

Alcohol in isolation: Understanding single-person household drinking patterns during the COVID-19 pandemic in Seoul

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Objectives: This study examined changes in alcohol drinking behaviors among single-person households in Seoul, South Korea, during the COVID-19 pandemic, and compared them with multiple-person households. The study further identified factors influencing changes in alcohol consumption, specifically among single-person households. **Methods:** Data were drawn from a survey on health behavior changes conducted among 3,669 adults aged 20–69 living in Seoul in October 2020. We analyzed how pandemic-related changes—such as reduced income, heightened stress, mental health vulnerability, Internet use, and increased time at home—affected drinking frequency, quantity, location, and partners. **Results:** Overall alcohol consumption declined during the pandemic, but patterns differed by household type. Single-person households reported more frequent solitary drinking at home and a smaller reduction in heavy drinking than multiple-person households. Within single-person households, higher stress and greater leisure-related Internet use were associated with increased drinking frequency, quantity, and solitary home drinking. **Conclusion:** These findings suggest that the pandemic reinforced patterns of solitary drinking without adequately addressing preexisting alcohol-related health problems. Although overall consumption declined, the rise in habitual solitary drinking at home underscores the need for targeted health promotion interventions to prevent long-term alcohol-related harms.

Key words: alcohol consumption, single-person household, COVID-19, drinking behavior

I. Introduction

The increase in the proportion of single-person households is a pervasive global trend, and South Korea (hereafter referred to as Korea) is no exception. It has consistently risen, forming an estimated 36.1% of total households as of 2024, with an average increase rate of 19.5% in the last five years. The number of these households is notably high in urban areas, and the proportion of single-person households in Seoul in 2024 was 39.9%, which was higher than the national

average (Statistic Korea, 2024).

Living alone is not necessarily a health risk factor in and of itself. Previous studies examining the health status of people living alone have yielded inconsistent results. While some studies have indicated that single-person households have better health outcomes and higher socioeconomic status (Chan et al., 2011; J. Kim et al., 2017; Lanjouw & Ravallion, 1995), others have reported that they often lack social resources and have poor health status (Demey et al., 2013; Posel, 2021; Zhang et al., 2019). Regarding health behavior,

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certain studies have identified that alcohol consumption may elevate the risk of problem drinking and alcohol dependence in single-person households (Joutsenniemi et al., 2007; Nordløykken et al., 2013; Okui, 2021), whereas others have reported no significant differences between single and multi-person households (S. Jeong & Cho, 2017; Lee et al., 2020; Neill et al., 2020). To gain a comprehensive understanding of the relationship between living alone and health, it is imperative to consider this association within specific contextual conditions.

In highly stressful situations, single-person households often resort to alcohol consumption as a way to cope with the stress (Adams et al., 2006; Keyes et al., 2011). This can be attributed to various factors, including increased feelings of isolation, heightened anxiety, and limited access to alternative stress-relief mechanisms. However, the patterns of alcohol consumption in single-person households during such crises depend on factors like age, gender, socioeconomic status, and environmental conditions for purchasing alcohol. Some studies suggest that single-person households with lower socioeconomic status are more likely to engage in binge drinking, consuming larger amounts of alcohol at one time (Cerdá et al., 2008). In contrast, single-person households with higher socioeconomic status may have a pattern of drinking smaller amounts but more frequently, potentially increasing their vulnerability to alcohol dependence (Cerdá et al., 2011; Wu et al., 2008).

The global upheaval caused by the COVID-19 pandemic has not only inflicted immense social stress but has also significantly altered patterns of alcohol consumption. Winstock et al. (2020) analyzed data on alcohol consumption in May and June 2020 in 11 countries and found that the patterns of alcohol consumption changed during the pandemic. Among the respondents, 36% reported an increase in the

amount of alcohol consumed, and 43% reported more frequent use. Changes were also observed in situations involving alcohol consumption. Three-quarters of respondents reported drinking alone at home. Of these, 42% reported drinking alone more often during lockdown, 39% reported no change, and 19% reported drinking alone less often. Additionally, a significant decrease was observed in the proportion of individuals consuming alcohol with others outside the home. An Organisation for Economic Co-operation and Development (OECD, 2021) report on alcohol use showed changes in alcohol consumption during the COVID-19 pandemic, and several countries have reported increased alcohol sales. Alcohol sales in bars or restaurants significantly decreased, but those in retail and online stores significantly increased.

Amid the COVID-19 pandemic, key population characteristics were associated with notable disparities in drinking behaviors. Increased alcohol consumption was more likely among heavy drinkers, women with higher education and income, households with children, middle-aged people, people facing income loss, and those with mental health problems (Acuff et al., 2022; Pollard et al., 2020; Sallie et al., 2020; Tran et al., 2020). However, most studies, including systematic reviews, have found no consistent differences in alcohol consumption between single-person and multi-person households during the pandemic. These findings may reflect the heterogeneity within the single-person household population and the varying environmental context they experienced amid the COVID-19 pandemic.

Seoul, the bustling capital of Korea, fosters diverse social relationships within its densely populated urban landscape. In this vibrant city, alcohol consumption plays a central role in social life (Ko & Sohn, 2018). Single-person households in Seoul, however, often confront Seoul's high housing cost burden, cramped living space, and social isolation. These factors have

been linked to elevated stress and poorer perceived health among young adults (J. Kim & Yoo, 2021). Such urban-specific stressors—compounded during the pandemic—may predispose individuals living alone to more pronounced changes in their alcohol consumption patterns (Lee et al., 2020).

