelling;
- bought any alcohol on the internet (apart from the retail sales monopoly Systembolaget);
- bought any alcohol that has been brought into the country with the purpose to sell the alcohol with a profit.

The recall period was the past 30 days.

The respondents who gave an affirmative response to any of these questions were asked which types of alcoholic beverages had been acquired that way (wine, beer, spirits, cider/alcopops). Next, the respondents were asked about the beverage-specific volume of the alcohol the respondent has acquired the last time, in terms of number and size of containers. Lastly, this amount was multiplied by the number of trips the respondent has done during the last 30 days, or the number of times the respondent has bought ‘smuggled’ alcohol, or alcohol on the internet.

Home-production of wine and beer was gauged by a question about how much of these beverages (in litres) the respondent has produced during the last 30 days. Finally, home-distilled spirits were measured by questions about consumption of that kind of spirits, where the Quantity-Frequency scale was used.

To put the findings regarding unrecorded consumption into perspective, we also included a measure of recorded consumption, proxied by purchases of alcohol at the state monopoly stores (Systembolaget) using the following set of questions. First, the respondent was asked if s/he had bought any alcohol at Systembolaget during the last 30 days. If so, there were...
a series of beverage specific questions about how much that was bought last time. These volumes were converted into litres 100% alcohol, which was multiplied by the number of times the respondent had bought alcohol at Systembolaget during the recall period.

All consumption indicators were converted into litres 100% alcohol per year.

### Statistical analysis

On the basis of ordinary least squares regression (Stata command regress), we estimated adjusted SES-specific means of the various forms of unrecorded consumption. That is, we obtained the mean consumption of each form of unrecorded alcohol (and recorded) across the three educational groups. The means were adjusted for the effects of region, age, age\(^2\), sex and an interaction term age*sex. Age was included as a continuous variable, while region was a categorical variable with three values: 1 = northern Sweden, 2 = mid-Sweden and 3 = southern Sweden (see [14] for exact delineations.) The adjusted means were obtained through the post estimation procedure Margins in Stata v.15.

### Ethical considerations

The study was approved by the regional ethics committee in Stockholm (Dnr 2018/2018-31/5).

### Results

Descriptive statistics are shown in Table 1. The outcome of the main analyses is displayed in Table 2. As can be seen, there were no significant educational

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**Table 1. Descriptive statistics (n = 64 375)**

|                | %    |
|----------------|------|
| **Sex**        |      |
| Females        | 53.0 |
| Males          | 47.0 |
| **Age, years** |      |
| 25–39          | 26.0 |
| 40–59          | 39.5 |
| 60–74          | 34.6 |
| **Education**  |      |
| Basic          | 10.0 |
| Intermediate   | 40.5 |
| High           | 49.5 |
| **Region**     |      |
| Southern Sweden| 49.7 |
| Mid-Sweden     | 38.1 |
| Northern Sweden| 12.2 |

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**Table 2. Estimated consumption of various sources of alcohol (litres 100% alcohol/year) in three educational groups**

