Changes in Alcohol Use in Denmark during the Initial Months of the COVID-19 Pandemic: Further Evidence of Polarization of Drinking Responses

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Keywords
Alcohol consumption · Alcohol use disorders identification test-consumption · SARS-CoV-2 pandemic · COVID-19 · Denmark

Abstract
Introduction: The year 2020 was marked by the COVID-19 pandemic. Policy responses to COVID-19 affected social and economic life and the availability of alcohol. Previous research has shown an overall small decrease in alcohol use in Denmark in the first months of the pandemic. The present paper focused on identifying which subgroups of individuals had decreased or increased their consumption. Materials and Methods: Data were collected between May and July 2020 (n = 2,566 respondents, convenience sample). Weights were applied to reflect the actual Danish general population. Variables included the pre-pandemic alcohol consumption, change in alcohol consumption in the past month, socio-demographics, and reported economic consequences. Responses to a single item assessing changes in alcohol consumption in the past month were classified as no change, increase, or decrease in consumption. Regression models investigated how changes in consumption were linked to pre-pandemic drinking levels, socio-demographics (gender, age groups, education), and reported economic consequences. Results: While 39% of participants reported decreased consumption levels and 34% had stable levels, 27% increased consumption. Characteristics associated with changes in consumption were associated with both increases and decreases in consumption: younger people, those with higher consumption levels before the pandemic, and those with...
lower education more often both reported increases as well as decreases in consumption. **Discussion/Conclusions:** We confirmed that more people decreased rather than increased their alcohol consumption in the first few months of the pandemic in Denmark. Characteristics associated with changes in consumption such as younger age, higher consumption levels, and lower education demonstrated a polarization of drinking since these were associated with both increases and decreases in consumption. Public health authorities should monitor alcohol use and other health behaviours for increased risks during the pandemic.

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**Introduction**

The year 2020 was marked by the rapid emergence of the COVID-19 global pandemic caused by the SARS-CoV-2 virus. The pandemic prompted almost all countries to undertake substantial public health policies to stem the spread of infection. Most governments in Europe had begun by mid-March 2020 to introduce contact restrictions, lockdowns, and other policies to curb the spread of the virus [1]. Such measures have had economic, physical, and mental health consequences [2–4]. Additionally, it was seen that the pandemic itself could affect mental health negatively [5], due to increased stress and anxiety [6, 7], and consequently an increased use and misuse of alcohol, tobacco, and cannabis [8].

Changes in alcohol use during the COVID-19 pandemic could also be related to changes in affordability and availability, two well-known instruments of alcohol policy [9]. With reduced opening hours or closings of off- and on-premise outlets, alcohol availability would decrease. Therefore, reductions in alcohol consumption were expected [10]. Furthermore, lockdowns, closures, and other restrictions have led to a global economic recession. Studies of previous economic crises not only have documented similar effects on alcohol use as mentioned above, that is, reduced intake, but also negative alcohol-related consequences among vulnerable subgroups [11–13].

However, several early European studies suggested that many had increased their drinking than had decreased it, particularly among frequent and heavy drinkers [3, 14–19]. But, by summer 2020, changes in alcohol consumption in Europe largely showed either slight decreases or mixed results [20–24]. A systematic review of these and other studies summarized its results as showing both increases and decreases in drinking, often within the same population [25].

**Denmark**

The first national lockdown began in Denmark on March 13, 2020, which involved various major containment strategies. As a side effect, these restrictions were expected to significantly limit the possibilities to drink alcohol within social situations. In the past, major changes in alcohol prices in Denmark generally have shown little effect on Danes’ drinking. In 2004, Danish excise taxes on alcohol were lowered by on average 25%. It was thought that Danes would increase their consumption, but no change was evident [26]. There was however a temporary increase in alcohol poisoning among Danish teenagers [27].