Alcohol accessibility is facilitated not only by availability in specialized bars but also in general restaurants. Moreover, alcohol can be easily purchased at nearby convenience stores and supermarkets in Seoul, contributing to its widespread use (Yoon et al., 2018). However, as the number of confirmed COVID-19 cases surged in Seoul since August 2020, social drinking behavior was curtailed. In response to social distancing policies, dining establishments, including restaurants and bakeries, were prohibited from serving customers after 9 p.m. (Seoul Metropolitan Government, 2020). Additionally, franchised cafés were restricted to offering only take-out and delivery services all day. Intensive measures including prohibiting access to major public facilities and highly populated areas were enacted to reduce population density and enhance social distancing. Within such urban environments, the most notable change Seoul residents experienced during the COVID-19 pandemic was the involuntary interruption of social interactions and gatherings due to the social distancing policies. Therefore, examining the differences in drinking behaviors between single-person and multi-person households in Seoul during the COVID-19 pandemic may shed light on the ripple effects of social drinking restrictions, especially when conditions facilitating easier access to alcohol remain in place.

We aimed to examine the differences in changes in alcohol drinking behavior patterns between single-person and multi-person households during the COVID-19 pandemic in Seoul. Specifically, we assessed whether single-person households consumed

more alcohol than their multi-person counterparts, as well as changes in drinking venues and companions. We also analyzed factors associated with changes in alcohol consumption among single-person households. As Seoul adopted social distancing policies without instituting full-scale lockdowns, and given the city's availability and accessibility of alcohol, this context offers a unique setting for the study. The findings are expected to elucidate underlying factors of drinking behavior changes, particularly in single-person households, and provide valuable insights for public health interventions and policies for future pandemic scenarios.

II. Methods

1. Data source and participants

We used data collected from an online survey of 3,669 respondents aged 20-69 who lived in Seoul, Korea, conducted in October 2020, to measure changes in health-related lifestyles during the COVID-19 pandemic. The survey was conducted using an online platform provided by the research company Macromill Embrain. Quota sampling based on age, sex, and local district was used to create a representative sample of Seoul citizens. The survey consisted of questionnaires on health behaviors such as smoking, drinking, dietary behaviors, Internet use, and changes in social relationships during the COVID-19 pandemic. The survey instrument was developed by referencing several questionnaires about health and lifestyle during the COVID-19 pandemic created by various institutions including the U.S. Centers for Disease Control and Prevention (CDC), Korea Disease Control and Prevention Agency (KDCA), and Korean National Information Society Agency. Among the respondents, 521 adults who replied that they lived in single-person households were included

in the main analysis. This study was approved by the Institutional Review Board of Seoul National University (IRB No. 2009/001-015).

2. Variables

1) Outcome variables

The outcome variables in this study included changes in the frequency and amount of alcohol consumption, drinking companions, and drinking locations during the COVID-19 pandemic. Survey items related to alcohol consumption were constructed by translating and adapting relevant questions from the COVID Experiences Surveys (CovEx) of the CDC (2020). The frequency and amount of alcohol consumption before and during the COVID-19 pandemic were measured using open-ended questions, and the participants were also asked about who they drank with and where they drank before and during the COVID-19 pandemic. The responses before and during the pandemic were compared, and the outcome variables were used as binary variables in the analyses to determine whether the frequency of drinking, amount of drinking, drinking alone, or drinking at home had increased.

2) Explanatory variables

The main explanatory variables were lifestyle changes during the COVID-19 pandemic, including changes in income, stress perceptions, attitudes toward social norms, Internet use, and time spent at home. Questions on changes in income and stress perceptions were adapted from the Community Health Survey of the KDCA (2020), and questions on Internet use were adapted from a survey on smartphone overdependence by the Korean National Information Society Agency (2020). The following explanatory variables were included in the analyses as binary variables: a decrease in income or not, an increase in

stress or vulnerability in mental health caused by social norms or not, an increase in time spent at home or not, and an increase in time online for leisure purposes, such as playing games, watching movies, or listening to music, or not.

3) Control variables

Participants' demographic and socioeconomic characteristics were considered control variables. The demographic and socioeconomic characteristics included sex (male, female), age (20-29, 30-39, 40-49, 50-59, ≥ 60), education (\leq high school, \geq college), occupation (non-manual, manual, others), and monthly income (\leq 2,000 US Dollars (USD), 2,000-3,999 USD, 4,000-5,999 USD, \geq 6,000 USD). The analyses also controlled for whether participants were heavy drinkers before the COVID-19 pandemic. Heavy drinking was defined as five or more drinks at once for women or seven or more drinks at once for men.

3. Statistical analysis

First, differences in changes in alcohol drinking behaviors between those respondents living alone and those in multi-person households were compared using chi-square tests. Second, among single-person households, changes in the frequency and amount of alcohol consumption, drinking companions, and drinking locations during the COVID-19 pandemic were compared according to individual characteristics using chi-square tests. Finally, multiple logistic regression analyses were performed to identify factors associated with changes in drinking behaviors among single-person households, after adjusting for control variables. All analyses were performed using SAS 9.4 (SAS Institute Inc., Cary, NC, USA).

III. Results

1. General characteristics

Among all respondents, 14.2% lived in single-person households, and 85.8% lived with their family or others. Significant differences in individual characteristics, including age, occupation, monthly income, and alcohol consumption before COVID-19 were observed between respondents from single- and those from multi-person households (Table 1).

