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A Cross-sectional Analysis of Self-reported Long COVID and Binge Drinking Amongst COVID-Positive Individuals Using the Behavioral Risk Factor Surveillance System (BRFSS), 2022

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Abstract:

Objective: Identify an association between Long COVID (exposure) and binge drinking (outcome) amongst COVID-positive individuals.

Methods: COVID-positive respondents (n=116,120) were sampled from the 2022 Behavioral Risk Factor Surveillance System (BRFSS). Univariate analysis assessed distribution of Long COVID, binge drinking, and covariates sex, age, race/ethnicity, education, income, rural/urban residency, veteran status and BMI. Bivariate analysis determined crude prevalence odds ratios (POR) between exposure, outcome, and covariates. Multivariate logistic regression determined adjusted prevalence odds ratios (aPOR) and 95% confidence intervals (95% CI) for exposure, outcome and covariates.

Results: No association found between Long COVID and binge drinking (aPOR: 0.94 (95% CI: 0.87, 1.0). Association found with outcome for women (aPOR: 0.60, 95% CI: 0.56, 0.64), 25-34 age group (aPOR: 6.88, 95% CI: 6.15, 7.70), Black racial identity (aPOR: 0.61, 95% CI: 0.53, 0.66), < high school education (aPOR: 0.78, 95% CI: 0.67, 0.93), and earning < $25,000 annually (aPOR: 0.57, 95% CI: 0.49, 0.66).

Conclusion: Findings suggest Long COVID is not associated with binge drinking. Further study is needed due to limited research on impact of Long COVID on drinking behaviors.

Introduction

Public health and medical communities have recognized that long-term health issues can follow acute SARs-CoV-2 infections, which follows research conducted over the past century demonstrating that viral infections can leave persistent signs and symptoms in their wake.[1] "Long COVID," also known as "post COVID-19 condition" or "post-acute coronavirus syndrome," is a syndrome some people develop after initial infection with SARS-CoV-2, the virus that causes COVID-19.[2] It's defined by the World Health Organization as the persistence or new emergence of diverse signs and symptoms 3 months or more after acute infection, that then continue for two months or longer.[2] These signs and symptoms include shortness of breath, "brain fog," anxiety, depression, diarrhea, and fatigue that seriously inhibits basic daily activities. [3,4] Such signs and symptoms can also be aggravated after physically or mentally taxing experiences.[3]

Although anyone can develop Long COVID regardless of severity of the initial infection, it is more commonly associated with severe illness during the initial infection.[3] Since people can be infected with COVID-19 more than once, they risk developing Long COVID after each bout of illness.[3] Per the CDC's Household Pulse Survey of American households, 25.6% of respondents who ever had COVID reported experiencing Long COVID at some point after initial infection.[5] Among respondents who ever had COVID-19 reported, 9.5% are currently experiencing symptoms of Long COVID.[5] Finally, 82.8% of people currently experiencing Long COVID reported limitations to performing their daily activities, while 28.4% of people with Long COVID report serious limitations to their daily activities.[5]

According to University of Washington researchers in their review of BRFSS data from 2000-2014, there is a strong link between “functional limitations” – difficulties in performing typical daily activities like going shopping or dressing oneself – and poor mental health.[6] When people in the general population experience mental health conditions, they can sometimes develop substance use disorders.[7] Some researchers theorize this happens because people experiencing mental distress may try to cope by using alcohol.[7]

Excessive alcohol use causes nearly 400 deaths per day, making it a leading preventable cause of death in the United States.[8] Not only does it contribute to premature death, shortening the lives of people affected by 26 years on average via conditions like cancer and heart disease, but these deaths disproportionately occur among men and people over 35.[8] Over half of the years of potential life lost were due to incidents where people drank a lot in a short period of time (binge drinking), leading to alcohol poisoning, motor vehicle collisions, criminal ramifications, and suicides.[9] While binge drinking isn’t indicative of an alcohol use disorder by itself, this type of excessive alcohol consumption has been associated with alcohol dependence and a higher chance of developing an alcohol use disorder. [10] According to the 2022 National Survey on Drug Use and Health (NSDUH), 21.7% of respondents reported binge drinking.[11]

