

MICHIGAN BRFSS SURVEILLANCE BRIEF



A newsletter from the Lifecourse Epidemiology & Genomics Division, MDHHS

Vol. 14 No. 1

July 2023

Electronic Cigarette Use and Mental Health among Michigan Adults, 2021

In 2021, one in every 13 Michigan adults reported currently using electronic cigarettes (e-cigarettes) or other electronic vaping products. Using data from the 2021 Michigan Behavioral Risk Factor Survey (MiBRFS), this surveillance brief examines the prevalence of current e-cigarette use by demographic characteristics among Michigan adults. Additionally, this brief assesses the relationship between current e-cigarette use and mental health outcomes, overall and by race/ethnicity, adjusting for demographics.

Background

Although commercial cigarette smoking among U.S. adults has declined during the last decades¹⁻², a diverse landscape of new commercial tobacco products has emerged and tobacco product use remains the leading cause of preventable disease and death in the U.S.; some populations continue to be disproportionately affected by tobacco use¹⁻². E-cigarettes were introduced into the U.S. over a decade ago and have grown in popularity. E-cigarettes deliver nicotine to users through an inhaled aerosol. This aerosol can contain harmful substances³.

Mental illnesses are among the most common health conditions in the U.S. and more than one in five U.S. adults live with a mental illness⁴. A review found that adolescents (10-21 years) who use e-cigarette are more likely to have a mental health problem such as depression and suicidal ideation⁵. One cross-sectional study also observed that e-cigarette users had higher odds of reporting a history of clinical diagnosis of depression compared with participants who never used e-cigarettes⁶.

Methods

The MiBRFSS is a telephone-based health survey of adult Michigan residents that provides statewide prevalence of chronic health conditions, health-related behaviors, medical conditions, and preventive health care practices. The Michigan BRFSS provides cross-sectional data, and a temporal relationship cannot be established. To improve the generalizability of the data, making it possible to draw conclusions about the health of Michiganders, CDC weighted survey data using iterative proportional fitting, also known as raking, to account for demographic differences between the survey sample and Michigan's population.

What is the Michigan Behavioral Risk Factor Surveillance System (MiBRFSS)?

The MiBRFSS comprises annual, statewide telephone surveys of Michigan adults aged 18 years and older and is part of the national BRFSS coordinated by the Centers for Disease Control and Prevention (CDC).

The MiBRFSS follows the CDC BRFSS protocol and use the standardized English core questionnaire that focuses on various health behaviors, medical conditions, and preventive health care practices related to the leading causes of mortality, morbidity, and disability. Landline and cell phone interviews are conducted across each calendar year.

Data are weighted to adjust for the probabilities of selection and a raking weighting factor is used to adjust for the distribution of the Michigan adult population based on eight demographic variables.

All analyses are performed using SAS-callable SUDAAN® to account for the complex sampling design.

One question on e-cigarette use was included in the 2021 MiBRFS. The question was, “Do you now use e-cigarettes or other electronic vaping products every day, some days or not at all?” For this analysis, respondents who answered “Every day” or “Some days” to the above question were classified as current e-cigarette use. Respondents who answered “Not at all” or “Never smoked e-cigarettes” to the above question were classified as not current e-cigarette use.

This study used two mental health outcomes in the 2021 MiBRFS. Subjective poor mental health was defined based on respondents who reported 14 or more days of poor mental health, which includes stress, depression, and problems with emotions, during the past 30 days. Clinical diagnosis of depression was defined according to respondents who reported ever being told by a doctor, nurse, or other health professional that they ever had a depressive disorder including depression, major depression, dysthymia, or minor depression.

The prevalence of current e-cigarette use and each mental health outcome among Michigan adults was assessed by age, gender, race/ethnicity, education, household income, marital status, employment status, cigarette use and heavy alcohol use. Weighted logistic regression models were utilized to assess the relationship between current e-cigarette use and mental health outcomes, overall and by race/ethnicity, controlling for demographics. All analyses accounted for the complex sample design.