The majority (66.6%) of respondents from single-person households were in their 20s and 30s, and this age group only formed 39.0% of multi-person household respondents, indicating a significant difference ($p < .001$). Regarding occupation, non-manual workers accounted for a higher proportion of single-person household respondents than multi-person household respondents. Conversely, students or unemployed individuals represented 32.1% of multi-person household respondents, which was higher than for single-person households ($p < .001$).

The majority of participants who lived alone (84.9%) reported an income of less than 4,000 USD per month, whereas 59.9% of those from multi-person households reported an income of 4,000 USD or more per month ($p < .001$). Compared to single-person household respondents, more multi-person household respondents reported a decrease in income during the COVID-19 pandemic ($p < .001$). Furthermore, a greater proportion of single-person households reported heavy alcohol consumption before the COVID-19 outbreak ($p < .001$).

Regarding changes in the frequency or amount of alcohol consumption and changes in drinking places during the COVID-19 pandemic, no significant differences were found between single- and multi-person households. However, experiences of drinking alone were more prevalent among those who lived alone than among those who lived with others ($p < .001$).

2. Changes in frequency and amount of alcohol consumption before and during the COVID-19 pandemic

Those who lived alone drank more than those who lived with others in terms of monthly or heavy drinking ($p < .001$ for all). During the COVID-19 pandemic, the rates of monthly or heavy drinking decreased in both groups [Figure 1]. The monthly drinking rate of single-person households decreased by 5.0%, while that of multi-person households decreased by 6.9%, and the heavy drinking rate of single-person households decreased by 25.5%, while that of multi-person households decreased by 22.2%.

Approximately 6.6% and 3.6% of non-drinkers in single- and multiple-person households, respectively, became monthly drinkers during the COVID-19 pandemic, whereas 2.6% and 4.3% of non-heavy drinkers in single- and multi-person households, respectively, became heavy drinkers during the COVID-19 pandemic. Moreover, 5.9% and 7.7% of respondents from single- and multi-person households, respectively, stopped drinking during the COVID-19 pandemic. Among respondents from single- and multi-person households who were previously heavy drinkers, 29.2% and 31.9%, respectively, decreased their frequency and amount of alcohol consumption. During the COVID-19 pandemic, the rate of not drinking or reducing alcohol consumption was higher among those who lived alone than among those who lived with others.

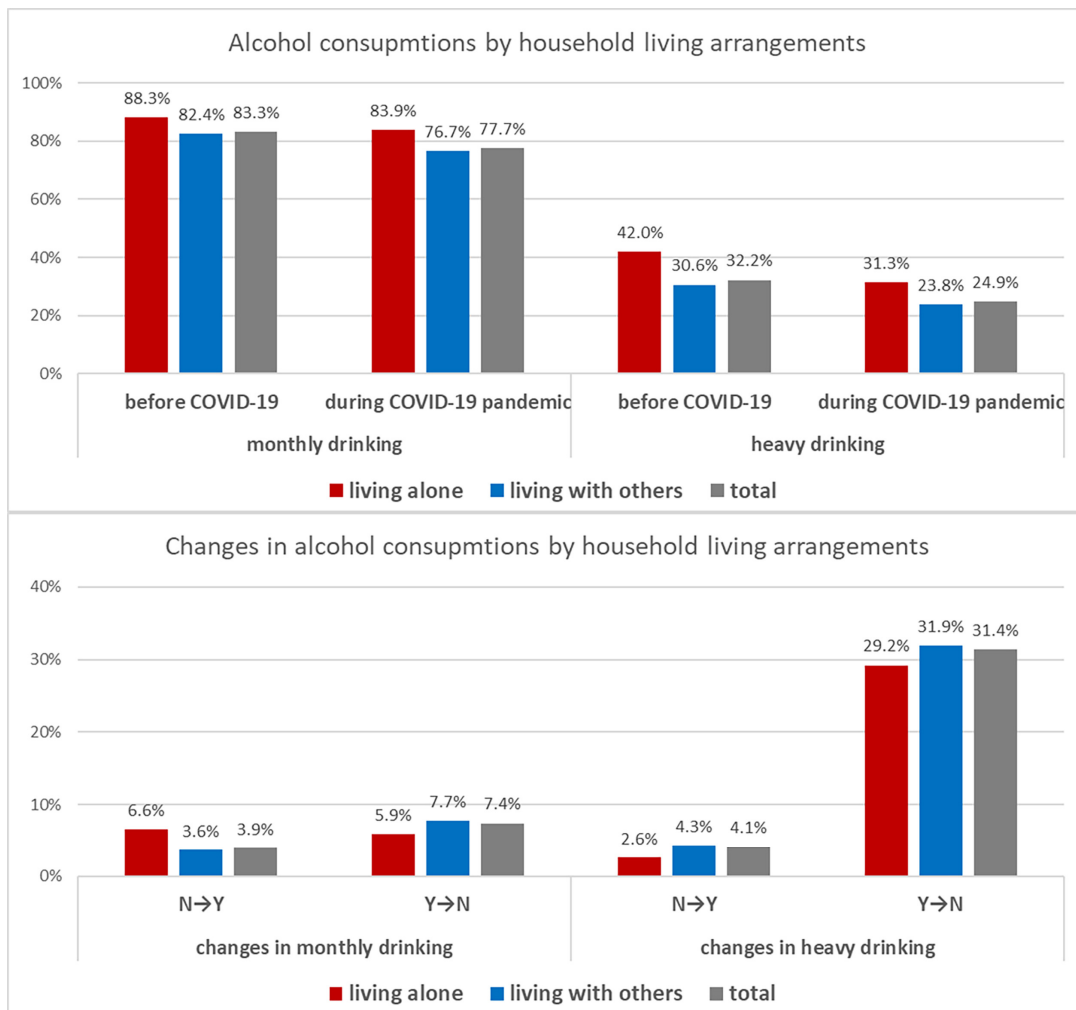
3. Changes in patterns of alcohol consumption during the COVID-19 pandemic

