

Health and Alcohol Consumption Prevalence During the COVID-19 Pandemic

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Abstract

The aim of this research is to evaluate health-related quality of life (HRQoL) differences and alcohol consumption changes within subpopulations during the COVID-19 pandemic. This study consisted of a primary survey of U.S. adults administered in three waves over the course of the pandemic and the data were combined into one analytical dataset. Subpopulations with the largest HRQoL comparisons included 18-44-year olds vs 45+ individuals, respondents employed during the pandemic vs non-employed respondents, and low-income earners vs high-income earners. Research on subpopulations enables targeted assistance efforts focusing on specialized programs that can improve HRQoL and alcohol consumption changes in the most impacted subpopulations.

Introduction

As the Coronavirus Disease 2019 (COVID-19) Pandemic progressed through the United States from March 2020, the population increasingly focused on the resulting health effects. While on the surface, most of the effects were physical, the greater concept of health stretches beyond the physical realm and into the mental space. Measuring an individual's health at a specific point in time can be estimated through health-related quality of life (HRQoL), a numerical-based indicator estimating perceived physical and mental health. Most research explores the HRQoL of the overall population but lacks a detailed analysis of segmented populations. General population analysis provides a basis for understanding the effects of the pandemic in a population-wide view whereas expanding the focus into segmented demographic subpopulations allows for more precise comparisons. Subpopulation comparisons and estimations allow for the development of targeted assistance programs aimed at subpopulations disproportionately affected by the COVID-19 Pandemic under the context of HRQoL and alcohol consumption.

While the COVID-19 Pandemic contributed to apparent health changes, perceived stress and anxiety may have influenced various health-related habits. The pandemic produced increased levels of both anxiety and stress in the population as many individuals had to adhere to social distancing guidelines, increasing uncertainty about the future, and adapting to new routines [1]. Research into alcohol consumption and HRQoL during the COVID-19 pandemic has found changes in both drinking patterns and diminishing HRQoL [2]. Previous catastrophic stress events such as the 9/11 terrorist attacks, Hurricane Katrina, and the Mt. St. Helens volcanic eruption were all associated with increased alcohol consumption [3-4], further linking population-level stressors like the pandemic to alcohol consumption behaviors. Additionally, an

increase of 14% in alcohol sales between April 2019 and April 2020 further urges examining alcohol consumption changes from before and after the early months of the pandemic [4]. As a result of these factors, the study of current alcohol consumption and HRQoL trends is beneficial for the understanding of the COVID-19 pandemic's impact.

This paper contributes to this body of research by measuring health utility and alcohol consumption in the state of the COVID-19 pandemic. The overall aim of this research was to explore health utility through HRQoL for the purpose of a greater understanding of its changes and relationship to alcohol consumption. Assessing HRQoL in the context of the pandemic allows for the addition of outside stressors in order to evaluate health utility and alcohol consumption changes.

Methods

Survey Background: Data used in the analysis of the study derived from a primary analysis survey consisting of 24 questions aimed to measure HRQoL, changes in alcohol consumption, and COVID-19 responsiveness. The 12-Item Short Form Health Survey version 2 (SF-12) was incorporated in the survey measuring HRQoL amongst respondents. The survey was administered to a NORC AmeriSpeak panel maintained by the University of Chicago, comprised of a U.S. population representative sample. Distribution of the survey occurred in three separate waves: December 2020 with 1,046 respondents, April 2021 with 998 respondents, and August 2021 with 1,081 respondents. Administering the survey at three separate times during the pandemic captures data in different phases of the pandemic including prior and post-vaccine. The

resulting data from all three waves produced a pooled analytical dataset with a sample size of 3,125 respondents.

Variable Construction and Implementation: Variable creation primarily focused on demographic variables due to the analysis of subpopulations within the U.S. population. Six demographic variables examining gender, age, race/ethnicity, employment status, income level, and region of occupancy were created. Demographic variables were divided into subpopulations as presented in Table 1. Analysis comparing subpopulations within demographic variables was conducted to examine relationships and differences across demographic variables.

Five variables measuring COVID-19 responsiveness were developed from the survey to analyze the effects of the COVID-19 pandemic on facets of respondents' lives. These variables measured the respondent's impact from COVID-19 related to job loss/change, social distancing/isolation, income loss/change, their own health, and the pandemic's overall impact. Analysis pertaining to respondents' impacts resulting from the COVID-19 pandemic will be conducted to measure demographic variables and their relationship with HRQoL and alcohol consumption during the pandemic.