Results

Prevalence of Current E-Cigarette Use

Based on 2021 MiBRFS data, an estimated one in 13 (7.6%) Michigan adults reported currently using e-cigarettes or other electronic vaping products (Table 1).

- The prevalence of current e-cigarette use was similar across gender.
- Young adults were more likely to report current e-cigarette use (14.1% for adults aged 18-44 years old and 3.3% for adults aged 45-64 years old) than adults aged 65 years and older (1.4%).
- The prevalence of current e-cigarette use was significantly higher among adults with high school graduate or less education (10.1%) than those with some college or more education (6.0%).
- The prevalence of current e-cigarette use decreased with increasing household income (8.2% for household income less than \$20,000, 8.7% for \$20,000-74,999, and 5.7% for \$75,000 or above).
- Uninsured adults reported current e-cigarette use more frequently (16.2%) than insured adults (6.8%).
- Non-married adults were more likely to currently use e-cigarettes than married adults (11.6% vs. 3.5%, respectively). Compared to adults who never smoked cigarettes (4.2%), adults who currently smoked cigarettes reported significantly higher rate of current e-cigarette use (14.9%).
- Adults who had heavy alcohol use reported current e-cigarette use more frequently (12.8%) than adults who did not use heavy alcohol (7.2%).

Prevalence of Mental Health Outcomes

In 2021, an estimated 15.6% Michigan adults reported 14 or more days of poor mental health, which includes stress, depression, and problems with emotions, during the past 30 days (Table 1).

- An estimated 23% of adults reported ever being told by a doctor, nurse, or other health professional that they ever had a depressive disorder including depression, major depression, dysthymia, or minor depression.
- The prevalence of poor mental health and clinical diagnosis of depression was significantly higher among younger adults, female, adults with high school graduate or less education, adults with lower household income, uninsured adults, non-married adults, unemployed adults, and adults who currently smoked cigarettes.

Table 1. The Prevalence of Current E-Cigarette Use and Mental Health by Demographics, MiBRFS 2021