Alcohol consumption patterns during the COVID-19 pandemic differed between single-person and multi-person households [Figure 2]. Approximately 18.2% of single-person households and 10.2% of multi-person households reported increases in

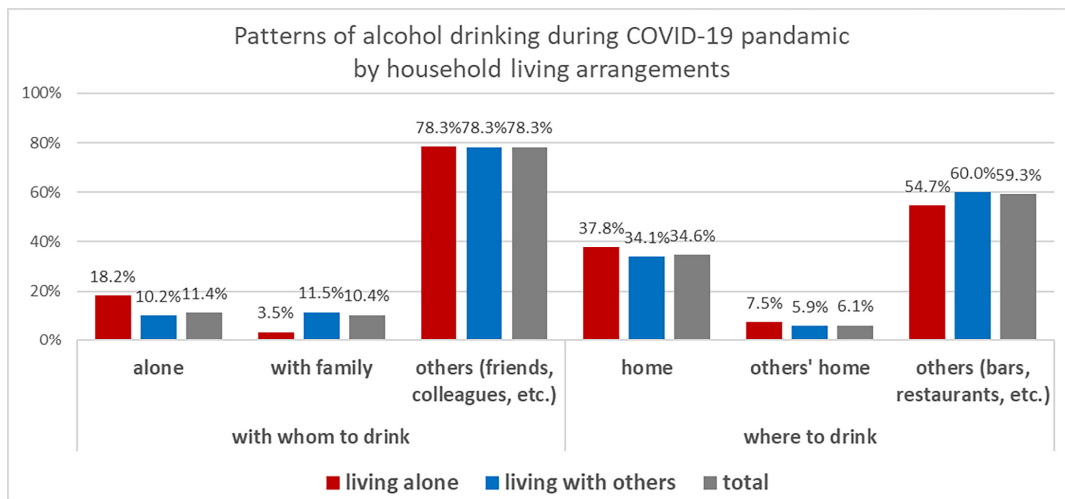
〈Table 1〉 General characteristics of study population

Unit: n (%)

Variables	Categories	Living alone (n=521)	Living with others (n=3,148)	Total (n=3,669)	χ^2 (p-value)
Individual characteristics					
Sex	Male	252 (48.4)	1,538 (48.9)	1,790 (48.8)	0.043
	Female	269 (51.6)	1,610 (51.1)	1,879 (51.2)	(.837)
Age	20-29	176 (33.8)	606 (19.3)	782 (21.3)	147.373
	30-39	171 (32.8)	621 (19.7)	792 (21.6)	($<.001$)
	40-49	90 (17.3)	731 (23.2)	821 (22.4)	
	50-59	55 (10.6)	769 (24.4)	824 (22.5)	
	≥ 60	29 (5.6)	421 (13.4)	450 (12.3)	
Education	\leq High school	114 (21.9)	784 (24.9)	898 (24.5)	2.211
	\geq College	407 (78.1)	2,364 (75.1)	2,771 (75.5)	(.137)
Occupation	Non-manual	336 (64.5)	1,716 (54.5)	2,052 (55.9)	20.556
	Manual	66 (12.7)	422 (13.4)	488 (13.3)	($<.001$)
	Other	119 (22.8)	1,010 (32.1)	1,129 (30.8)	
Monthly income (USD)	$\leq 2,000$	179 (34.4)	312 (9.9)	491 (13.4)	427.981
	2,000-3,999	263 (50.5)	950 (30.2)	1,213 (33.1)	($<.001$)
	4,000-5,999	56 (10.7)	886 (28.1)	942 (25.7)	
	$\geq 6,000$	23 (4.4)	1,000 (31.8)	1,023 (27.9)	
Heavy drinking before the COVID-19 pandemic	No	302 (58.0)	2,186 (69.4)	2,488 (67.8)	26.969
	Yes	219 (42.0)	962 (30.6)	1,181 (32.2)	($<.001$)
Lifestyles changes during the COVID-19 pandemic					
Decrease in income	No	363 (69.7)	1,809 (57.5)	2,172 (59.2)	27.585
	Yes	158 (30.3)	1,339 (42.5)	1,497 (40.8)	($<.001$)
Increase in stress perception during the COVID-19 pandemic	No	222 (42.6)	1,214 (38.6)	1,436 (39.1)	3.072
	Yes	299 (57.4)	1,934 (61.4)	2,233 (60.9)	(.080)
Increased vulnerability in mental health caused by social norms during the COVID-19 pandemic	No	195 (37.4)	1,256 (39.9)	1,451 (39.5)	1.141
	Yes	326 (62.6)	1,892 (60.1)	2,218 (60.5)	(.285)
Increase in time spent at home	No	176 (33.8)	1,021 (32.4)	1,197 (32.6)	0.370
	Yes	345 (66.2)	2,127 (67.6)	2,472 (67.4)	(.543)
Increase in time spent online for leisure purposes	No	180 (34.5)	1,105 (35.1)	1,285 (35.0)	0.060
	Yes	341 (65.5)	2,043 (64.9)	2,384 (65.0)	(.807)
Changes in alcohol consumption behaviors during the COVID-19 pandemic					
Increase in frequency of drinking	No	438 (84.1)	2,595 (82.4)	3,033 (82.7)	0.835
	Yes	83 (15.9)	553 (17.6)	636 (17.3)	(.361)
Increase in amount of alcohol consumed	No	460 (88.3)	2,728 (86.7)	3,188 (86.9)	1.047
	Yes	61 (11.7)	420 (13.3)	481 (13.1)	(.306)
Increase in drinking alone	No	426 (81.8)	2,826 (89.8)	3,252 (88.6)	28.438
	Yes	95 (18.2)	322 (10.2)	417 (11.4)	($<.001$)
Increase in drinking at home	No	324 (62.2)	2,075 (65.9)	2,399 (65.4)	2.743
	Yes	197 (37.8)	1,073 (34.1)	1,270 (34.6)	(.098)