Denmark is a unique country among the Nordic nations regarding alcohol consumption. It has a liberal alcohol policy, no alcohol monopoly, and drinking is well integrated into society with a low 12-month abstinence prevalence (6%–8% in the last 10 years) [28, 29]. Danish youth are known for their excessive drinking behaviour, including frequent heavy episodic drinking (HED). Furthermore, the legal age for purchasing alcohol is 16 years for beer and wine and 18 years for spirits [30]. Alcohol can be bought at a variety of outlets, and there is no curb on alcohol sales [28]. The country is well known for its strong social welfare state, with free higher education, universal health insurance, social security, and unemployment benefits as well as paid parental leave [31]. During the COVID-19 lockdown, the Danish government issued a number of financial compensation packages, economic stimulus measures, tax relief, etc. to Danes and Danish businesses [32]. We expected these benefits would buffer against some pandemic-related stress and economic hardship.

Because previous research already has established that alcohol consumption mainly has slightly decreased in Europe in the early months of the COVID-19 pandemic in most countries, the present paper firstly sought to confirm that consumption also has declined in Denmark. Thus, despite Denmark’s well-integrated drinking culture and its social cohesion, we still expected a higher proportion of individuals to decrease rather than increase their consumption in the first period of the COVID-19 pandemic in Denmark. Additionally, our study has investigated changes in alcohol consumption as they relate to various sociodemographic subgroups in order to examine whether they have deviated in their drinking behaviour changes from the main tendency of reduced consumption. Such an investigation contributes needed information on subpopulations which may be more vulnerable to potential risky drinking during the COVID-19 pandemic.
Table 1. AUDIT-C consumption indicators in the past 12 months (baseline consumption) by sex, percentages, and 95% CI (n = 538 men, n = 2,018 women)

| Drinking frequency in past year | Never | ≤Monthly | 2–3 months | 2–3 weeks | 4+ weeks |
|---------------------------------|-------|----------|------------|-----------|----------|
| **Women**                       |       |          |            |           |          |
| 1–2 drinks                      | 6.6 (3.7–9.4) | 33.8 (28.5–39.1) | 33.2 (28.5–38.1) | 19.1 (15.0–23.3) | 7.3 (4.2–10.4) |
| 3–4 drinks                      |       |          |            |           |          |
| **Men**                         |       |          |            |           |          |
| 1–2 drinks                      | 3.2 (1.4–4.9) | 10.0 (7.0–12.9) | 39.8 (34.9–44.7) | 34.7 (30.0–39.4) | 12.4 (9.2–15.5) |
| 3–4 drinks                      |       |          |            |           |          |

| Drinks on a typical day for consumers, n |
|-----------------------------------------|
| **Women**                               |
| 1–2 drinks                               | 54.6 (49.1–60.0) |
| 3–4 drinks                               | 19.1 (15.2–23.1) |
| 5–6 drinks                               | 11.9 (8.7–15.1)  |
| 7–9 drinks                               | 9.3 (6.7–11.9)   |
| 10+ drinks                               | 5.0 (2.9–7.1)    |
| **Men**                                 |
| 1–2 drinks                               | 30.4 (25.9–35.0) |
| 3–4 drinks                               | 22.7 (18.6–26.9) |
| 5–6 drinks                               | 14.9 (11.2–18.7) |
| 7–9 drinks                               | 15.7 (11.9–19.6) |
| 10+ drinks                               | 16.2 (12.3–20.1) |

| Frequency of HED for consumers         |
|----------------------------------------|
| **Women**                             |
| Never                                  | 24.2 (19.2–29.1) |
| ≤Monthly                               | 51.3 (45.8–56.8) |
| Monthly                                | 17.4 (14.3–20.6) |
| Weekly                                 | 6.8 (4.3–9.2)    |
| Daily (almost)                         | 0.3 (0.02–0.6)   |
| **Men**                                |
| Never                                  | 7.1 (4.6–9.6)    |
| ≤Monthly                               | 29.9 (25.4–34.4) |
| Monthly                                | 31.9 (27.1–36.7) |
| Weekly                                 | 28.6 (23.9–33.3) |
| Daily (almost)                         | 2.5 (0.9–4.2)    |

HED, heavy episodic drinking; AUDIT-C, Alcohol Use Disorders Identification Test – Consumption; CI, confidence interval.