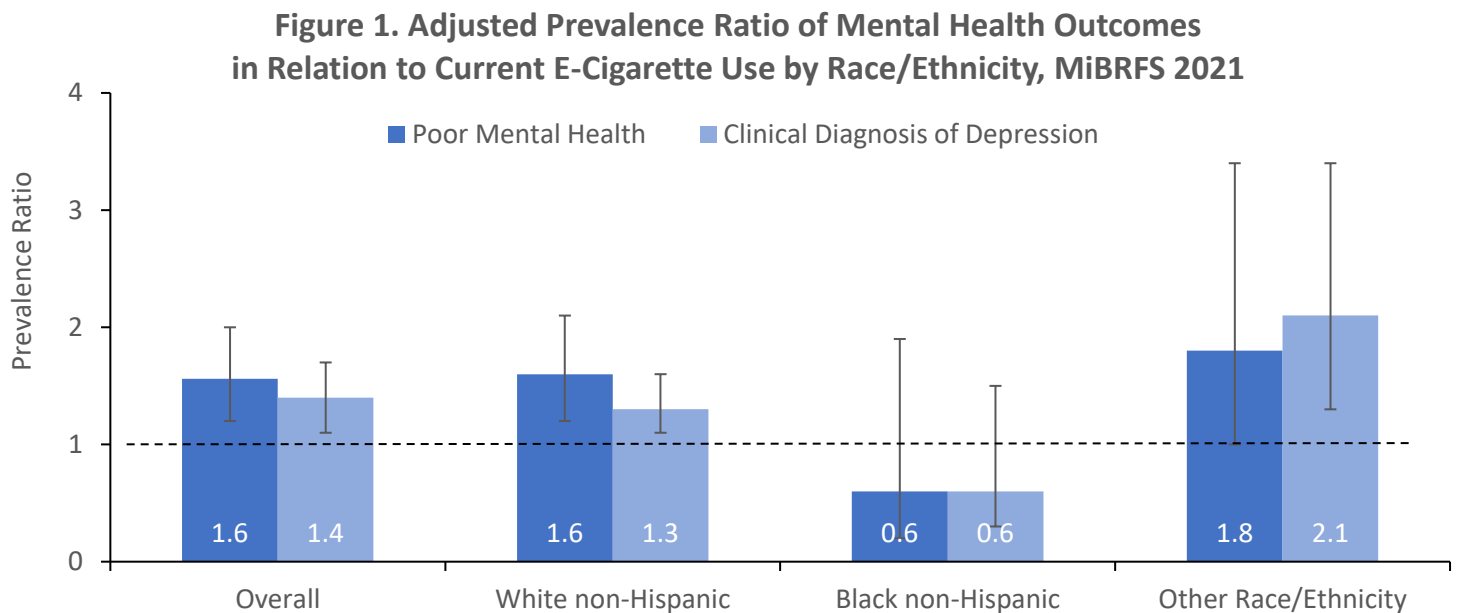
	Current e-Cigarette User		Poor Mental Health		Clinical Diagnosis of Depression	
	%	95% CI	%	95% CI	%	95% CI
Statewide	7.6	(6.8-8.5)	15.6	(14.6-16.7)	23.0	(21.9-24.3)
Age						
18-44	14.1	(12.5-16.0)	20.8	(18.9-22.9)	28.8	(26.7-31.1)
45-64	3.3	(2.7-4.2)	14.6	(13.1-16.1)	21.0	(19.3-22.7)
65+	1.4	(1.0-2.1)	7.8	(6.6-9.2)	15.4	(13.9-17.1)
Gender						
Male	8.5	(7.3-9.8)	12.1	(10.7-13.6)	16.6	(15.1-18.2)
Female	6.7	(5.6-7.9)	19.0	(17.5-20.6)	29.1	(27.4-30.9)
Race/Ethnicity						
White non-Hispanic	7.1	(6.2-8.0)	15.4	(14.3-16.6)	24.2	(22.8-25.6)
Black non-Hispanic	6.7	(4.7-9.4)	15.3	(12.6-18.6)	17.5	(14.5-21.1)
Other	11.7	(8.6-15.6)	17.4	(13.9-21.6)	21.7	(18.1-25.9)
Education						
High school diploma or less	10.1	(8.6-11.9)	18.6	(16.7-20.7)	25.2	(23.1-27.5)
Some college or more	6.0	(5.2-7.0)	13.9	(12.8-15.1)	21.7	(20.4-23.1)
Household Income						
< \$20,000	8.2	(5.8-11.4)	27.0	(23.0-31.4)	35.7	(31.1-40.4)
\$20,000 - \$74,999	8.7	(7.5-10.2)	16.9	(15.3-18.7)	25.2	(23.3-27.1)
≥\$75,000	5.7	(4.4-7.2)	10.8	(9.3-12.6)	17.9	(16.1-19.9)
Health Insurance						
Insured	6.8	(6.0-7.7)	15.2	(14.2-16.3)	23.4	(22.2-24.7)
Uninsured	16.2	(11.5-22.4)	24.3	(18.8-30.8)	24.1	(18.4-30.8)
Marital Status						
Married	3.5	(2.8-4.4)	11.0	(9.7-12.3)	18.4	(16.9-19.9)
Non-Married	11.6	(10.2-13.2)	20.4	(18.8-22.1)	27.9	(26.1-29.8)
Employment status						
Employed	9.1	(7.9-10.4)	13.9	(12.5-15.3)	20.2	(18.7-21.8)
Unemployed	10.8	(7.8-14.6)	27.5	(22.9-32.7)	33.3	(28.2-38.7)
Non-working	4.7	(3.8-6.0)	15.8	(14.2-17.5)	25.4	(23.5-27.3)
Cigarette smoking						
Current smoking	14.9	(12.5-17.8)	25.6	(22.6-28.9)	33.8	(30.5-37.3)
Former smoking	9.8	(8.1-11.7)	16.0	(14.0-18.2)	22.9	(20.8-25.2)
Never smoking	4.2	(3.4-5.3)	12.6	(11.4-13.9)	19.9	(18.4-21.4)
Heavy alcohol use						
No	7.2	(6.4-8.1)	15.2	(14.2-16.3)	22.8	(21.6-24.1)
Yes	12.8	(9.5-17.0)	22.8	(17.8-28.8)	26.3	(21.4-31.8)