[Figure 1] Changes in alcohol consumption by household type



[Figure 2] Patterns of alcohol consumption during the COVID-19 pandemic by household type

drinking alone ($p < .001$). With regard to drinking location, 37.8% of respondents from single-person households replied that they drank at home more compared to before the COVID-19 pandemic, which was higher than the percentage from multi-person households (34.1%). Those who lived alone were less likely to drink at bars or restaurants (54.7%) compared to multi-person households (60.0%).

4. Changes in alcohol drinking behaviors of single-person households according to their characteristics

Among individuals living alone, 15.9% reported an increased frequency of drinking, while 11.7% reported drinking larger amounts during the COVID-19 pandemic than before the pandemic. Additionally, 18.2% of the respondents reported an increase in solitary drinking and 37.8% reported an increase in home drinking.

Several significant differences were found according to respondent characteristics (Table 2). Women were more likely to drink alone ($p = .024$) or at home ($p = .010$) than men. Furthermore, younger ($p = .003$) or highly educated ($p = .004$) participants reported increased drinking at home. For heavy drinkers before the COVID-19 pandemic, the frequency and amount of alcohol consumption did not decrease significantly during the pandemic. Rather, there was a significant increase in the frequency of drinking at home ($p < .001$). Changes in conditions during the pandemic also affected patterns of drinking behavior. Specifically, a decrease in income was associated with an increase in alcohol consumption frequency ($p = .011$). Individuals experiencing higher levels of stress during the pandemic exhibited significantly higher levels of alcohol consumption ($p < .001$), increased alcohol consumption frequency ($p < .001$), and were more likely to drink alone ($p < .001$) at home ($p = .004$). Those experiencing more vulnerable mental health caused by

social norms during the pandemic also reported significantly more frequent ($p = .006$) alcohol consumption alone ($p = .045$) at home ($p < .001$), with larger amounts ($p = .006$) consumed.

Those who spent more time at home during the pandemic had significantly increased drinking frequency ($p < .001$), amount ($p = .006$), and occurrence of drinking alone at home ($p < .001$). In particular, the frequency of drinking alone increased by approximately three times, and experiences of drinking at home increased by approximately two times. Respondents who reported an increase in Internet usage for leisure purposes during the COVID-19 pandemic, along with changes in the amount of time spent at home, also showed significant increases in both alcohol consumption frequency ($p < .001$) and amount ($p < .001$) as well as drinking alone at home ($p < .001$). These findings suggest that the context and circumstances of alcohol consumption have significantly changed during the COVID-19 pandemic compared to the period before the outbreak, reflecting a notable shift.

5. Factors affecting changes in alcohol drinking behaviors of single-person households

Multiple logistic regression analyses on the factors influencing the drinking behavior patterns of single-person households revealed that changes in lifestyle during the COVID-19 pandemic significantly impacted their drinking behavior patterns, even after controlling for demographic characteristics and pre-COVID-19 drinking patterns (Table 3).

Single-person households who experienced higher levels of stress during the COVID-19 pandemic showed a significant increase in both alcohol consumption frequency (OR=1.874; 95% CI:1.015-3.463) and amount (OR=4.231; 95% CI:1.869-9.579). Furthermore, they had a significant increase in experiences of drinking alone (OR=2.267; 95% CI:1.276-4.030). The increased time