Materials and Methods

Data

The present survey data on Denmark were collected as a part of a larger project, the "European Alcohol and COVID-19 Survey" (ESAC), a collaborative effort that includes 21 European countries [23, 24, 33]. Data for Denmark were collected between May 15 and July 1, 2020 [34]. Data collection was managed by the ESAC team in Dresden, Germany. The survey questionnaire was originally developed in English, translated into Danish, and pretested before dissemination. Convenience sampling was conducted, and for the Danish sample, dissemination strategies included dissemination of the questionnaire to professional networks and student mailing lists, posting the questionnaire on the institutional website as well as on social media.

Measures

The Alcohol Use Disorders Identification Test – Consumption (AUDIT-C) [35] was used to measure pre-pandemic alcohol use. Respondents were asked a general quantity-frequency question about their typical alcohol consumption in the past 12 months and about the frequency of HED which is defined by consuming six or more standard drinks (one “unit” equalling 12 g of ethanol) on a single occasion [36].

In reference to the three AUDIT indicators of frequency, amount, and frequency of HED, respondents were asked whether their drinking had changed during the past month. With regard to each indicator, respondents were asked whether they were “drinking much less (often)” (−2), “drinking slightly less (often)” (−1), “no change” (0), “drinking slightly more (often)” (+1), or “drinking much more (often)” (+2). The three past-month indicators were summed and divided by six to obtain an overall consumption change score, scaled to a range of −1 to +1, with negative values indicating a decrease and positive values indicating an increase in consumption during the past month, relative to the past 12 months. Respondents were also asked about their monthly net household income before the COVID-19 pandemic and whether they had experienced financial distress due to changes in their financial or occupational situation or distress due to changes in their everyday life within the past month. In addition to sex and age, educational level (in three categories: less than high school, high school, and university or higher), size of surrounding residential locality (rural to urban), and household size were asked. Missing values occurred regarding household income (203 missing, 7.9%), AUDIT-C (179 missing, 7.0%), change score for alcohol consumption (147 missing, 5.7%), change of income (122 missing, 4.8%), distress (11 missing, 0.4%), and change of financial situation (5 missing, 0.2%).

Statistical Analyses

Individual income was calculated by using the information on household income and household size. The change score was categorized into three groups: decrease in alcohol consumption (change score <0), no change in alcohol consumption (change score = 0), and increase in consumption (change score >0). In Table 1, percentages (95% confidence interval [CI]) of AUDIT-C consumption indicators by sex are reported. In Table 2, percentages (95% CI) of decrease/no change/increase of alcohol consumption during the pandemic as well as mean, standard deviation, median, interquartile range of the baseline AUDIT-C score by subgroups (age, sex, income, education, etc.) is reported. The average standardized mean difference (SMD) of pairwise comparisons is provided as an effect size measure of group differences using R package “tableone” [37–39]. Multinomial logistic regression was used to conduct adjusted analyses of the categories of consumption change. Weights that were aimed to ensure a country-specific representative distribution by age, sex, and education were calculated by the ESAC team and were applied to all analyses [24]. Additional models including interaction terms of age and sex, age and consumption level (AUDIT-C), and sex and consumption level were conducted but were not superior in comparison to the main effects model, according to Bayesian information criterion values and therefore are not reported.

To avoid information bias due to missing data, estimation of missing values was conducted by assuming “missing at random”/“missing completely at random.” Using multiple imputations by chained equations yields thirty complete datasets based on the information of all available data on change in alcohol consumption, sex, age, income, change of income, education, household size, AUDIT-C, and size of residence locality [40]. Statistical analyses were conducted using SPSS 26 [41] and R [42].
Table 2. Descriptive statistics of the study sample by AUDIT-C (means and SD), median and IQR, and change in alcohol use (percentages, 95% CIs)

