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Changes in substance use among young adults during a respiratory disease pandemic

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Abstract

Background: News articles, commentaries, and opinion articles have suggested that ongoing social distancing measures coupled with economic challenges during COVID-19 may worsen stress, affective state, and substance use across the globe. We sought to advance our understanding of the differences between individuals who change their substance use patterns during a public health crisis and those who do not.

Methods: Cross-sectional survey of young adults (18–25 years of age) assessing respondent characteristics and vaping, tobacco, alcohol, and/or marijuana use. We calculated prevalence estimates, prevalence changes, and prevalence ratios with associated 95% confidence intervals and looked for differences with the chi-square test.

Results: Of the total sample, 53.2% ($n = 542/1018$) young adults reported vaping or using tobacco, alcohol, and/or marijuana. Among the 542 respondents reporting use, 34.3% reported a change in their use patterns. Among respondents reporting changes in substance use patterns during the pandemic ($n = 186$), 68.8% reported an increase in alcohol use, 44.0% reported a decrease in vaping product use, and 47.3% reported a decrease in tobacco product use due to COVID-19. Substance use changed significantly for respondents with increasing degree of loneliness (continuous loneliness score: prevalence ratio = 1.12, 95% confidence interval = 1.01–1.25), anxiety (prevalence ratio = 1.45, 95% confidence interval = 1.14–1.85), and depression (prevalence ratio = 1.44, 95% confidence interval = 1.13–1.82).

Conclusion: Self-reported substance use among young adults was observed to change during a pandemic, and the degree of loneliness appears to impact these changes. Innovative strategies are needed to address loneliness, anxiety, depression, and substance use during global health crises that impact social contact.

Keywords

COVID-19, pandemic, anxiety, depression, loneliness, substance use

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Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS CoV-2), the virus that causes COVID-19, has caused a significant health crisis around the world.[1] Threat related to the COVID-19 pandemic is not limited to contracting illness itself, but also includes threat to individual social, mental, and financial well-being. To prevent the spread of the virus, the government has implemented social distancing measures including stay-at-home orders limiting individuals' ability to engage in their usual routines.[2] This extended state of uncertainty and social distancing can be particularly troubling for individuals with psychosocial and psychological vulnerability, such as those with anxiety, depression, or those who experience loneliness.[3]

Prolonged uncertainty and unpredictability pose a risk for persistent internal homeostatic dysregulation increasing the risk of maladaptive behaviors such as substance use.[4] Anxiety, loneliness, and negative affect triggered by social

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strain function as independent and interactive risk factors for substance use.[5,6] Scientists have observed changes in the use of substances during large scale, traumatic events such as increased cigarette and alcohol use in adults following hurricane Katrina compared to pre-Hurricane prevalence.[7] Similarly, it was observed that utilization of cigarettes, alcohol, or cannabis increased among New York City residents, especially who experienced symptoms of post-traumatic stress disorder and depression, following the September 11 terrorist attacks.[8] However, studies tracking substance use in young adults during an ongoing major respiratory threat and large-scale traumatic events are lacking.

This study assessed the self-reported changes in substance use among a young adult population during an ongoing respiratory disease pandemic with imposed social distancing. We assessed differences between individuals who reported changes in substance use and those who did not in domains of demographic characteristics, self-reported anxiety, depression, loneliness, and substance use and direction of change.

Method

We developed a survey tool (survey tool is provided as Supplemental Appendix) to understand the prevalence of substance use within a young adult population in a large, mixed urban/rural Midwestern setting. Patients were included in this study if they had been seen at one of our outpatient practice settings over the prior 4.2 months, were between the ages of 18 and 25 years as of 24 January 2020, and had a documented email address. The patients included were seen for any indication including, but not limited to, substance use. We did not have any specific exclusion criteria. Based on recent analysis of National Health Interview Survey (NHIS) data, the percentage of persons aged 18–24 years, who reported using e-cigarettes at least once during their lifetime and now used "every day" or "some days," was 7.6%.[9] Since the original intent of this study was to characterize electronic vaping product (EVP) use in an outpatient setting, we wanted to have a meaningful sample size such as of 1000 subjects, therefore, we deployed the survey to 6119 patients.

