Association of alcohol consumption and frequency with loneliness: A cross-sectional study among Japanese workers during the COVID-19 pandemic

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ABSTRACT

Background: There are increasing concerns that prevention measures against coronavirus disease 2019 (COVID-19) such as social distancing and telework are leading to loneliness and poor lifestyle habits like increased alcohol consumption. The purpose of this study was to assess whether loneliness reported among workers during the COVID-19 pandemic is associated with changes in alcohol consumption.

Methods: The study comprised a cross-sectional, online survey of 27,036 workers between December 22 and 26, 2020. A questionnaire was used to assess loneliness, usual alcohol consumption and whether that consumption had changed. Odds ratios (ORs) were estimated by logistic regression analysis.

Results: A total of 2831 (10.5%) workers indicated they had increased alcohol consumption during the pandemic. Increased alcohol consumption was significantly associated with loneliness (OR = 1.94, 95%CI 1.70–2.21). This association held true for those who indicated they drank two or more days per week (OR = 1.98 95%CI 1.71–2.30) and those who drank less than one day per week (OR = 1.51 95%CI 0.71–3.25). In contrast, there was no association between increased alcohol consumption and loneliness among those who indicated they hardly ever drank (OR = 1.22 95%CI 0.55–2.72).

Conclusions: Among those drinking more than once a week, increased alcohol consumption is associated with loneliness.

1. Introduction

The first reported cases of coronavirus disease 2019 (COVID-19) emerged in December 2019 from Wuhan, China. Thereafter, the infection caused by SARS-CoV-2 spread worldwide and the situation was declared a pandemic by the World Health Organization (WHO) on March 31, 2020. Several vaccines have since been developed and deployed around the globe, helping to reduce disease severity and transmission of the virus [1]. However, as of July 2021, infection rates were continuing to rise, an indication that the virus will not be easily controlled. As a result, populations around the world were forced to continue taking precautions to prevent COVID-19 infection.

The WHO has recommended avoiding “the 3Cs,” namely closed spaces, crowded places, and close contact with others [2]. Physical distancing has formed a key part of recommendations by the WHO and governments around the world as a way to reduce the spread of
COVID-19. The Japanese Ministry of Health, Labor, and Welfare, for example, has released practical examples of “new lifestyles,” recommending that people telework, work rotating shifts, keep their distance in the office, and conduct meetings online [3]. However, such practices could lead to a greater likelihood of social isolation and loneliness. Thus, there is concern that continuing measures such as physical distancing to prevent COVID-19 may cause loneliness and have a negative impact on physical and mental health [4].

A major problem that can accompany loneliness is increased alcohol consumption [5]. Several studies have reported an increase in alcohol consumption during the COVID-19 pandemic [6, 7, 8]. Data from the United States shows that alcohol sales and deliveries increased after the COVID-19 outbreak [9]. In Belgium, there was a 30.3% increase in alcohol consumption [10], and 21% of Canadians who were unlikely to go out drinking before the pandemic have started to do so [11]. Similar to before the pandemic, negative psychological stress, anxiety, and loneliness are suggested causes of the increase in alcohol consumption during the COVID-19 pandemic. In addition to loneliness, social isolation is also associated with mental health problems [12, 13]. While loneliness and social isolation are similar, they differ in that the former is subjective while the latter is objective [14]. Social isolation is thought to be a predictor of loneliness, which subsequently leads to psychological problems such as depression and anxiety [15].

COVID-19 prevention measures like telework are leading to more social isolation and loneliness among the working population. This study aimed to assess whether loneliness among workers in Japan during the COVID-19 pandemic was associated with changes in alcohol consumption.

2. Methods

2.1. Study design and subjects

This investigation formed part of the Collaborative Online Research on the Novel-Coronavirus and Work (CoroNaWork) Project, a cross-sectional study that used internet surveys between December 22 and 26, 2020 to examine the health of Japanese workers during the COVID-19 pandemic. This period comprised five weekdays prior to the New Year holiday period in Japan, where Christmas Eve, Christmas Day and Boxing Day are not considered holidays. A detailed description of the protocol is published elsewhere [16]. In brief, workers who indicated they were employed during the survey period were selected according to their prefecture of residence, occupation and sex. Workers’ questionnaire data were collected. Those with extremely short response times, height less than 140 cm, weight less than 30 kg, and inconsistent responses to multiple identical questions were excluded. Of the 33302 workers who returned the questionnaire, 6266 were excluded, leaving 27036 for analysis.

This study was conducted with the approval of the Ethics Committee of the University of Occupational and Environmental Health, Japan (Approval number R2-079). Informed consent was obtained through the questionnaire website.