Two dependent variables of HRQoL and change in alcohol consumption were measured in the analysis. Health-related quality of life was measured through an SF-6D score derived from the SF-12 health survey [5]. Measured on a 0-1 scale, with 0 representing dead and 1 representing optimal health, the HRQoL of respondents was calculated using a pre-existing calculation methodology. The SF-6D score encompasses the components of a health index evaluating six

dimensions: physical functioning, role participation, social functioning, bodily pain, mental health, and vitality. The change in alcohol consumption variable was derived using a self-reported change in drinking question from the survey. This variable was coded into 4 categories as displayed in Table 2. Change in alcohol consumption was used in the comparison of subpopulations during the COVID-19 pandemic to examine significant tendencies within demographic variables.

Table 1. Sample Characteristics

Variables	Survey	Weighted %
Sample Size	3,125	
Gender		
Male	1,494	48.29%
Female	1,631	51.71%
Age		
18-24 years old	112	7.04%
25-34 years old	683	18.78%
35-44 years old	572	18.08%
45-54 years old	388	13.59%
55-64 years old	611	19.63%
65-74 years old	517	15.59%
Over 75 years old	242	7.29%
Race/Ethnicity		
White, non-Hispanic	2,085	63.18%
Black, non-Hispanic	364	11.89%
Other, non-Hispanic	54	1.47%
Hispanic	427	16.33%
Mixed, non-Hispanic	96	2.13%
Asian, non-Hispanic	99	5.00%
Employment		
Working, as a paid employee	1,621	48.88%
Working, self-employed	286	10.28%
Not working, on temp. layoff	25	0.91%
Not working, looking for work	137	5.71%
Not working, retired	653	19.4%

Not working, disabled	205	7.59%
Not working, other	198	7.23%
Income		
Under \$10,000	143	5.79%
\$10,000-\$19,999	246	8.64%
\$20,000-\$29,999	341	11.69%
\$30,000-\$39,999	304	9.70%
\$40,000-\$49,999	269	8.47%
\$50,000-\$74,999	682	20.13%
\$75,000-\$99,999	460	13.95%
\$100,000-\$149,999	419	12.89%
Over \$150,000	261	8.73%
Region		
Northeast	478	17.39%
Midwest	809	20.67%
South	1,050	38.02%
West	788	23.92%

Data Analysis: Data were analyzed in multiple forms over the course of this study. Firstly, data derived from the three waves of the UNCG survey were composed into one pooled dataset with a sample size of 3,125 respondents. A means comparison was used to discover relationships in HRQoL and alcohol consumption within demographics and subpopulations while controlling for COVID-19-related effects. Comparisons made within subpopulations provided evidence as to which demographics and subpopulations were most greatly affected by the COVID-19 pandemic in relation to HRQoL and changes in alcohol consumption.

The second section of data analysis examined the relationship between demographic subpopulations and HRQoL. Linear regression analysis was used to analyze HRQoL between multiple subpopulations. The five COVID-19-related factors of overall impact of COVID-19,

physical & emotional health, social distancing & isolation, job loss/change, and financial loss/change were controlled for in the regression models.

Results

Data presented in the Sample Characteristics table (Table 1) describes the population-weighted sample representative of the U.S. population.

In the means comparison of the SF-6D Scores table (Table 2), the mean SF-6D score of the 3,125-participant sample was 0.727. Males reported an average SF-6D score than females: 0.7746 for males; 0.7115 for females. Age has a positive relationship between the SF-6D score and the age range of respondents with every increase in age range accompanied by an increase in SF-6D score: 0.6949 for 18-24-year olds; 0.7508 for respondents over 75 years of age. White, non-Hispanic respondents reported the highest average HRQoL of any race/ethnicity while Other, non-Hispanic respondents reported the lowest: 0.7337 for white, non-Hispanic; 0.6834 for Other, non-Hispanic; Black, non-Hispanic, Hispanic, Mixed, non-Hispanic, and Asian, non-Hispanic all reported an average between 0.7111-0.7179. Respondents that continued working or were retired reported the highest average HRQoL of all employment statuses while those on temporary layoff, seeking work, and disabled reported the lowest: 0.7540 for self-employed respondents; 0.7447 for retired respondents; 0.7396 for paid employee respondents; 0.6704 for respondents looking for work; 0.6656 for respondents on temporary layoff; 0.6030 for disabled respondents. Income level followed the same positive relationship as age with increased income levels accompanied by increased HRQoL: 0.6614 for respondents earning under \$10,000; 0.7641

for respondents earning over \$150,000. There was minimal difference between regions with the Midwest reporting the highest HRQoL at 0.7339.