An electronic survey tool was deployed via Qualtrics® survey software (Provo, UT). Mayo Survey Research center, who deployed the survey, has the proper arrangements both internally (with our institutional review board (IRB) and in compliance with HIPAA) and with Qualtrics® to be used for clinical research. In the month of March 2020, due to COVID-19, local and state government officials implemented stay-at-home guidelines and encouraged social distancing between individuals. The orders were further extended to the month of April and May. Our survey was administered in April 2020 during the time of this stay-at-home order. All survey responses were anonymous to the research team. The study was approved by IRB at Mayo Clinic through expedited review procedures and determined that the study constitutes minimal risk.

Measures

Due to the timing of our survey launch with the COVID-19 pandemic, we included one additional question to assess "Do you think your use of electronic vaping products, tobacco products, alcohol, or marijuana (any of these) changed (increased or decreased) since Coronavirus (COVID-19) outbreak?" If individuals answered "Yes," we then provided subsequent questions to assess the directionality of change of each product type as: "Which of the following products and to what direction this change happened?" with the response option of "Increase / Decrease" for each substance type. Our survey instrument also included demographic information (age, gender, educational status) and requested each respondent to answer "Have you ever been told by a healthcare provider that you have [anxiety; depression]?" These factors were used in the present analysis. We assessed the presence of loneliness through the validated three-item University of California, Los Angeles (UCLA) Loneliness Scale.[10] We present both continuous loneliness scores (range, 3–9) as a sum of individually answered questions, as well as a dichotomized loneliness variable where the continuous loneliness score was greater or equal to 6, similar to other reports.[11] The higher UCLA Loneliness Scale scores indicate greater degrees of loneliness.[10]

Statistical analyses

We focused our analyses on the differences between individuals who changed substance use patterns and those who did not. We present frequencies and simple proportions (%), and due to the cross-sectional nature of our study, we have calculated prevalence estimates, prevalence changes, and prevalence ratios (PRs) with associated 95% confidence intervals (CIs). Analyses were done via chi-square test unless test assumptions were unmet, whereby Fisher's exact test was performed. We used Statistical Analysis Software (SAS) Version 9.2 (Cary, North Carolina), and employed a $p < 0.05$ for significance for statistical testing and considered our PR significant if they did not span the null.

Results

Our overall survey had a response rate of 16.6% (1018 patients of 6119), 53.2% (542 patients of 1018) of whom reported vaping or using marijuana, tobacco, and/or alcohol during the COVID-19 pandemic. Of the 542 individuals using substances who reported current use of one of our substances of interest, 186 reported a change in their substance use patterns (34.3%; 186/542; Table 1). Overall, 18.3% (186 patients of 1018) of the population used substances of interest and changed use patterns. Compared to individuals not reporting a change in substance use, individuals reporting a change in substance use were younger ($p = 0.0053$), had more self-reported anxiety ($p = 0.0045$), had more self-reported

Table 1. Demographics, anxiety, depression, loneliness, and substance use change among substance[a] using young adult population during COVID-19.