| Variables                      | Un-weighted, n | Baseline AUDIT-C¹ (n = 2,387) | Alcohol use change (n = 2,419) | average SMD |
|--------------------------------|----------------|-------------------------------|---------------------------------|-------------|
|                                |                | Mean score (SD), median (IQR) | decrease, % (95% CI)           |             |
|                                |                |                               | no change, % (95% CI)           |             |
|                                |                |                               | increase, % (95% CI)            |             |
| Total sample                   | 2,566          | 5.1 (2.6) 5.0 [3.0–7.0]       | 38.8 (35.3–42.3)                |             |
| Sex                            |                |                               | 34.3 (30.6–38.0)                | 26.9 (23.6–30.2) | 0.31 |
| Women                          | 2,018          | 4.0 (2.3) 4.0 [2.0–5.0]       | 32.2 (27.5–36.9)                |             |
| Men                            | 538            | 6.1 (2.4) 6.0 [4.0–8.0]       | 45.1 (40.1–50.2)                |             |
| Other*                         | 10             |                               |                                 |             |
| Age group, years               |                |                               |                                 | 0.63        |
| ≤20                            | 327            | 6.7 (2.2) 7.0 [5.0–9.0]       | 48.6 (39.9–57.3)                |             |
| 21–30                          | 1,171          | 5.9 (2.5) 6.0 [4.0–8.0]       | 55.1 (49.4–60.8)                |             |
| 31–40                          | 373            | 4.4 (2.3) 4.0 [3.0–6.0]       | 33.4 (23.3–43.6)                |             |
| 41–50                          | 338            | 3.6 (1.9) 3.0 [2.0–4.0]       | 21.7 (13.7–29.7)                |             |
| 51–60                          | 252            | 4.2 (2.7) 4.0 [2.0–6.0]       | 27.0 (18.6–35.4)                |             |
| 61+                            | 105            | 3.7 (2.0) 3.0 [2.0–5.0]       | 21.2 (10.4–32.0)                |             |
| Income per person (monthly in DKK) (203 missing) |                |                               |                                 | 0.27        |
| ≤7,500                         | 1,095          | 5.5 (2.6) 5.0 [3.0–7.6]       | 46.3 (40.4–52.3)                |             |
| 7,501–12,000                   | 504            | 4.5 (2.5) 4.0 [3.0–6.0]       | 32.1 (24.6–39.7)                |             |
| 12,001–17,500                  | 425            | 4.7 (2.6) 4.0 [3.0–7.0]       | 30.6 (22.6–38.6)                |             |
| >17,500                        | 339            | 4.8 (2.4) 5.0 [3.0–7.0]       | 33.0 (24.5–41.5)                |             |
| Education                      |                |                               |                                 |             |
| Less than high school**        | 142            | 4.9 (2.6) 5.0 [3.0–7.0]       | 39.4 (28.6–50.3)                |             |
| High school                    | 891            | 5.5 (2.7) 5.1 [3.0–8.0]       | 40.3 (34.6–46.1)                |             |
| Higher than high school        | 1,533          | 4.4 (2.3) 4.1 [3.0–6.0]       | 36.2 (33.0–39.4)                |             |
| Household size                 |                |                               |                                 |             |
| 1 person                       | 588            | 5.4 (2.8) 5.0 [3.0–7.0]       | 43.3 (35.6–51.0)                |             |
| 2                              | 978            | 5.0 (2.6) 5.0 [3.0–7.0]       | 36.5 (30.9–42.2)                |             |
| 3                              | 430            | 4.9 (2.4) 4.0 [3.0–7.0]       | 44.7 (35.8–53.6)                |             |
| 4+                             | 570            | 5.0 (2.5) 5.0 [3.0–7.0]       | 34.2 (27.3–41.2)                |             |
Results

Baseline Drinking Status (before COVID-19)

A total of 2,566 individuals answered the online survey. Table 1 displays the “point of departure” for drinking habits, which we refer to as “baseline” alcohol consumption. Five per cent of respondents were abstainers in the last 12 months which agrees with abstinence rates reported in recent national representative surveys [43, 44]. Almost 60% of women and more than 85% of men drank...
two to three times per month or more often. Among consumers, more than 45% of women and almost 70% of men drank three or more drinks per occasion, and almost 25% of women reported engaging in HED at least monthly while over 60% of men did so.