Long COVID has been hypothesized as a potential risk factor for alcohol abuse.[12] Emerging research indicates people experiencing Long COVID may self-medicate using alcohol, as a larger proportion of people with Long COVID in a study by Veliz et al endorsed using alcohol to self-medicate compared to people without persistent

symptoms.[13] However, this study was not representative as it was conducted via online convenience sampling.[13] and it didn't specify intensity or quantity. Additionally, new onset alcohol use disorder has been identified in certain individuals after acute SARS-CoV-2 infection during some, but not all, waves of infection.[14] Research into excessive drinking among people with Long COVID is limited but is an important area for study due to the potential for alcohol misuse among this population, and the consequences to individuals and the public of excessive alcohol consumption.[8], [9],[15] This study asks if there is an association between experiencing Long COVID and binge drinking (as defined by the CDC) amongst people who tested positive for COVID-19.

Methods section

Study Design

This study is a cross-sectional, descriptive analysis using data from the Centers for Disease Control and Prevention (CDC)'s 2022 Behavioral Risk Factor Surveillance System (BRFSS) survey, a nationally representative survey of the U.S. adult non-institutionalized population. Interviewers for the BRFSS conducted over 400,000 telephone-based interviews throughout all 50 states, Washington, D.C., and several U.S. territories. BRFSS captures information about a variety of health outcomes and behaviors, chronic disease indicators, and healthcare utilization. The questions are categorized by mandatory and psections. This study analyzed responses to questions from Core Section 8: Demographics related to age, sex, race/ethnicity, income, education, and residence in a rural or urban area, Core Section 14: Alcohol Consumption *(Considering all types of alcoholic beverages, how many times during the*

past 30 days did you have X [CATI X = 5 for men, X = 4 for women] or more drinks on an occasion?).

BRFSS uses a complex survey design to mitigate bias and ensure its sample is representative. It is a randomized, multi-stage process that applies different weights to responses to account for the varying probability of being selected to interview. Two different sampling methods are used depending on whether the respondent uses a cell phone or a landline, since the likelihood of being selected to respond is different for an single adult cellphone user versus all adults living in a household with one landline.

Study Population

Before applying inclusion and exclusion criteria, this cross-sectional study included 445,132 observations. Observations were included in the study sample if respondents answered “yes” to having a positive result for COVID-19 as determined by a healthcare provider or home test. Observations were excluded if respondents answered “no” to having tested positive for COVID-19, answered “don’t know,” “not sure” or “refused” to questions about the exposure or outcome, or were missing values. 319,939 responses (65.7%) of responses were excluded, leaving an initial sample size of 124,313.

Primary Exposure Variable – Long COVID

Long COVID, as defined above, is the primary exposure variable. Observations within this sample were included if they answered “yes” or “no” to the primary exposure question (“Did you have any symptoms lasting 3 months or longer that you did not have

prior to having coronavirus or COVID-19?"). This variable is a dichotomous answer of "yes" or "no." Observations were excluded if respondents answered "don't know," "not sure" or "refused" to the exposure question. Per this criteria, 2,820 responses (1.86%) were excluded. The exposure variable was recoded into a new variable to exclude responses that didn't meet inclusion criteria. Answering "no" to this question was the reference value

Primary Outcome Variable – Binge Drinking

CDC defines binge drinking for women as having 4 or more standard drinks in one sitting and for men as having 5 or more standard drinks in one sitting.[16] A standard drink equals one 12-ounce beer, a 5-ounce glass of wine, or a 1.5-ounce shot of 80-proof/40% alcohol distilled liquor.[17] This study used as its primary outcome a calculated, binary variable from the BRFSS 2022 codebook that categorized responses by whether respondents binge drank at least once (yes or no) in the month before responding to the BRFSS.