	No change in substance use ($n = 356$)	Change in substance use ($n = 186$)	Total ($N = 542$)	p-value[b]
Age				0.0053[c]
• Mean (SD)	22.2 (2.1)	21.6 (2.2)	22.0 (2.1)	
• Median	22.0	21.0	22.0	
• Q1, Q3	21.0, 24.0	20.0, 24.0	20.0, 24.0	
• Range	(18.0–25.0)	(18.0–25.0)	(18.0–25.0)	
Gender				0.2916
• Female	291 (81.7%)	145 (78.0%)	436 (80.4%)	
• Male	65 (18.3%)	41 (22.0%)	106 (19.6%)	
Education				0.6562
• Missing	1	0	1	
• Associate	35 (9.9%)	18 (9.7%)	53 (9.8%)	
• Bachelor's	123 (34.6%)	58 (31.2%)	181 (33.5%)	
• High school	92 (25.9%)	47 (25.3%)	139 (25.7%)	
• Master's	3 (0.8%)	4 (2.2%)	7 (1.3%)	
• Some college	102 (28.7%)	59 (31.7%)	161 (29.8%)	
Self-reported anxiety disorder				0.0045[c]
• Yes	161 (45.2%)	108 (58.1%)	269 (49.6%)	
• No	195 (54.8%)	78 (41.9%)	273 (50.4%)	
Self-reported depression				0.0018[c]
• Yes	149 (41.9%)	104 (55.9%)	253 (46.7%)	
• No	207 (58.1%)	82 (44.1%)	289 (53.3%)	
UCLA Loneliness Scale				0.0812
1. How often do you feel that you lack companionship?				
• Hardly ever	201 (56.5%)	93 (50.0%)	294 (54.2%)	
• Some of the time	133 (37.4%)	72 (38.7%)	205 (37.8%)	
• Often	22 (6.2%)	21 (11.3%)	43 (7.9%)	
How often do you feel left out?				0.2051
• Hardly ever	168 (47.2%)	73 (39.2%)	241 (44.5%)	
• Some of the time	163 (45.8%)	97 (52.2%)	260 (48.0%)	
• Often	25 (7.0%)	16 (8.6%)	41 (7.6%)	
How often do you feel isolated from others?				0.2679
• Missing	2	0	2	
• Hardly ever	178 (50.3%)	80 (43.0%)	258 (47.8%)	
• Some of the time	143 (40.4%)	85 (45.7%)	228 (42.2%)	
• Often	33 (9.3%)	21 (11.3%)	54 (10.0%)	
UCLA score				0.0301[c]
• N	354	186	540	
• Mean (SD)	4.7 (1.6)	5.0 (1.7)	4.8 (1.6)	
• Median	4.0	5.0	5.0	
• Q1, Q3	3.0, 6.0	3.0, 6.0	3.0, 6.0	
• Range	(3.0–9.0)	(3.0–9.0)	(3.0–9.0)	
Vaping product change		134 (72.0%)	134 (24.7%)	
• Missing	356	52	408	
• Increase	0 (0.0%)	52 (27.9%)	52 (9.6%)	
• Decrease	0 (0.0%)	82 (44.0%)	82 (15.1%	
Marijuana change		140 (75.2%)	140 (25.8%)	
• Missing	356	46	402	
• Increase	0 (0.0%)	73 (39.2%)	73 (13.4%)	
• Decrease	0 (0.0%)	67 (36.0%)	67 (12.3%)	
Tobacco change		133 (71.5%)	133 (24.5%)	
• Missing	356	53	409	
• Increase	0 (0.0%)	45 (24.1%)	45 (8.3%)	
• Decrease	0 (0.0%)	88 (47.3%)	88 (16.2%)	

(Continued)

Table 1. (Continued)

	No change in substance use ($n=356$)	Change in substance use ($n=186$)	Total ($N=542$)	p-value[b]
Alcohol change		171 (91.9%)	171 (31.5%)	
• Missing	356	15	371	
• Increase	0 (0.0%)	128 (68.8%)	128 (23.6%)	
• Decrease	0 (0.0%)	43 (23.1%)	43 (7.9%)	

UCLA: University of California, Los Angeles.
[a]Use of EVP (or electronic vaping product), marijuana, tobacco, and alcohol.
[b]Chi-square test.
[c]Statistically significant p-value.

depression ($p=0.0018$), and were lonelier ($p=0.0301$). The proportion of people reporting a change in substance use significantly increased for those patients reporting increasing degrees of loneliness (continuous score PR = 1.12, 95% CI = 1.01–1.25), anxiety (PR = 1.45, 95% CI = 1.14–1.85), and depression (PR = 1.44, 95% CI = 1.13–1.82).