2.2. Assessment of loneliness and social isolation

Loneliness was assessed using the question: “During the last 30 days, how frequently did you feel the following emotions?” Participants responded by choosing from never, a little, sometimes, usually, and always. For analysis, responses of “never” and “a little” were categorized as indicating no loneliness, while responses of “sometimes,” “usually,” and “always” were categorized as indicating loneliness.

Social isolation was assessed using three questions about whether the participants had friends to talk to, acquaintances to ask for favors, and people to communicate with through social networking sites. Participants chose from yes and no responses.

2.3. Assessment of usual and changes in alcohol consumption

A questionnaire was used to assess usual alcohol consumption and whether that consumption had changed during the COVID-19 pandemic. Drinking frequency was classified as at least two days per week, one day per week, or hardly ever. For analysis, alcohol consumption during the COVID-19 pandemic was classified as either increased or not increased.

2.4. Other covariates

The following were included as confounders: age, sex, marital status, equivalent income, education, smoking, job type, number of employees at the workplace, cumulative incidence rate of COVID-19 in the prefecture of residence, lack of friends to talk to, lack of acquaintances to ask for favors, and lack of people to communicate with through social networking sites. Age was treated as a continuous variable, while all other variables were used as categorical variables and presented as percentages.

Further, the cumulative incidence of COVID-19 in the prefecture of residence in the month immediately preceding the survey was treated as a community-level variable. These incidence data were obtained from the websites of public institutions.

2.5. Statistical analysis

Univariate and multivariate logistic regression analyses were used to determine odds ratios (ORs), with loneliness or drinking frequency as independent variables and change in alcohol consumption as a dependent variable. The multivariate model was adjusted for age, sex, marital status, equivalent income, education, smoking, alcohol consumption, job type, number of employees at the workplace, cumulative incidence rate of COVID-19 in the prefecture of residence, lack of friends to talk to, lack of acquaintances to ask for favors, and lack of people to communicate with through social networking sites. A p-value less than 0.05 indicated statistical significance. Stata (Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC) was used for analysis.

3. Results

Table 1 summarizes participants’ general characteristics. A total of 2831 of 27036 participants (10.5%) indicated they had increased their alcohol consumption during the COVID-19 pandemic. While there were no differences in age, marital status, education, or company size between those who did and did not increase their alcohol consumption, those who did so tended to be male, smokers and have higher income. There were no missing data among the responses of the 27036 people included in the analysis.

Table 2 summarizes the ORs of loneliness associated with changes in alcohol consumption according to the logistic regression model. The age-adjusted model revealed a significant association between increased alcohol consumption and loneliness (OR = 1.78, 95%CI 1.59–1.98, p < 0.001), as did the multivariate analysis (OR = 1.88, 95%CI 1.65–2.15, p < 0.001). There was also a significant association between increasing alcohol consumption and a lack of friends to talk to in both the age-adjusted model (OR = 1.10 95%CI 1.02–1.20, p = 0.018) and multivariate analysis (OR = 1.13 95%CI 1.00–1.27, p = 0.050). While a lack of acquaintances to ask for favors was also associated with increasing alcohol consumption in the age-adjusted model (OR = 1.16 95%CI 1.07–1.26, p < 0.001) and multivariate analysis (OR = 1.20 95%CI 1.07–1.35, p = 0.003), a lack of people to communicate with through social networking sites was significantly associated with no increase in alcohol consumption in both the age-adjusted model (OR = 0.89 95%CI 0.82–0.97, p = 0.005) and multivariate analysis (OR = 0.86 95%CI 0.78–0.96, p = 0.005).

Compared to those who did not drink, both those who drank less than one day per week and those who drank two or more days per week were
Increased alcohol consumption was significantly more likely to increase their alcohol consumption. Since the interaction term was significant, we further estimated the OR of loneliness associated with increased alcohol consumption for each category of drinking frequency using a logistic regression model. The results are shown in Table 3. Among those who drank two or more days per week, increasing alcohol consumption was significantly associated with loneliness in the age-adjusted model (OR = 2.15 95%CI 1.87–2.47, p < 0.001) and multivariate analysis (OR = 1.91 95%CI 1.64–2.21, p < 0.001). A similar finding was observed for those who drank less than one day per week: increasing alcohol consumption was significantly associated with loneliness in the age-adjusted model (OR = 1.91 95%CI 1.40–2.58, p < 0.001) and multivariate analysis (OR = 1.82 95%CI 1.31–2.52, p < 0.001). In contrast, among those who hardly ever drank, increased alcohol consumption was not associated with loneliness either in the age-adjusted model (OR = 1.51 95%CI 0.71–3.25, p = 0.281) or multivariate analysis (OR = 1.21 95%CI 0.54–2.70, p = 0.651).