〈Table 2〉 Changes in alcohol consumption behaviors of single-person households

Unit: %

Variables	Categories	Increase in frequency of drinking	Increase in amount of alcohol consumed	Increase in drinking alone	Increase in drinking at home	n
Individual characteristics						
Sex	Male	15.5	13.1	14.3	32.1	252
	Female	16.4	10.4	21.9*	43.1**	269
Age	20-29	14.8	10.8	19.9	43.8**	176
	30-39	18.7	14.0	19.9	40.9	171
	40-49	14.4	12.2	17.8	37.8	90
	50-59	10.9	5.5	10.9	18.2	55
	≥ 60	20.7	13.8	13.8	20.7	29
Education	≤ High school	15.8	13.2	12.3	26.3	114
	≥ College	16.0	11.3	19.9	41.0**	407
Occupation	Non-manual	14.0	9.8	19.6	40.8	336
	Manual	21.2	18.2	15.2	28.8	66
	Other	18.5	13.4	16.0	34.5	119
Monthly income (USD)	≤ 2,000	16.2	11.7	15.1	30.7	179
	2,000-3,999	17.1	11.8	20.9	41.8	263
	4,000-5,999	12.5	10.7	14.3	41.1	56
	≥ 6,000	8.7	13.0	21.7	39.1	23
Heavy drinking before the COVID-19 pandemic	No	16.2	12.3	16.6	31.5	302
	Yes	15.5	11.0	20.5	46.6***	219
Lifestyle changes during the COVID-19 pandemic						
Decrease in income	No	13.2	9.9	17.9	39.9	363
	Yes	22.2	15.8	19.0	32.9	158
Increase in stress perception during the COVID-19 pandemic	No	9.0	4.1	10.4	30.6	222
	Yes	21.1***	17.4***	24.1***	43.1**	299
Increase in vulnerability in mental health caused by social norms during the COVID-19 pandemic	No	10.3	6.7	13.9	27.2	195
	Yes	19.3**	14.7**	20.9*	44.2***	326
Increase in time spent at home	No	8.0	6.3	8.5	20.5	176
	Yes	20.0***	14.5**	23.2***	46.7***	345
Increase in time spent online for leisure purposes	No	6.7	4.4	10.0	21.7	180
	Yes	20.8***	15.5***	22.6***	46.3***	341

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$

spent at home during the COVID-19 pandemic was associated with a significant increase in occurrences of solitary drinking (OR=2.028; 95% CI:1.074-3.829) at home (OR=2.185; 95% CI:1.357-3.518). The increased time spent online for leisure purposes during the pandemic not only led to an increase in alcohol

consumption frequency (OR=3.214; 95% CI:1.572-6.568) and amount (OR=3.486; 95% CI:1.484-8.187) but also increased drinking at home (OR=1.963; 95% CI:1.223-3.153).

Individuals who engaged in heavy drinking before the COVID-19 outbreak had a higher

〈Table 3〉 Factors affecting changes in alcohol consumption behaviors of single-person households

Variables	Categories	Increase in frequency of drinking		Increase in amount of alcohol consumed		Increase in drinking alone		Increase in drinking at home	
		OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Individual characteristics									
Sex	Male	1.000		1.000		1.000		1.000	
	Female	0.862	(0.509-1.461)	0.578	(0.315-1.062)	1.363	(0.828-2.244)	1.397	(0.925-2.111)
Age	20-29	1.000		1.000		1.000		1.000	
	30-39	1.673	(0.852-3.287)	1.608	(0.734-3.526)	0.872	(0.475-1.600)	0.827	(0.497-1.379)
	40-49	1.121	(0.497-2.530)	1.166	(0.466-2.913)	0.916	(0.437-1.919)	0.856	(0.466-1.572)
	50-59	0.959	(0.347-2.648)	0.589	(0.155-2.244)	0.607	(0.230-1.602)	0.353	(0.158-0.785)
	≥ 60	2.008	(0.661-6.097)	1.567	(0.424-5.798)	0.973	(0.295-3.213)	0.595	(0.215-1.646)
Education	≤ High school	1.000		1.000		1.000		1.000	
	≥ College	0.854	(0.437-1.672)	0.699	(0.329-1.484)	1.390	(0.693-2.791)	1.466	(0.841-2.556)
Occupation	Non-manual	1.000		1.000		1.000		1.000	
	Manual	1.760	(0.799-3.875)	2.121	(0.883-5.094)	0.928	(0.409-2.109)	0.819	(0.414-1.621)
	Other	1.823	(0.861-3.860)	1.855	(0.772-4.459)	1.052	(0.509-2.173)	1.135	(0.627-2.054)
Monthly income (USD)	≤ 2,000	1.000		1.000		1.000		1.000	
	2,000-3,999	1.185	(0.625-2.246)	1.203	(0.574-2.523)	1.099	(0.591-2.045)	1.034	(0.621-1.723)
	4,000-5,999	1.124	(0.410-3.083)	1.666	(0.537-5.174)	0.980	(0.370-2.595)	1.376	(0.651-2.908)
	≥ 6,000	0.464	(0.095-2.255)	1.081	(0.261-4.475)	1.145	(0.349-3.757)	0.867	(0.310-2.424)
Heavy drinking before the COVID-19 pandemic	No	1.000		1.000		1.000		1.000	
	Yes	0.816	(0.485-1.374)	0.671	(0.366-1.232)	1.344	(0.829-2.180)	2.020	(1.350-3.022)
Lifestyle changes during the COVID-19 pandemic									
Decrease in income	No	1.000		1.000		1.000		1.000	
	Yes	1.380	(0.796-2.394)	1.270	(0.672-2.402)	0.888	(0.512-1.542)	0.620	(0.390-0.986)
Increase in stress perception during the COVID-19 pandemic	No	1.000		1.000		1.000		1.000	
	Yes	1.874	(1.015-3.463)	4.231	(1.869-9.579)	2.267	(1.276-4.030)	1.271	(0.809-1.997)
Increase in vulnerability in mental health caused by social norms during the COVID-19 pandemic	No	1.000		1.000		1.000		1.000	
	Yes	1.206	(0.652-2.231)	1.236	(0.593-2.576)	0.830	(0.471-1.461)	1.306	(0.825-2.066)
Increase in time spent at home	No	1.000		1.000		1.000		1.000	
	Yes	1.773	(0.914-3.442)	1.376	(0.646-2.931)	2.028	(1.074-3.829)	2.185	(1.357-3.518)
Increase in time spent online for leisure purposes	No	1.000		1.000		1.000		1.000	
	Yes	3.214	(1.572-6.568)	3.486	(1.484-8.187)	1.738	(0.936-3.226)	1.963	(1.223-3.153)

probability of increased drinking at home (OR=2.020; 95% CI:1.350-3.022). Conversely, individuals whose income decreased during the COVID-19 pandemic had

a lower probability of increased drinking at home (OR=0.620; 95% CI:0.390-0.986).

