

Background

- E-cigarettes have become a public health concern related to tobacco use, with 1 in 10 U.S. middle and high school students have used e-cigarettes in the past 30 days (Cooper et al., 2022).
- The prevalence of e-cigarette use among adults in the U.S. increased from 4.4% in 2017 to 5.4% in 2018.
- An estimated 11 million people used e-cigarettes in 2017, and 13.7 million in 2018 (Obeissan et al., 2020).
- Nicotine in vape is a major inhibitor of cytodifferentiation and mineralization of dental pulp.
- Toxic aerosols in cigarettes cause cytotoxicity to the oral epithelium and increase oxidative stress of molecular functions (Ji et al., 2016).
- Black mouth and dry mouth have been reported among E-cigarette users based on a survey of 11 countries (Alhajj et al., 2022).

Objective

To examine the association of e-cigarettes, use with dental visits, and self-perceived oral health status (SPOH) among adults using nationally representative personal-level data.

Methods

Study design: This cross-sectional study utilized data from the National Health and Nutrition Examination Survey from 2013 to 2018.

Dependent Variables: Dental visits and SPOH.

Independent Variable: Vaping status, age, gender, race/ethnicity, marital status, education status, poverty status, insurance type, the reason for last dental visit, and routine places for healthcare

Statistical analysis: Multivariate logistic regression analysis. The statistical significance level was set at 0.05. Statistical analysis was performed using Stata Version 16 (StataCorp)

Association of vaping status with last dental visit in more than 12 months, NHANES 2013-18

Characteristics	Adjusted Odds Ratio (95% C.I.)	P-Value
Vaping status		
People who do not vape	Reference	-
People who vape	1.22 (1.05, 1.43)	<0.05
Age Group		
Age 18-24 Years	Reference	-
Age 25-44 Years	1.50 (1.17, 1.94)	<0.05
Age 45-64 Years	1.19 (0.90, 1.57)	0.22
Gender		
Male	Reference	-
Female	0.78 (0.68, 0.90)	<0.05
Race-Ethnicity		
Non-Hispanic White	Reference	-
Non-Hispanic Black	0.97 (0.80, 1.17)	0.71
Hispanic	0.92 (0.78, 1.10)	0.36
Non-Hispanic Asian	0.93 (0.74, 1.17)	0.51
Other race/ Multiracial	0.89 (0.62, 1.29)	0.53
Marital Status		
Married	Reference	-
Never married	1.24 (0.98, 1.57)	0.07
Living with Partner	1.70 (1.35, 2.14)	<0.05
Widowed/Separated/Divorced	1.55 (1.27, 1.89)	<0.05
Education Status		
College Graduate or Above	Reference	-
Less than High School	1.78 (1.36, 2.33)	<0.05
HS Graduate/GED Or Equivalent	1.70 (1.28, 2.26)	<0.05
Some college or AA Degree	1.60 (1.34, 1.91)	<0.05
Poverty Status		
Above FPG	Reference	-
Below FPG	1.12 (0.90, 1.39)	0.3
Insurance Type		
Private Insurance	Reference	-
Medicare with Medigap	2.17 (1.35, 3.47)	<0.05
Medicaid	1.21 (0.96, 1.53)	<0.05
Other	1.35 (1.07, 1.72)	<0.05
No Insurance	1.77 (1.39, 2.27)	<0.05
Reason for Last Dental Visit		
Non-Routine visit	Reference	-
Routine Visit	0.27 (0.24, 0.31)	<0.05
Routine places for HC		
Has Routine Place for HC	Reference	-
No Place for HC	1.14 (0.96, 1.35)	<0.05

Association of vaping status with fair/poor self-perceived oral health status, NHANES 2013-18

Characteristics	Adjusted Odds Ratio (95% C.I.)	P-Value
Vaping status		
People who do not vape	Reference	-
People who vape	1.48 (1.25, 1.75)	<0.05
Age Group		
Age 18-24 Years	Reference	-
Age 25-44 Years	2.51 (1.79, 3.52)	<0.05
Age 45-64 Years	2.84 (1.99, 4.05)	<0.05
Gender		
Male	Reference	-
Female	0.96 (0.82, 1.11)	0.55
Race-Ethnicity		
Non-Hispanic White	Reference	-
Non-Hispanic Black	1.17 (1.02, 1.33)	<0.05
Hispanic	1.31 (1.12, 1.53)	<0.05
Non-Hispanic Asian	1.22 (0.96, 1.57)	0.11
Other race/ Multiracial	1.06 (0.65, 1.72)	0.81
Marital Status		
Married	Reference	-
Never married	1.02 (0.84, 1.23)	0.87
Living with Partner	1.11 (0.83, 1.49)	0.49
Widowed/Separated/Divorced	1.08 (0.88, 1.34)	0.44
Education Status		
College Graduate or Above	Reference	-
Less than High School	4.90 (3.79, 6.33)	<0.05
HS Graduate/GED Or Equivalent	2.94 (2.35, 3.67)	<0.05
Some college or AA Degree	2.35 (1.99, 2.78)	<0.05
Poverty Status		
Above FPG	Reference	-
Below FPG	1.34 (1.09, 1.63)	<0.05
Insurance Type		
Private Insurance	Reference	-
Medicare with Medigap	2.91 (1.84, 4.59)	<0.05
Medicaid	1.80 (1.39, 2.33)	<0.05
Other	1.35 (1.07, 1.72)	<0.05
No Insurance	1.77 (1.39, 2.27)	<0.05
Reason for Last Dental Visit		
Non-Routine visit	Reference	-
Routine Visit	0.27 (0.24, 0.31)	<0.05
Routine places for HC		
Has Routine Place for HC	Reference	-
No Place for HC	1.14 (0.96, 1.35)	<0.05

Results

- The study population consisted of 7,599 participants, of which 26% have used e-cigarettes.
- More than half of e-cigarette users did not visit a dentist in the past 12 months, and about 36% perceived their oral health status as fair or poor.
- Interestingly, people from the 25–44-year age group had consistently higher odds of last dental visits in more than 12 months and reported fair/poor oral health status.
- E-cigarette users had significantly higher odds (22%) of dental visits more than last 12 months ago than participants who do not vape.
- E-cigarette users had a 48% higher odds ratio of having fair/poor oral health status than people who do not vape.
- Compared to non-Hispanic whites, Hispanics and non-Hispanic blacks had significantly higher odds of reporting fair/poor oral health status.

Discussion

Our study showed that participants who had used e-cigarette products had increased odds of not having a dental visit for more than a year and were also fair to poor oral health status(self-perceived). There also could be a behavioral component that may need to be assessed

Conclusion

This study provides evidence of a concerning association between vaping and poor hygiene perception, specifically the individuals who reported vaping. Surprisingly, more than half of the people who vape did not visit a dentist in over one year, which indicates that focused policy and health promotion interventions should be planned. Like smoking cessation, vaping cessation should be motivated, and the 5 'A' model could be applied to this population. There is a need for further research into potential oral health risks associated with e-cigarettes.