This calculated variable was based on the question *"Considering all types of alcoholic beverages, how many times during the past 30 days did you have X [X=5 for men, 4 for women] or more drinks on an occasion?"* Observations were excluded if respondents answered "don't know," "not sure" or "refused" to the exposure question, or were missing values. Per criteria, 51,102 responses (13.7%) were excluded. This binge drinking variable was recoded into a new variable to exclude responses that didn't meet inclusion criteria. Answering "no" to this question was the reference value.

Covariates

Several covariates were included in this study based upon their potential impact on binge drinking. Per the Centers for Disease Control and Prevention (CDC), age, race, sex, educational level, income, and residing in an urban or rural area can all influence the likelihood of binge drinking.[16] Veteran status is potential risk factor for binge drinking in male and female veterans.[18],[19] Obesity and overweight has also been associated with binge drinking in previous research.[20], [21], [22]

Age was categorized into 6 levels ("age 18-24," "25-34," "35-44," "45-54," "55-64," "65 and older"). Missing age values were imputed. The age category of 65 and older is the reference category. Race was categorized into 4 levels ("White, non-Hispanic," "Black non-Hispanic," "Hispanic," and "Other Race"). "White, non-Hispanic" was the reference category. Missing race values were imputed. Sex was a binary variable (male/female). No values were missing. Male was the reference category. Education level was categorized into 4 levels ("didn't graduate high school," "graduated high school," "some college or technical school," and "graduated college"). Observations were excluded if respondents answered "don't know," "not sure" or "refused" to the exposure question, or were missing values. Per criteria, 2,383 responses (0.60%) were excluded. Graduated college was the reference category.

Income categories were collapsed into fewer categories for a more robust analysis and recoded as a new variable ("less than $25,000," "$25,000 to less than $50,000," "$50,000 to less than $100,000," "$100,000 to less than $200,000," "$200,000 or

more”). Income of $200,000 or more was the reference value. 96,047 responses (23.84%) were missing or respondents answered “don’t know,” “not sure,” or “refused.” Because of the large amount of missing data, data were given their own category of “Missing” for analytical purposes.

Residence was a binary variable (rural/urban). Urban location was the reference variable. 9,408 responses (2.10%) were missing and excluded from analysis. Veteran status was a binary variable (yes/no) asking about whether a respondent has served in the American armed forces or national guard with 5,649 (1.29%) missing values. Overweight/obesity was a calculated, binary variable (yes/no) that categorized a respondent as having an overweight/obese body mass index (BMI), or not. 48,806 values (13.1%) were missing. Observations were excluded from residence, veteran and BMI variables if respondents answered “don’t know,” “not sure” or “refused” to the exposure question, or were missing values.

After applying exclusion and inclusion criteria for the primary exposure, primary outcome, and covariates, 116,120 observations formed the final sample.

Data Analysis

Data was initially evaluated via univariate analysis to show the distribution of exposure, outcome, and covariates. Subsquent bivariate analysis analyzed the exposure and outcome variables to determine the distribution of data and crude prevalence odds ratios. Finally, a stepwise backward selection process was used to create the final multivariate logistic regression model, resulting in adjusted prevalence odds ratios.

The backward model selection process included the covariates sex, age, race/ethnicity, education, income, living in a rural/urban area, veteran status and BMI. Covariates were removed in descending order by the size of their statistical significance, defined for this study as a p-value of 0.05 or less. BMI was removed, followed by veteran status. Maintaining sex, age, race/ethnicity, education, income, and living in an urban/rural area yielded the best fitting model.

A multivariate logistic regression was performed to determine the association between the exposure and outcome variables and the above covariates using SAS On Demand For Academics 9.04 (SAS Institute, Cary, NC). Due to the complex sampling design of the BRFSS, models were adjusted to control for the effects of any confounders on the relationship between Long COVID and binge drinking.

Ethical Approval

This study used de-identified, publicly-available public health surveillance data and was therefore not subject to IRB oversight.