IV. Discussion

This study examined the impact of the COVID-19 pandemic on alcohol drinking behaviors among single-person households in Seoul, a metropolitan area with high population density. We compared changes in drinking behavior patterns before and during the pandemic and identified factors affecting changes using survey data. The results revealed that while monthly alcohol consumption and heavy drinking experiences among single-person households generally decreased during the pandemic, those monthly or heavy drinkers were less likely to reduce their consumption compared to individuals in multi-person households. Moreover, drinking alone at home became more prevalent among single-person households.

Increased frequency and quantity of alcohol consumption, as well as experiences of solitary drinking at home, were significantly associated with higher levels of perceived stress during the pandemic. Furthermore, after controlling for individual characteristics and pre-pandemic drinking habits, increases in time spent online for leisure purposes significantly predicted higher frequency and amount of alcohol consumption and at home drinking.

Our findings align with some previous research but diverge from others, as studies on drinking behavior during the pandemic yielded inconsistent results. Some report decreases in both drinking frequency and volume, while others observe increases. Social distancing regulations restricted social interactions and may have contributed to reduced alcohol consumption (Guignard et al., 2021; Minhas et al., 2021). Conversely, stress, anxiety, or depression arising from these restrictions could contribute to increased alcohol use (Cho et al., 2022; Stanton et al., 2020; Vanderbruggen et al., 2020; Xu et al., 2021). Prior to the COVID-19 pandemic, solitary drinking at home

was often associated with high levels of alcohol dependence or high-risk binge drinking (Joutsenniemi et al., 2007). However, as home drinking became more common during the pandemic, a greater number of individuals reported drinking more frequently and with greater ease, regardless of whether they had drinking companions (Guignard et al., 2021).

In countries where national lockdowns were implemented, a general decrease in overall alcohol consumption was observed alongside with a shift toward home drinking (Sohi et al., 2022; Stanton et al., 2020; Vanderbruggen et al., 2020; Xu et al., 2021), likely driven by mobility restrictions (Acuff et al., 2022; Celidoni et al., 2023; Guignard et al., 2021). For some, alcohol served as a maladaptive coping strategy in response to elevated anxiety related to the pandemic (aan het Rot et al., 2023; Roberts et al., 2021). The tendency to drink alcohol had increased as a means to relieve boredom resulting from abrupt changes in daily life and to manage the stress and tension brought by the pandemic (White et al., 2022). Notably, increased time spent at home significantly contributed to these changes in drinking behavior (Patrick et al., 2022).

These changes in drinking behavior patterns were consistently observed in this study. Unlike many Western countries that implemented national lockdown, Korea did not introduce a full-scale lockdown during the COVID-19 pandemic. Instead, the government adopted a strictly phased social distancing policy, with the level of restrictions adjusted to the size and severity of each outbreak. The drinking culture in Korea is characterized by frequent alcohol consumption in diverse settings, including restaurants, bars, food stalls, and sitting areas near convenience stores (Yoon et al., 2018; Y. Y. Kim et al., 2018). This culture emphasizes drinking as a means of fostering and maintaining interpersonal relationships (Ko & Sohn, 2018). During the COVID-19 pandemic, social distancing measures placed considerable limits on

such gatherings and reduced drinking at dining establishments due to restricted business hours for restaurants and bars (W. Jeong, 2023).

The main findings of the study indicated that individuals experiencing high levels of stress and spending more time on online entertainment activities, such as gaming or watching movies, during the COVID-19 pandemic showed increased frequency and volume of alcohol consumption. This suggests that, amid limited opportunities for social drinking outside the home, people may turn to alcohol consumption as both a means of stress relief and a way to maintain interpersonal connections through social media. The pandemic has prompted rapid growth in contact-free communication, resulting in increased opportunity for solitary leisure at home. Consequently, shifts in leisure patterns facilitated changes in drinking behavior, as home-based activities substituted for social gatherings restricted during the pandemic.

In terms of economic impact, total expenditure on alcohol consumption in Korea during the third quarter of 2020 was about 3.2 billion USD, marking the highest figure since the Bank of Korea began released such statistics in 1970 and representing 6.2% increase compared to that of 2019. This upward trend began with the onset of the first confirmed COVID-19 case in Korea in early 2020 (Bank of Korea, 2021). According to the Korea Rural Economic Institute's report, based on Statistics Korea's data for 2020, single-person households spent 10.1% of their processed food expenditure on alcoholic beverages, compared to 6.9% among multi-person households. Moreover, those in their 20s and 30s living alone spent 12.6% of their income on alcohol, making them the largest contributor to alcohol consumption among all household types (Korea Rural Economic Institute [KREI], 2021).