95% CI = 95% Confidence Interval.

Data Source: Michigan Behavioral Risk Factor Surveillance System, 2021.

Current E-Cigarette Use and Mental Health Outcomes

Figure 1 displays the adjusted prevalence ratio of mental health outcomes in relation to current e-cigarette use by race/ethnicity among Michigan adults. Overall, these results indicated the significant associations between current e-cigarette use and mental health outcomes. Compared to adults currently not using e-cigarettes, current e-cigarette users had significantly higher adjusted prevalence ratio [95% confidence interval] for poor mental health (1.6 [1.2-2.0]) and depressive disorders (1.4 [1.1-1.7]), adjusting for age, gender, race/ethnicity, education, household income, marital status, employment status, cigarette use, and heavy alcohol use (Figure 1). After stratifying by race/ethnicity, these significant associations remained among white, non-Hispanic adults and other race/ethnicity adults. Among white, non-Hispanic adults, current e-cigarette users were 1.6-fold [1.2-2.1] more likely to report poor mental health and 1.3-fold [1.1-1.6] more likely to report depressive disorders, compared with those currently not using e-cigarettes. Among other, non-Hispanic adults, current e-cigarette users had 1.8-fold [1.0-3.4] higher prevalence of reporting poor mental health and 2.1-fold [1.3-3.4] higher prevalence of reporting depressive disorders, compared with those currently not using e-cigarettes.



Error bars represent 95% confidence intervals. Reference line represents prevalence ratio=1.0.

Data Source: Michigan Behavioral Risk Factor Surveillance System, 2021.

Discussions

E-cigarette use can undermine social norms about tobacco, delay cessation among cigarette smokers, and increase the risk of ever using combustible tobacco cigarettes among youth and young adults⁷. Evidence-based efforts for reducing the major public health harms and burden of tobacco products include individual treatments, health care provider training and policy adoptions⁸. Ongoing monitoring of commercial tobacco product use and tailored strategies and policies to be more culturally responsive to reduce the effects of inequitable conditions could help in reducing disparities in tobacco use⁹.

Conclusions

The prevalence of e-cigarette use was higher among adults who are young, with low educational level, uninsured, non-married, currently smoking cigarettes, and heavily using alcohol. The brief suggested Michigan adults currently using e-cigarettes reported significantly higher rates of poor mental health and depressive disorders than those currently not using e-cigarettes. Michigan BRFSS data demonstrate correlation, but not causation. More policies and programs are needed to address the burden of poor mental health among Michigan adults using e-cigarettes.

Recommendations

A comprehensive effort is warranted to achieve equity toward reducing adult tobacco use with attention to all subgroups, including smokers with poor mental health. Continued improvement in integration of smoking cessation interventions into mental health treatment facilities, equitable implementation of comprehensive commercial tobacco control policies, and population-specific approaches could reduce cigarette smoking among adults with mental health conditions.

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Suggested citation: Tian Y, Shamo F, Kleyn M. Electronic Cigarette Use and Mental Health Outcomes among Michigan Adults, 2021. Michigan BRFSS Surveillance Brief. Vol. 14, No. 1. Lansing, MI: Michigan Department of Health and Human Services, Lifecourse Epidemiology and Genomics Division, July 2023.