Results

Shown in Table 1 as weighted percentages, 19.6% of respondents included in this study reported binge drinking in the past 30 days, and 22% reported having Long COVID. The sample was 53.5% female and 46.5% male. People ages 25-44 composed over 40% of respondents. 59.7% of respondents identified as white, while 10.9% identified as Black, 18.8% as Hispanic, and 10.7% as another racial/ethnic grouping. Nearly 65% of respondents attended or graduated college, with fewer than 9% of people reporting they

didn’t graduate high school. Over 25% of people reported earning between $50,000 and $100,000, though income information for a little over 16% of individuals. Finally, almost 95% of individuals lived in urban areas compared to 6% of respondents living in rural areas.

As seen in Table 2, individuals who reported binge drinking had 13% lower odds (POR: 0.87 | 95% CI: 0.81, 0.94) of experiencing Long COVID compared to those who didn’t have Long COVID. There was 42% lower odds (POR: 0.58 | 95% CI: 0.55, 0.62) of binge drinking in the past month amongst women compared to men, while people ages 25-34 had over 6 times the odds of binge drinking compared to people age 65 and older (POR: 6.74 | CI: 6.03, 7.52). The bivariate analysis also found 39% lower odds (POR: 0.61 | 95% CI: 0.55, 0.68) of reporting binge drinking in the past month amongst Black people compared to White people, while there no significant association was found between binge drinking and people identifying as Hispanic.

Table 2 also showed 39% lower odds of reporting binge drinking amongst people who didn’t graduate high school compared to people who graduated college or technical school (POR: 0.61 | 95% CI: 0.53, 0.71), 53% lower odds (POR: 0.47 | CI: 0.41, 0.54) of binge drinking amongst people earning less than $25,000 reported compared to those earning $200,000 or more, and 53% lower odds of binge drinking (POR: 0.43 | 95% CI: 0.38, 0.48) amongst people with missing income information compared to those reporting income of $200,000 or more. There was 24% lower odds of binge drinking for people living in rural areas compared to people living in urban areas (POR: 0.76 | 95% CI: 0.69, 0.83).

As shown in Table 3, after adjusting for the above covariates, binge drinking was not significantly associated with Long COVID. The multivariate logistic regression resulted in a crude prevalence odds ratio of 0.87 (95% CI: 0.81, .094) and an adjusted prevalence odds ratio of 0.938 (95% CI: 0.87, 0.10). Binge drinking was significantly associated with sex, age, race, education, income and living in an urban or rural area.

Table 3 also showed a 40% lower odds of binge drinking for women compared to men (aPOR: 0.60 | 95% CI: 0.56, 0.64), 6.88 times the odds of reporting binge drinking amongst people ages 25-34 compared to people ages 65 and older (aPOR: 6.88 | 95% CI: 6.15, 7.70), and 41% lower odds of binge drinking for Black people compared to White people (aPOR: 0.61 | 95% CI: 0.53, 0.66). Additionally, there was a 22% lower likelihood of binge drinking for people who didn't graduate high school compared to those who graduated college or technical school (aPOR: 0.78 | 95% CI: 0.67, 0.93), 43% lower odds of binge drinking for people earning less than $25,000 compared to those earning $200,000 or more (aPOR: 0.57 | 95% CI: 0.49, 0.66), and a 55% lower likelihood of binge drinking for people who had no reported income compared to those reporting an income of $200,000 or more (aPOR: 0.45 | 95% CI: 0.39, 0.51). Finally, there was a 14% lower likelihood of binge drinking for people living in rural areas compared to urban areas (aPOR: 0.86 | 95% CI: 0.78, 0.94).

Discussion

This study evaluated whether there was an association between binge drinking and having Long COVID amongst people who tested positive for COVID-19. While binge drinking was initially significantly associated with Long COVID in the bivariate analysis, it was no longer significantly associated after adjusting for covariates in the multivariate

logistic regression analysis. One potential overall explanation for this finding is that people with Long COVID may develop a new heightened sensitivity to the effects of alcohol, as described in a case series from 2023, making them less likely to binge drink.[23]

Consistent with previous findings from the CDC, this study found binge drinking was lower among women compared to men, highest among people ages 25-34 compared to all other age groups, highest amongst White people compared to people of other races/ethnicities, and it generally increased as income increased.[16] Data for income was missing for over 15% of respondents, however, which may have introduced non-random response bias into this study. Patterns of missingness required additional analysis to appropriately evaluate their impacts on binge drinking, analysis which was beyond the scope of this study.