Among participants reporting substance use change, we observed the largest reported change in directionality among those who used alcohol (68.8% increase). Participants reported decreased usage among inhaled substances (vaping product 44.0% decrease; tobacco product 47.3% decrease), and a split in reported changes by marijuana using participants (39.2% increase, 36.0% decrease). When analyzing within substance type groups (electronic vaping, marijuana, tobacco product, alcohol), we did not observe significant differences by report of loneliness, anxiety, or depression for changes in substance use direction (increased vs decreased usage).

Discussion

We observed that, overall, less than one in five respondents used substances of interest and changed their use patterns during the respiratory disease pandemic. More than 50% of respondents reported vaping or using marijuana, tobacco, and/or alcohol. We observed that 34.3% of respondents who used substances of interest reported a change in their substance use patterns during the COVID-19 pandemic, with the highest proportion of respondents reporting a change in the amount of inhaled substances (decrease) and alcohol (increase) they used. We also observed that the proportion of respondents reporting a change in their substance use patterns differed by age, self-reported anxiety and depression, and degrees of loneliness.

We observed that respondents who reported a change in their substance use patterns reported decreased use of inhaled substances. Since COVID-19 is a respiratory illness, and media coverage has disseminated information about the severe manifestation of this virus on the lungs, especially among those who smoke and vape, young adults may be exhibiting increased caution about using combustible forms of substances. This notion is supported by Rohde and colleagues who surveyed adult tobacco smokers and found that respiratory harm health consequence was a major reason for vaping discouragement.[12] Conversely, we observed reported increased use of alcohol. Studies have shown that young adults often indulge in drinking behavior not only for celebration but also to cope with aversive mood states, which prolongs or worsens negative affective states and further drinking.[13] The increase in alcohol use by young adults could be related to an attempt to alleviate negative affective states triggered by social strain, as we observed change in substance use tied to increasing degree of loneliness in our population.

In a recent study, it was projected that prolonged or intermittent social distancing measures need to be practiced until 2022 to prevent the resurgence of COVID-19.[14] If social distancing is to continue until 2022 or we are at risk of future pandemics then nontraditional socialization opportunities for people with poor emotional health and loneliness to mitigate social strain are essential. Social isolation may also affect patient's access to treatment, therefore, multidisciplinary and integrated treatment delivery approaches utilizing digital platform and technology are required to better serve patients with poor mental health.

Our study has limitations including a reliance on self-reported data and potential for recall bias and we did not assess amount of change. We suffered from low response rate (16.6%), lower than other surveys of the same population.[15] Research has shown that young adults may be less likely to participate in research studies, and studies of self-reported risky behaviors such as substance use can struggle to enroll.[16] Our study is limited because apart from the loneliness scale, no other survey components were validated. Our study also had several strengths, including the timing of our study during the COVID-19 pandemic, and the use of a validated measure of loneliness.

Conclusion

We need to advance our understanding of how best to support individuals with anxiety, depression, and loneliness during times of social distancing measures. Our data emphasize the importance of advancing our understanding of how substance use changes with pandemics and what infrastructure

could be built leveraging technology to provide assessment and support to patients with mental health concerns and substance use.

Author contributions

All authors have contributed substantially to the manuscript.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

Ethical approval for this study was obtained from Mayo Clinic Institutional Review Board (Approval number/MSR #: 0000 -123039-H01).

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Informed consent

The IRB Reviewer approved waiver of the requirement for the Investigator to obtain a signed consent form in accordance with 45 CFR 46.117 as justified by the Investigator.

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Supplemental material

Supplemental material for this article is available online.

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