4. Discussion

In this study, approximately 10% of workers indicated they had increased their alcohol consumption during the first 9 months of the pandemic. Loneliness, a lack of friends to talk to, and lack of acquaintances to ask for favors were associated with increased alcohol consumption. In contrast, a lack of people to communicate with through social networking sites was associated with decreased alcohol consumption. We also found that the association between loneliness and increased alcohol consumption varied depending on an individual's previous consumption: a greater association between loneliness and increased alcohol consumption was observed among those who more frequently consumed alcohol prior to the start of the pandemic.

Similar to our finding that alcohol consumption increased in 10% of workers during the COVID-19 pandemic, previous studies have reported a rise in alcohol consumption during disaster events such as natural disasters and infectious disease outbreaks. Studies have reported that individuals drank more in the aftermath of the tsunami in Southeast Asia in 2004 and Hurricanes Katrina and Rita in 2005 than before the disasters [17, 18]. In addition, alcohol consumption increased during the Severe Acute Respiratory Syndrome (SARS) pandemic [19, 20]. Negative coping behaviors like drinking are thought to suppress loneliness as well as depression and anxiety [21], suggesting that the increase in alcohol consumption observed in this study may be related to the depression, anxiety, and loneliness associated with the COVID-19 pandemic.

It should be emphasized that even those who drank only about once a week before the COVID-19 pandemic increased their drinking frequency when they felt lonely. This is in contrast to other studies on the COVID-19 pandemic, which showed that while heavy and frequent drinkers increased their alcohol consumption, occasional drinkers did not [22, 23, 24]. The difference between these studies and our study is that we took loneliness into account. Our findings suggest that loneliness, even among occasional drinkers, may increase drinking and the risk of inappropriate drinking.

In addition to loneliness, we also inquired about social isolation, namely whether participants had friends to talk to, acquaintances to ask for favors, and people to communicate with through social networking sites. A lack of friends to talk to and acquaintances to ask for favors are considered indicators of social isolation, and, like loneliness, were associated with increased alcohol consumption. However, those who indicated they had people to communicate with through social networking sites, suggesting the absence of social isolation, tended to increase alcohol consumption. Despite some overlap, loneliness and social isolation describe different phenomena [14]. Some individuals who are socially isolated do not experience loneliness but rather feel comfortable with their situation. An example of this is the phenomenon known as “super solo” in Japan [25], where social isolation is seen as an advantageous and something to be enjoyed rather than avoided. Those engaged in “super solo,” while isolated, do not experience feelings of loneliness. Further, while social media can be a useful way to reduce loneliness while preventing COVID-19 infection [26, 27], it has also been identified as a possible factor responsible for the deterioration of individuals’ mental health due to the overflow of inaccurate information on the COVID-19 pandemic [4]. Our findings suggest that use of social networking sites does not relieve feelings of loneliness, but may instead...
enhance negative feelings such as anxiety, which may in turn increase alcohol consumption.

Several limitations warrant mention. First, because this study was conducted using Internet monitors, generalizability of the results is unclear. However, we attempted to minimize subject bias as much as possible by sampling by region, occupation, and prefecture based on the incidence of infection. Second, alcohol consumption was self-reported in this study. Given that drinkers tend to underreport their alcohol consumption [28], the same may have occurred in this study. However, we think that underreporting was unlikely because this study was an anonymous survey conducted on the Internet. Third, there are several ways to assess loneliness [29, 30]. We assessed loneliness with a single question, “Have you ever felt alone?” This strategy is based on a previous study, which assessed loneliness with a single question [31]. Further studies using more comprehensive methods for assessing loneliness should be performed to confirm our findings.

5. Conclusion

During the COVID-19 pandemic, physical distancing and telecommuting, along with refraining from going out and socializing have become the norm. In addition, the risk of infection and concerns about job and economic insecurity are spreading among individuals. Against this backdrop, there are concerns that isolation and loneliness among workers may be causing an increase in alcohol consumption. We found that 10% of workers in Japan had increased in their alcohol consumption during the pandemic. For those who drank more than once a week, increased alcohol consumption was associated with loneliness. Thus, workers experiencing loneliness may be at high risk of inappropriate drinking. Future prevention strategies should thus take into account the interconnectedness of inappropriate drinking and loneliness, as both lead to negative health outcomes.

Declarations

Author contribution statement

Yusuke Konno: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Makoto Okawara: Performed the experiments; Contributed reagents, materials, analysis tools or data.

Ayako Hino, Tomohisa Nagata, Keiji Muramatsu, Seiichiro Tateishi, Mayumi Tsuji, Akira Ogami: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data.
Reiji Yoshimura: Analyzed and interpreted the data; Wrote the paper.
Yoshihisa Fujino: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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