The study also found that the education category “some college or technical school” had lower odds of binge drinking, a finding not consistent with prior research from the CDC. Considering CDC labeled their equivalent category “some college” only, it’s possible this definition didn’t include technical schools, whose student population may differ in meaningful ways from that of colleges, resulting in a different outcome.

Binge drinking was lower amongst people living in rural areas compared to urban areas, as demonstrated in previous research.[24,25] This study found that binge drinking was not significantly associated with identifying as Hispanic, contradicting prior research showing not only that identifying as Hispanic was significant, but that Hispanic people had the fourth highest prevalence of binge drinking of all racial/ethnic groups

surveyed.[24] The difference in findings may be due to differences in how racial/ethnic groups were defined, categorized, and analyzed during this study compared to previous research.

This study's finding differed from prior research into the effect of Long COVID on drinking behaviors, which found increased amounts of drinking amongst people experiencing Long COVID compared to those without Long COVID.[7] This difference may have been due to differences in measurement, sampling bias, selection bias, response bias, and recall bias. While the BRFSS was a nationally-representative survey, Veliz et al's study experienced sampling bias because it used two convenience samples derived from a market research panel and a specific social media advertising campaign.[13] It was also completed online, which may have made respondents feel more comfortable taking their time and answering honestly because it felt more anonymous, compared to speaking with an interviewer over the phone as is the case with the BRFSS survey.[13] Finally, even though over 99% of Americans had a phone in the household, less than 92% of American households had an internet subscription.[26] For these reasons, not all Americans had an equal probability of participating in this study.

Self-reporting bias could have influenced the responses to the 2022 BRFSS, upon whose data this study was based. Respondents may have felt pressured to give "socially acceptable" answers to the person interviewing them, compared to answering questions in an online survey. Selection bias may have been a factor, as the individuals who agreed to answer questions for the BRFSS and for Veliz et al may have been fundamentally different in meaningful ways than individuals who didn't respond.

Respondents may have been reluctant to divulge the truth about their binge drinking, as they may want to provide a socially desirable answer to the interviewers.[27] Finally, recall bias could have impacted the results of this study as well, because the BRFSS asked people to recall information from within the past 30 days from the date of the interview, whereas people responding to Veliz et al were recalling information from between January 2020, when the first documented case of COVID-19 appeared in the U.S. and the survey period of December 22, 2021 through January 10, 2022.[13,28]

Limitations

As a cross-sectional study, this study couldn't identify whether Long COVID predated binge drinking in respondents and thus was a true risk factor. This study was also limited in its ability to assess variations in the frequency of binge drinking amongst people who experienced Long COVID and people who didn't because these data were evaluated using a binary logistic regression with an outcome of either "yes" or "no." This outcome measurement didn't account for the number of binge drinking episodes for each BRFSS respondent.

The type of analysis used in this study (logistic regression) may account for results that refute some of the findings generally found in the literature regarding risk factors for binge drinking as well as the lack of association between Long COVID and binge drinking. For example, an analysis that evaluated frequency of binge drinking episodes or the average number of binge drinking episodes within the past 30 days between people with Long COVID and people without it may have yielded a statistically significant difference between them.

Public Health Importance

This study is one of the few to examine the question of Long COVID's impact on binge drinking using a nationally-representative dataset. Despite the results of this study, further exploration of the association between Long COVID and binge drinking is important. Long COVID is a relatively new syndrome with little research exploring its impact on drinking behaviors, so its influence on the frequency and intensity of drinking remains unknown. It's important for researchers to continue to identify potential risk factors for binge drinking, considering the serious individual and public health consequences of binge drinking. If further research showed a positive association between Long COVID and binge drinking, public health professionals and healthcare practitioners could develop educational campaigns and interventions to spread awareness of this risk factor, develop individual and community mitigation methods, and potentially reduce the likelihood of Long COVID contributing to more instances of binge drinking.