|                | Low/high | Low/high | Low/high | Low/high | Low/high | Low/high | Low/high |
|----------------|----------|----------|----------|----------|----------|----------|----------|
| **Education**  |          |          |          |          |          |          |          |
| Low            | 1.531    | 1.168    | 0.935    | 0.969    | 0.935    | 0.969    | 0.954    |
| Intermediate   | 1.510    | 1.152    | 1.037    | 1.097    | 1.107    | 1.132    | 1.010    |
| High           | 1.311    | 1.000    | 1.000    | 1.010    | 1.107    | 1.000    | 1.000    |
| **Import**     |          |          |          |          |          |          |          |
| Low            | 2.731    | 0.977    | 0.917    | 1.000    | 0.946    | 1.000    | 0.946    |
| Intermediate   | 2.731    | 0.977    | 0.917    | 1.000    | 0.946    | 1.000    | 0.946    |
| High           | 2.731    | 0.977    | 0.917    | 1.000    | 0.946    | 1.000    | 0.946    |
| **Smuggled**   |          |          |          |          |          |          |          |
| Low            | 4.031    | 3.248    | 2.481    | 3.248    | 2.481    | 3.248    | 2.481    |
| Intermediate   | 4.031    | 3.248    | 2.481    | 3.248    | 2.481    | 3.248    | 2.481    |
| High           | 4.031    | 3.248    | 2.481    | 3.248    | 2.481    | 3.248    | 2.481    |
| **Home distilling** |      |          |          |          |          |          |          |
| Low            | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |
| Intermediate   | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |
| High           | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |
| **Home brewing** |        |          |          |          |          |          |          |
| Low            | 0.080    | 0.011    | 0.011    | 0.011    | 0.011    | 0.011    | 0.011    |
| Intermediate   | 0.080    | 0.011    | 0.011    | 0.011    | 0.011    | 0.011    | 0.011    |
| High           | 0.080    | 0.011    | 0.011    | 0.011    | 0.011    | 0.011    | 0.011    |
| **Internet**   |          |          |          |          |          |          |          |
| Low            | 4.031    | 3.248    | 2.481    | 3.248    | 2.481    | 3.248    | 2.481    |
| Intermediate   | 4.031    | 3.248    | 2.481    | 3.248    | 2.481    | 3.248    | 2.481    |
| High           | 4.031    | 3.248    | 2.481    | 3.248    | 2.481    | 3.248    | 2.481    |
| **Recorded**   |          |          |          |          |          |          |          |
| Low            | 1.412    | 0.080    | 0.011    | 0.011    | 0.011    | 0.011    | 0.011    |
| Intermediate   | 1.412    | 0.080    | 0.011    | 0.011    | 0.011    | 0.011    | 0.011    |
| High           | 1.412    | 0.080    | 0.011    | 0.011    | 0.011    | 0.011    | 0.011    |

Estimates adjusted for age, age\(^2\), sex, age*sex, and region (n = 64 375). F-test = test whether differences between educational groups are statistically significant.

n > 0 = number of respondents who report any consumption.
differences in the total of unrecorded alcohol consumption; the same holds true for home-production and internet. However, with respect to smuggled and home-distilling, a statistically significant gradient was observed with the lowest educational group scoring approximately four times higher than the highest. It can further be noted that there is a marked educational gradient for recorded alcohol consumption, implying that the consumption level for the group with basic education is approximately 62% of the consumption level for the group with high education.

Discussion

On the basis of Swedish data from the large-scale Monitor project, covering the period 2013–2018, this study has provided an encompassing description of the educational profile of consumers of various sources of unrecorded alcohol. There is only one previous study on this area, which was confined to travellers’ import of alcohol [12]. The general pattern of our findings is that we found no educational gradient for the total of unrecorded alcohol. However, for the cheap sources of unrecorded alcohol (smuggled and home-distilling) we found a significant and negative educational gradient, that is, an elevated consumption in the lowest educational group. An urgent task for future research is to investigate to what degree consumption of these specific forms of unrecorded alcohol is associated with detrimental drinking patterns. If that is the case (as may be hypothesised from the findings reported in [6,7]), it would potentially strengthen the educational gradient observed in alcohol-related harm [15].

Finally, we wish to highlight some limitations of the study. First, we only had access to one measure of SES, educational level, in the Monitor data. Still, education, together with occupation and income, is one of the main dimensions for classifying SES in epidemiological studies. Education has the advantage of being stable within individuals over time, and is less likely to be affected by reversed causation than are occupation and income, that is that a person’s occupation and/or income may be negatively affected by his/her misuse of alcohol [15,16]. Second, almost all of the alcohol indicators concerned the acquisition of unrecorded alcohol and not the consumption of unrecorded alcohol. The rationale of this approach is that it is probably difficult for the respondents to recall where the alcohol they consume originates from, especially as the bottles and cans often look the same, irrespective of the source of the beverages. Thus, to ask about the acquisition is in all probability the only way to capture this aspect of alcohol consumption. Furthermore, questions about the acquisition of alcohol yield a higher coverage rate than questions about consumption [17]. Finally, our findings are based on data for one single country, and can thus not be generalised to other drinking cultures and alcohol regulations.

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