Mean AUDIT-C scores by demographic characteristics are presented in Table 2. The possible range of the AUDIT-C is from 0 to 12. Younger respondents had higher scores than older ones, and men had higher scores than women. For all other demographic characteristics, subgroup differences in baseline drinking were minor.

Changes in the Past 30 Days during the First COVID-19 Lockdown Months
Overall, there was a mean decrease in drinking during the first COVID-19 lockdown (Table 2). The mean change score was −0.10 (standard deviation: 0.43, 95% CI: −0.12 to −0.08) (not shown in table). This decrease is illustrated
by 39% of the respondents who reported that they had decreased their consumption, whereas 34% reported no change and 27% reported an increase.

Focussing on alcohol use change in subgroups, men had higher proportions reporting that they had either decreased (45% vs. 32%) or increased (30% vs. 23%) their consumption in comparison to women, who mostly reported no change (SMD: 0.31). Large subgroup differences in alcohol consumption change were found for age (SMD: 0.63). Older respondents less often reported an increase in consumption (13%), whereas 35% of the youngest group reported an increase. However, more respondents under 30 years decreased consumption (about 50%) compared to older respondents (20%-30%). Regarding the AUDIT-C score, most of the lightest drinkers (<3 points) reported no change (67%). But, the highest AUDIT-C scoring group (6+ points) had the largest proportions reporting both decreasing (45%) and increasing their consumption (34%) (SMD: 0.58). More of those with low income reported a decrease (46%) compared to around 30% who decreased consumption in the other income groups (SMD: 0.27). Regarding education, those who completed high school reported the largest proportions of decrease (40% vs. 39%/36%) and increase (30% vs. 18%/27%) of their drinking compared to other educational groups (SMD: 0.21).

Those who reported a decrease in their income during the pandemic were more likely to decrease their drinking as compared to those reporting no change or an increase in income (53% vs. 36% and 46%), and those who reported an increase in their income were more likely to increase drinking than those in the other groups (34% vs. 27% and 18%) (SMD: 0.28). Those who reported being aware of public or daily life restrictions had higher proportions reporting a decrease (41% vs. 25%) or increase (28% vs. 20%) in drinking (SMD: 0.25).

Figure 1 displays changes in consumption by AUDIT-C and by gender. Among men and women, more than 63% of light drinkers (AUDIT-C scores of <3 points) reported no change in their drinking. Of those who had an AUDIT-C score of 3–5 points, 46% of the men and 35% of the women reported a decrease. For those with the highest AUDIT-C scores, more than 40% of men and women reported a decrease, but at the same time, more than 30% reported an increase in consumption.

Figure 2 displays changes in consumption by AUDIT-C and by age groups, where an age gradient is noticeable. Among the youngest group, most of all three score categories reported either a decrease or no change in drinking. For the two older age groups, most of the lighter drinkers (around 70%) had not changed their drinking, whereas a distinct minority among the moderate or heavy drinkers decreased drinking. In the group with a high AUDIT-C score (6+), 47% of those 35–54 years and 38% of those 55+ years increased their consumption whereas around 20% decreased consumption.

Table 3 presents the results of multiple multinomial logistic regressions displaying odds ratios for decreases in consumption as well as for increases in consumption (reference: no change). Regarding the AUDIT-C, the higher the score, the more likely it was that alcohol use either decreased or increased, compared to respondents with lower scores. Men were more likely than women to report a decrease in consumption (odds ratio: 1.31, 95% CI: 1.03–1.67). Younger age was associated with both a higher probability of a decrease and an increase in alcohol use compared to older people. Respondents with the highest educational achievement were more likely to change their consumption in both directions: decrease and increase compared to those with lower educational achievement. Household size and size of locality, as well as change in income, played minor roles. Those who experienced negative consequences regarding their employment or financial situation changed their drinking behaviour in both directions more often; that is, a decrease and increase compared to those without or with a small degree of negative consequences.