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Table 1. Characteristics of the Study Population (n=116,120), Behavioral Risk Factor Surveillance System (BRFSS) 2022

Characteristic	n	Weighted %
People Who Tested Positive For COVID-19		
	116,120	100%
Binge Drinking		
No	95,215	80.4%
Yes	20,905	19.6%
Long COVID Symptoms		
No Long COVID Signs/Symptoms	90,260	78%
Yes, had Long COVID Symptoms	25,860	22%
Gender		
Female	62,739	53.5%
Male	53,381	46.5%
Age		
18-24	9,219	13.8%
25-34	16,366	20.2%
35-44	19,510	19.0%
45-54	20,086	16.2%
55-64	21,219	15.2%
65+	29,720	15.7%
Race		
White only, non-Hispanic	84,979	59.7%
Black only, non-Hispanic	8,345	10.9%
Hispanic	11,540	18.8%
Other Race	8,340	10.7%
Educational Level		
Didn't graduate high school	5,507	8.90%
Graduated high school	26,597	26.3%
Some college or technical school	32,939	32.4%
Graduated college or technical school	50,726	32.4%
Income		
Less than $25,000	11,726	10.8%
Between $25,000 to less than $50,000	22,770	19.8%
Between $50,000 to less than $100,000	32,029	25.6%
Between $100,000 to less than $200,000	24,173	20.4%
$200,000 and over	7,859	7.30%
Missing	17,563	16.2%
Locale		
Urban	101,889	94.1%
Rural	14,231	5.90%

N = total number of people who responded to the questions related to each characteristic
Weighted % = Percentage of respondents in each category, after accounting for complex survey design

Table 2: Bivariate Association of Long COVID and Covariates By Binge Drinking, Behavioral Risk Factor Surveillance System (BRFSS) 2022

Binge Drinking				
Characteristic	**Binge drinking**	**No binge drinking**	**Crude Prevalence Odds Ratio (CI)**	**p-value**
Long COVID				
Yes	4,164 (20.2%)	21,696 (22.5%)	0.87 (0.81, 0.94)	.0001
No	16,741 (79.9%)	73,519 (77.6%)	REFERENCE	REF.
Gender				
Female	8,956 (42.6%)	53,783 (56.1%)	0.58 (0.55, 0.62)	<.0001
Male	11,949 (57.4%)	41,432 (43.6%)	REFERENCE	REF.
Age (in years)				
18-24	2,826 (18.4%)	6,393 (12.7%)	5.60 (4.99, 6.31)	<.0001
25-34	4,945 (30.6%)	11,421 (17.7%)	6.74 (6.03, 7.52)	<.0001
35-44	4,628 (21.5%)	14,882 (18.4%)	4.56 (4.08, 5.11)	<.0001
45-54	3,827 (14.7%)	16,259 (16.6%)	3.45 (3.08, 3.87)	<.0001
55-64	2,878 (10.1%)	18,341 (16.4%)	2.39 (2.11, 2.71)	<.0001
65+	1,801 (4.70%)	27,919 (18.3%)	REFERENCE	REF.
Race				
White only, non-Hispanic	15,499 (63.5%)	69,480 (58.8%)	REFERENCE	REF.
Black only, non-Hispanic	1,067 (7.60%)	7,278 (11.6%)	0.61 (0.55, 0.68)	<.0001
Hispanic	2,404 (20.1%)	9,136 (18.6%)	1.00 (0.92, 1.10)	.8998
Other Race	1,496 (8.80%)	6,844 (11.1%)	0.74 (0.66, 0.82)	<.0001
Educational Level				
Didn't graduate high school	771 (6.60%)	4,736 (9.50%)	0.61 (0.53, 0.71)	<.0001
Graduated high school	4,532 (24.9%)	22,065 (26.7%)	0.82 (0.76, 0.88)	<.0001
Some college or technical school	5,891 (32.4%)	27,048 (32.4%)	0.87 (0.82, 0.93)	<.0001
Graduated college or technical school	9,661 (36.1%)	41,065 (31.5%)	REFERENCE	REF.
Income				
Less than $25,000	1,523 (8.40%)	10,203 (11.4%)	0.47 (0.41, 0.54)	<.0001
Between $25,000 to less than $50,000	3,484 (16.8%)	19,286 (20.5%)	0.53 (0.47, 0.59)	<.0001
Between $50,000 to less than $100,000	6,042 (27.4%)	25,987 (25.2%)	0.70 (0.63, 0.77)	<.0001
Between $100,000 to less than $200,000	5,589 (25.6%)	18,584 (19.1%)	0.86 (0.77, 0.96)	.0063
$200,000 and over	1,998 (10.2%)	5,861 (6.50%)	REFERENCE	REF.
Missing	2,269 (11.6%)	15,294 (17.4%)	0.43 (0.38, 0.48)	<.0001
Locale				
Rural	2,122 (4.80%)	12,109 (6.20%)	0.76 (0.69, 0.83)	<.0001
Urban	18,783 (95.3%)	83,106 (93.8%)	REFERENCE	REF.