Table 2. Means comparison of SF-6D scores within demographic populations

Demographic Variables	Survey Mean SF-6D Score
Average	0.7272
Gender	
Male	0.7746
Female	0.7115
Age	
18-24 years old	0.6949
25-34 years old	0.7110
35-44 years old	0.7181
45-54 years old	0.7271
55-64 years old	0.7310
65-74 years old	0.7500
Over 75 years old	0.7508
Race/Ethnicity	
White, non-Hispanic	0.7337
Black, non-Hispanic	0.7179
Other, non-Hispanic	0.6834
Hispanic	0.7144
Mixed, non-Hispanic	0.7111
Asian, non-Hispanic	0.7166
Employment	
Working, as a paid employee	0.7396
Working, self-employed	0.7540
Not working, on temp. layoff	0.6656
Not working, looking for work	0.6704
Not working, retired	0.7447
Not working, disabled	0.6030
Not working, other	0.7044

Income		
	Under \$10,000	0.6614
	\$10,000-\$19,999	0.6793
	\$20,000-\$29,999	0.6852
	\$30,000-\$39,999	0.7007
	\$40,000-\$49,999	0.7195
	\$50,000-\$74,999	0.7350
	\$75,000-\$99,999	0.7599
	\$100,000-\$149,999	0.7633
	Over \$150,000	0.7641
Region		
	Northeast	0.7287
	Midwest	0.7339
	South	0.7219
	West	0.7265

In the Changes in Alcohol Consumption Model (Table 3), females reported higher instances of never consuming alcohol (34.95% to 24.83%), whereas males reported higher instances of not changing alcohol consumption patterns since before the pandemic (34.87% to 26.39%). Both genders reported similar reported changes in alcohol consumption. Respondents of the age range between 18-44, had substantially greater changes in alcohol consumption than respondents in age ranges over 45: 45.54% for 18-24-year-olds (17.86% increased; 27.68% decreased/stopped); 47.15% for 25-34-year-olds (19.33% increased; 27.82% decreased/stopped); 43.70% for 35-44-year-olds (18.53% increased; 25.17% decreased); 38.3% for 55-64 years olds - highest range change over 45 years old (15.06% increased; 23.24% decreased). Mixed, non-Hispanic, Other, non-Hispanic, Hispanic, and respondents reported the greatest change in alcohol consumption: 48.96% for Mixed, non-Hispanic respondents (15.63% increased; 33.33% decreased/stopped); 46.3% for Other, non-Hispanic respondents (18.52% increased; 27.78% decreased/stopped); 45.67% for Hispanic respondents (18.5% increased; 27.17% decreased/stopped).

Employment status did not produce a significant impact on changes in alcohol consumption with retired respondents producing the only notable difference of being substantially lower than other employment statuses: 29.87% for retired individuals (7.66% increased; 22.21% decreased/stopped); The next lowest change was from respondents not working for other reasons at 39.39% (15.15% increased; 24.24% decreased/stopped). Alcohol consumption changes between income levels were relatively similar with the only exceptions of respondents earning over \$100,000 reporting larger increases in alcohol consumption: 18.85% increase for respondents earning between \$100,000-\$149,999; 19.16% increase for respondents earning over \$150,000. The West region reported the highest change in alcohol consumption of any region at 42.89% (17.26% increased; 25.63% decreased/stopped).