Discussion/Conclusion

As in many other areas of human behaviour, the COVID-19 pandemic has brought changes in people’s alcohol consumption. In Denmark, the overall tendency at the beginning of the crisis was a decrease in drinking. This result agrees well with the findings of the larger ESAC study which determined an overall change score decrease of −0.14, whereas our study found a mean change score of −0.10 for Denmark. In addition, the larger European study found that those with low incomes were less inclined to reduce their consumption, whereas income did not play a significant role in Denmark [23]. Furthermore, we found mixed results regarding the direction of changes in subgroups. Both younger age and higher AUDIT-C scores played major roles in changes in drinking. Interestingly, younger age was associated with both a decrease in drinking as well as an increase as compared to middle-aged or older participants. With longitudinal data, a Belgian study found that younger drinkers also responded most to the initial lockdown. Specifically, problematic
... and hazardous drinkers initially decreased their consumption but resumed a higher consumption level (but not a pre-pandemic level) after the first lockdown was lifted [45]. In contrast, however, a German study found that younger and middle-aged persons with a higher pre-pandemic consumption level were found to be at risk to increase their intake during the first lockdown [46].

Higher AUDIT-C scores were associated with greater likelihoods of both decreases and increases in drinking. We found that both sexes reduced their drinking, but men did so more often than did women. There were only minor differences in change in alcohol use by rural or urban residents. Among other indicators, perceptions of COVID-19 restrictions, stress, and illness were not substantially associated with changes in alcohol use among Danish respondents.

Finally, education was more strongly associated with changes in drinking here than has been the case regarding...
drinking in Danish general population pre-COVID era prevalence studies (e.g., [43]). Higher education was associated with both an increase and a decrease in use compared to those with lower education. Larger proportions of those who increased their drinking among the higher educated group (as seen in Table 2) could be a reflection of the association between education and income levels [47]; that is, those with lower education are those also with lower incomes and thus could be inclined not to increase their drinking if their disposable income has decreased. Similarly, Jackson et al. [19] found an increase in drinking among the British higher social class after the pandemic had begun. Nonetheless, the dynamics of this relationship are complex with experience of stress, income availability, and alcohol accessibility playing varying roles [23]. That is, even when analysing an income or socio-economic effect, the contribution of the various influences can quickly confuse the relationship as other mechanisms work simultaneously with unclear outcomes (stress, mental health, more free time may push alcohol use upward; reduced income, less alcohol availability may push consumption downward; changes of relative alcohol prices and changes in the use/availability of competing goods such as drugs could have an uncertain impact). Unfortunately, the present data set does not include variables to measure all possible factors contributing to changes in consumption.

Our study contributes to a growing body of research that documents a polarization in drinking, both at the level of the general population [33, 48, 49] and among certain subgroups. This pattern of a particular subgroup reporting both decreases and increases in drinking has been detected in other European studies. For example, in a Norwegian study, women, the youngest age group (18–34 years), and Oslo residents reported both increases and decreases of their drinking since COVID-19 measures began. Past-year drinking also showed a bifurcated outcome: those with low levels of drinking in the past year had reported decreases in drinking in the past month, whereas those with high drinking levels reported to have increased their consumption [22]. A UK study reported results that also suggested polarization during lockdown based on socio-economic status: Garnett et al. [18] reported that drinkers with low incomes more often decreased their consumption, whereas drinkers with higher incomes increased their consumption. In the current study, we found polarization in younger respondents, those with higher education, and in those with higher baseline consumption levels. All three subgroups had more often decreased as well as increased consumption compared to those of older age, lower education, and lower baseline consumption, respectively. To test this finding of polarization of drinking more formally, it would be necessary to evaluate the distributions of average alcohol intake in different subgroups before and after the start of the pandemic within representative samples.