OR = Prevalence Odds Ratio CI = Confidence Interval p-value = probability value

Table 3: Multivariate Association Between Long COVID, Binge Drinking, and Covariates, Behavioral Risk Factor Surveillance System (BRFSS) 2022

Characteristic	Unadjusted Prevalence Odds Ratio (CI)	Adjusted Prevalence Odds Ratio (CI)
Long COVID		
Yes	0.87 (0.81, 0.94)	0.94 (0.87, 1.0)
No	REFERENCE	REFERENCE
Gender		
Female	0.58 (0.55, 0.62)	0.60 (0.56, 0.64)
Male	REFERENCE	REFERENCE
Age		
18-24	5.60 (4.99, 6.31)	6.52 (5.77, 7.37)
25-34	6.74 (6.03, 7.52)	6.88 (6.15, 7.70)
35-44	4.56 (4.08, 5.11)	4.46 (3.98, 5.01)
45-54	3.45 (3.08, 3.87)	3.25 (2.88, 3.66)
55-64	2.39 (2.39, 2.71)	2.30 (2.03, 2.61)
65+	REFERENCE	REFERENCE
Race		
White only, non-Hispanic	REFERENCE	REFERENCE
Black only, non-Hispanic	0.61 (0.55, 0.68)	0.59 (0.53, 0.66)
Hispanic	1.01 (0.92, 1.10)	0.93 (0.84, 1.02)
Other Race	0.74 (0.66, 0.82)	0.61 (0.55, 0.68)
Educational Level		
Didn't graduate high school	0.61 (0.53, 0.71)	0.78 (0.67, 0.93)
Graduated high school	0.82 (0.76, 0.88)	0.87 (0.80, 0.95)
Some college or technical school	0.87 (0.82, 0.93)	0.96 (0.89, 1.04)
Graduated college or technical school	REFERENCE	REFERENCE
Income		
Less than $25,000	0.47 (0.41, 0.54)	0.57 (0.49, 0.66)
Between $25,000 to less than $50,000	0.53 (0.47, 0.59)	0.56 (0.49, 0.63)
Between $50,000 to less than $100,000	0.70 (0.63, 0.77)	0.69 (0.62, 0.77)
Between $100,000 to less than $200,000	0.86 (0.77, 0.96)	0.84 (0.75, 0.94)
$200,000 and over	REFERENCE	REFERENCE
Missing	0.43 (0.38, 0.48)	0.45 (0.39, 0.51)
Locale		
Rural	0.76 (0.69, 0.83)	0.86 (0.78, 0.94)
Urban	REFERENCE	REFERENCE

CI = Confidence Interval