Table 3. Changes in alcohol consumption within demographic populations – n and %

Demographic Variables	Never Drinker	Increased Drinking	No Change in Drinking	Decreased/ Stopped	Missing
Gender					
Male	371 (24.83)	218 (14.59)	521 (34.87)	368 (24.63)	16 (1.07)
Female	570 (34.95)	242 (14.84)	432 (26.49)	376 (23.05)	11 (0.67)
Age					
18-24 years old	24 (21.43)	20 (17.86)	33 (29.46)	31 (27.68)	4 (3.57)
25-34 years old	172 (25.18)	132 (19.33)	183 (26.79)	190 (27.82)	6 (0.88)
35-44 years old	150 (26.22)	106 (18.53)	169 (29.55)	144 (25.17)	3 (0.52)
45-54 years old	118 (30.41)	60 (15.46)	123 (31.70)	81 (20.88)	6 (1.55)
55-64 years old	170 (27.82)	92 (15.06)	206 (33.72)	142 (23.24)	1 (0.16)
65-74 years old	200 (38.68)	41 (7.93)	159 (30.75)	114 (22.05)	3 (0.58)
Over 75 years old	107 (44.21)	9 (3.72)	80 (33.06)	42 (17.36)	4 (1.65)
Race/Ethnicity					
White, non-Hispanic	618 (29.64)	285 (13.67)	701 (33.62)	464 (22.25)	17 (0.82)
Black, non-Hispanic	113 (31.04)	63 (17.31)	96 (26.37)	90 (24.73)	2 (0.55)
Other, non-Hispanic	15 (27.78)	10 (18.52)	14 (25.93)	15 (27.78)	0 (0.00)
Hispanic	130 (30.44)	79 (18.50)	95 (22.25)	116 (27.17)	7 (1.64)
Mixed, non-Hispanic	21 (21.88)	15 (15.63)	28 (29.17)	32 (33.33)	0 (0.00)
Asian, non-Hispanic	44 (44.44)	8 (8.08)	19 (19.19)	27 (27.27)	1 (1.01)
Employment					
Working, as a paid employee	402 (24.80)	282 (17.40)	542 (33.44)	379 (23.38)	16 (0.99)
Working, self-employed	82 (28.67)	46 (16.08)	87 (30.42)	69 (24.13)	2 (0.70)
Not working, on temp. layoff	6 (24.00)	4 (16.00)	7 (28.00)	8 (32.00)	0 (0.00)
Not working, looking for work	49 (35.77)	20 (14.60)	27 (19.71)	39 (28.47)	2 (1.46)
Not working, retired	244 (37.37)	50 (7.66)	209 (32.01)	145 (22.21)	5 (0.77)
Not working, disabled	90 (43.90)	28 (13.66)	30 (14.63)	56 (27.32)	1 (0.49)
Not working, other	68 (34.34)	30 (15.15)	51 (25.76)	48 (24.24)	1 (0.51)
Income					
Under \$10,000	53 (37.06)	20 (13.99)	30 (20.98)	40 (27.97)	0 (0.00)
\$10,000-\$19,999	92 (37.40)	38 (15.45)	59 (23.98)	55 (22.36)	2 (0.81)
\$20,000-\$29,999	134 (39.30)	38 (11.14)	61 (17.89)	104 (30.50)	4 (1.17)
\$30,000-\$39,999	109 (35.86)	41 (13.49)	90 (29.61)	62 (20.39)	2 (0.66)
\$40,000-\$49,999	85 (31.60)	38 (14.13)	77 (28.62)	68 (25.28)	1 (0.37)
\$50,000-\$74,999	203 (29.77)	101 (14.81)	218 (31.96)	150 (21.99)	10 (1.47)
\$75,000-\$99,999	126 (27.39)	55 (11.96)	150 (32.61)	124 (26.96)	5 (1.09)
\$100,000-\$149,999	88 (21.00)	79 (18.85)	159 (37.95)	90 (21.48)	3 (0.72)
Over \$150,000	51 (19.54)	50 (19.16)	109 (41.76)	51 (19.54)	0 (0.00)
Region					
Northeast	144 (30.13)	69 (14.44)	135 (28.24)	122 (25.52)	8 (1.67)
Midwest	240 (29.67)	109 (13.47)	270 (33.37)	185 (22.87)	5 (0.62)
South	324 (30.86)	146 (13.90)	337 (32.10)	235 (22.38)	8 (0.76)
West	233 (29.57)	135 (17.26)	211 (26.78)	202 (25.63)	6 (0.76)

In the regression model (Table 4), only the age range of 65-74-year olds was associated with a statistically significant difference in HRQoL than the reference group of 18-24-year olds: 0.0294 points higher ($p = 0.029$). Respondents who were retired or disabled were associated with a statistically significantly lower HRQoL than respondents working as paid employees: 0.0246 lower for retired ($p = 0.002$); 0.1107 lower for disabled ($p < 0.000$). Respondents reporting income levels of over \$50,000 were associated with statistically significantly higher HRQoL than the reference group of under \$10,000: 0.0322 higher for respondents earning between \$50,000-\$74,999 ($p = 0.003$); 0.0545 higher for respondents earning between \$75,000-\$99,999 ($p < 0.000$); 0.0514 higher for respondents earning between \$100,000-\$149,999 ($p < 0.000$); 0.0513 higher for respondents earning over \$150,000 ($p < 0.000$). After controlling for other factors, gender, race/ethnicity, and region did not produce any statistically significant differences in the survey.