Among single-person households, almost half of individuals who had been heavy drinkers prior to the

COVID-19 pandemic reported increased alcohol consumption at home during the pandemic. Most respondents identified solitary drinking at home as their primary drinking behavior. During restrictions on social gatherings, this pattern of at-home drinking persisted. In Seoul, the widespread availability of food and alcohol delivery services – even prior to the pandemic – facilitated the adoption of a delivery-oriented lifestyle and increased opportunities for solitary leisure activities. This, in turn, expanded access to alcohol and created more drinking opportunities for single-person households (Korea Agro-Fisheries & Food Trade Corporation, 2022). A further significant rise in delivery-based traditional liquor sales (KREI, 2021) supports this assumption. Collectively, these findings suggest that single-person households in Seoul were exposed to conditions that could accelerate changes in drinking behaviors.

Drinking alone at home may lead to excessive drinking and alcohol abuse because it is more difficult to control than social drinking. Furthermore, solitary drinking is associated with a higher probability of alcohol dependence (Miyamori et al., 2022; Murphy et al., 2014). From a behavioral perspective, increased frequency of alcohol consumption may sustain elevated intake, as routine or nearly routine solitary drinking is harder to moderate or reduce compared to less frequent consumption (Sasso et al., 2022). Therefore, while reducing the amount of alcohol consumed is important for health promotion, it is equally essential to monitor the evolving patterns – such as rising frequency of solitary drinking during extended period at home. Even with less overall consumption, the normalization of frequent solitary drinking may persist beyond the pandemic, reinforcing alcohol use as a routine, pleasurable activity rather than an unhealthy behavior with potential health consequences.

While a decline in overall alcohol consumption has

been widely reported during the COVID-19 pandemic, long-term trends remain uncertain. Patterns of alcohol consumption have changed during the COVID-19 pandemic, with the expansion of online purchase channels and new forms of home-based drinking – such as recreating bar or restaurant experiences at home – leading some to increase their alcohol use. These newly established drinking patterns are likely to persist beyond the pandemic. Therefore, it is important to anticipate and respond to emerging alcohol-related challenges in the post-pandemic era (Calina et al., 2021; Plata et al., 2022).

Current health promotion policies for alcohol consumption in Korea primarily target problem drinkers and individuals with alcohol addiction (OECD, 2020). However, growing evidence indicates that even low to moderate long-term alcohol use can increase health risks and mortality, underscoring the need to address harmful drinking behaviors beyond addiction (GBD 2020 Alcohol Collaborators, 2022; World Health Organization, 2024). In response to evolving drinking patterns, especially among single-person households, tailored health promotion initiatives are essential. While this study captures a single point during the pandemic, ongoing monitoring of alcohol consumption trends in this population is necessary to identify emerging risks and facilitate responsive interventions. Programs combining stress management, digital literacy to reduce excessive online media use, and targeted education on the risks of frequent low-level drinking may help mitigate alcohol-related harm. Public campaigns and community-based interventions should prioritize single-person households, ensuring accessible resources and support networks to address both social isolation and unhealthy drinking behaviors.

The observed increase in solitary drinking and the influence of online media on alcohol consumption highlight the need for preventive public health

strategies. Such strategies may include stress management programs, promotion of responsible drinking, and education about the risks associated with frequent low-level alcohol use. It is also important to develop policies that provide guidance for safe drinking at home, promote alternative leisure activities, and offer community support programs for single-person households, all of which may help reduce long-term alcohol-related harms. Given the prominent role of digital media in shaping drinking behaviors, integrating digital platforms for education and support may further enhance the effectiveness of these initiatives.

This study has several limitations. First, since data were collected using an online survey, older adults aged 60 and above were underrepresented compared to their actual proportion among single-person households in Seoul, potentially limiting the generalizability of findings for this age group. Future studies should consider incorporating mixed surveys to better capture the experiences of older adults. Second, the cross-sectional design precludes causal inference; thus, the findings should be interpreted as associations rather than causal relationships, and longitudinal studies are warranted. Third, changes in alcohol consumption during the COVID-19 were assessed using a binary variable (increase or no increase), which may not fully capture variations in drinking frequency or quantity. Future research should use more detailed measures to reflect these changes in alcohol consumption. Fourth, stress levels were assessed using single-item questions from the KDCA instrument, although stress is a multidimensional construct. Future studies should employ validated multidimensional scales for more precise measurement. Fifth, the use of self-reported data introduces the possibility of recall bias. Finally, because the survey was conducted during the early stage of the pandemic, it may not reflect behavioral

changes over the entire course of the COVID-19. Future studies should consider longitudinal or time-series analyses covering the entire pandemic period. Despite these limitations, this study offers important insights into changes in drinking behavior patterns and influencing factors among single-person households in Seoul during the COVID-19.

V. Conclusion

This study showed that the COVID-19 pandemic influenced alcohol consumption behaviors among single-person households in Seoul, particularly by increasing solitary drinking at home. Higher stress levels and increased engagement in online leisure activities were significantly associated with greater frequency and quantity of drinking, often in solitary settings at home. Although the average level of alcohol consumption decreased, the persistence of solitary and frequent home drinking represents an important emerging pattern with potential long-term public health implications. These findings emphasized the need for continued monitoring of behavioral shifts in alcohol use in single-person households. Tailored health promotion strategies, including stress management, digital literacy, and education on the risks of frequent low-level drinking, could mitigate potential alcohol-related harms. This study provides evidence on evolving drinking behaviors and underscore the importance of timely population-specific interventions.

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