Polarization may be an indication of a more fundamental change in drinking related to COVID-19 restrictions. A recent multinational study based on ESAC data found polarization of drinking in eight European countries during the early months of the pandemic. Rossow et al. [49] found that those whose pre-pandemic drinking lay in the 90th percentile or above in the distribution of each sample’s consumption were also those who increased their consumption during the pandemic, and this was evident in all eight countries. An earlier Norwegian study which inspired the multinational examination had investigated underlying change in the distribution of drinking before and after the introduction of lockdown measures. Here, Rossow et al. [33] analysed two surveys conducted during the early months of lockdown (one being the ESAC survey). They detected decreases in the baseline lower consumption percentiles and increases in the baseline high percentiles. These two countervailing forces resulted in a polarization of the underlying drinking distribution [33]. Thus, it suggests that the subgroup polarizations that have been identified in the current and previous studies could be reflections of shifts in the underlying population distribution of alcohol consumption. As Rossow et al. [33] point out, such shifts have implications for the major theories of the dynamics of change in alcohol consumption which prevail in alcohol epidemiology [22, 49, 50].

Limitations and Strengths

In attempting to attain a high completion rate, the survey questionnaire was designed to be brief. Thus, it was not possible to include more variables to examine additional explanations of changes in alcohol use. Furthermore, to react quickly to the rapidly changing aspects of the COVID-19 pandemic, it was necessary to accept several limitations in carrying out the study. The larger European study chose convenience sampling to gain an adequate sample size. To address the potential sampling bias, the European COVID-19 study team constructed weights for all participant countries to match the study samples to the actual age, sex, and educational distribution of each country [51]. However, the main drinking indicator characteristics of the study sample compare well to those estimated from representative surveys [28, 43]. Research using the ESAC surveys of Finland and Norway has found that they also compare to contempo-
raneous conventional surveys [50]. Information bias is often present in alcohol survey research. Most respondents underreport their consumption, either because of actual forgetting or because of social desirability [36, 52], leading usually to an underestimation of consumption as well as alcohol-related consequences. It is possible that this could have led to an underestimation of measures of association. An additional limitation is the fact that the baseline period of alcohol consumption (i.e., the past 12 months), which respondents were asked about, also covered a period occurring after the start of the pandemic.

The strengths of the present research lie in the immediacy of the data collection. Despite potential underreporting and underrepresentation of the general population, the results that we have obtained are similar to previous representative studies of the Danish general population [43] (e.g., median AUDIT-C in 2011 in Denmark in consumers was 5.0, interquartile range: 3–6).

In conclusion, this study has found a slight decrease in overall consumption during the first months of the COVID-19 pandemic in Denmark. However, as has been the case with other early European studies, it was also possible to identify both increases as well as decreases in alcohol consumption within population subgroups. Our analysis suggests that certain subgroups were at risk for increased heavy drinking during the pandemic, such as younger drinkers, heavy drinkers, and those with higher educational attainment. Monitoring of vulnerable subpopulations for increased drinking and other health risk behaviours during the pandemic is an important public health concern in Denmark.

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Statement of Ethics

As the survey was fully anonymous and the personal data were protected in accordance with the EU Regulation 2016/679 of the European Parliament and Council, ethical approval by a Research Ethics Committee was not needed, as confirmed by the Data Protection Officer of the Technische Universität Dresden (Germany; letter available upon request). Participation in the survey was voluntary and fully anonymous: respondents could choose not to answer any of the questions and could terminate participation in the survey at any time. Providing an explicit declaration of consent was mandatory in order to access the survey. Thus, written informed consent was obtained from all subjects.

Conflict of Interest Statement

Dr. Rehm is an Editorial Board Member of European Addiction Research. All the other authors declare no conflicts of interest.

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Author Contributions

Original conceptualization and approach: Kim Bloomfield and Ulrike Grittner; further methodology and formal analysis: Ulrike Grittner; writing and original draft preparation: Kim Bloomfield; data curation: Carolin Kilian; further writing, interpretation of findings, review, and editing: Kim Bloomfield, Ulrike Grittner, Carolin Kilian, Jürgen Rehm, Julie Brummer, and Jakob Manthey; overall project administration: Jürgen Rehm and Carolin Kilian; Danish data acquisition: Kim Bloomfield; final approval to published version: Kim Bloomfield, Ulrike Grittner, Jürgen Rehm, Carolin Kilian, Julie Brummer, and Jakob Manthey.

Data Availability Statement

The Danish data used in the current study are available in the Figshare (figshare.com) repository, https://doi.org/10.6084/m9.figshare.14315606.v1.

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