Table 4. Linear Regression Model estimating SF-6D Score

Variables	Coefficient	Std. Error	P-value
Gender (Male = Reference Group)			
Female	-0.0081	0.0043	0.059
Age (18-24 Years Old = Reference Group)			
25-34 years old	0.0083	0.0119	0.484
35-44 years old	0.0096	0.0121	0.429
45-54 years old	0.0103	0.0127	0.420
55-64 years old	0.0218	0.0123	0.083
65-74 years old	0.0294	0.0135	0.029
Over 75 years old	0.0274	0.0151	0.069
Race/Ethnicity (White, non-Hispanic = Reference Group)			
Black, non-Hispanic	0.0109	0.0068	0.100
Other, non-Hispanic	-0.02	0.0163	0.222
Hispanic	0.0105	0.0065	0.104
Mixed, non-Hispanic	-0.0081	0.0121	0.502
Asian, non-Hispanic	-0.0187	0.0121	0.123
Employment (Working, as a paid employee = Reference Group)			
Working, self-employed	0.0137	0.0077	0.076
Not working, on temp. layoff	-0.0223	0.023	0.332
Not working, looking for work	-0.02	0.0108	0.069
Not working, retired	-0.0246	0.0081	0.002
Not working, disabled	-0.1107	0.0093	0.000
Not working, other	-0.0091	0.0089	0.309
Income (Under \$10,000 = Reference Group)			
\$10,000-\$19,999	0.0022	0.0122	0.855
\$20,000-\$29,999	0.0025	0.0116	0.831
\$30,000-\$39,999	0.0058	0.0119	0.625
\$40,000-\$49,999	0.0208	0.0123	0.092
\$50,000-\$74,999	0.0322	0.011	0.003
\$75,000-\$99,999	0.0546	0.0115	0.000
\$100,000-\$149,999	0.0514	0.0118	0.000
Over \$150,000	0.0513	0.0127	0.000
Region (Northeast = Reference Group)			
Midwest	0.0007	0.0067	0.921
South	-0.005	0.0064	0.431
West	0.0017	0.0068	0.801

Discussion

The stressors as a result of the pandemic had potential impacts on HRQoL within subpopulations and demographics. A significantly lower HRQoL in females than males can be supported by research suggesting females experienced higher mental health problems than males during the pandemic [6]. The pattern displayed between HRQoL and the increase in age could be attributed to younger adults experiencing more mental health problems such as more significant major life changes than older adults. Situations such as work and school closures could have contributed to more stress and lower HRQoL, a problem older adults did not experience. The presence of stressors such as these could also explain the greater changes in alcohol consumption in younger adults than in older adults.

Changes in employment status are significant in the evaluation of HRQoL because they suggest that individuals who remained employed during the pandemic experienced higher levels of HRQoL than those not employed. Possible interpretations of this evidence could be attributed to non-employed individuals having more concerns about finances, economic fears, and uncertainty about the future. The exception to this proposition is retired individuals who experienced the lowest change in alcohol consumption additionally shown through respondents over the age of 65 also reporting the lowest changes in alcohol consumption. Income level was also a significant variable in the analysis of HRQoL. Following a similar pattern as age, higher incomes were also associated with higher HRQoL levels. Evidence of this relationship displays that it is not a result of the pandemic but rather one that was prevalent prior to the pandemic [7]. However, it could be proposed that respondents earning lower wages experienced added stress as a result of the pandemic compared to their higher-earning counterparts. As a result, their diminished HRQoL

could have been further impacted by these additional stressors not significant to higher earning respondents.

Based on the significant results presented, there are clear subpopulations more affected by the stressors of the pandemic than others in relation to health and alcohol consumption. Because of this evidence, designing assistance programs targeting these subpopulations could help mitigate some of the stressful effects of the pandemic. Programs and assistance to individuals in the age range of 18-44, individuals who were not employed during the pandemic, and individuals earning low incomes would have the greatest benefit to HRQoL and alcohol consumption.

Conclusion

Alcohol consumption and HRQoL varied substantially between subpopulations during the COVID-19 pandemic. At this time, it is unclear if the pandemic directly impacted these differences or if they were pre-existing to the pandemic. Analysis such as this allows for research into specific subpopulations that were affected during the COVID-19 pandemic such as low-income or non-employed individuals. Assistance and relief programs aimed towards aiding these subpopulations would be evermore important to improve the mental and physical health of the population.

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