Short communication

Associations of demographic and tobacco use characteristics with young adults' self-reported clinical encounters: Implications for cessation efforts

Melissa Mercincavage [a,b,*], Catherine Chen [a], Isabel Trenholm [a], Nishi J. Gonsalves [b], William J. Young [b], Michelle T. Bover Manderski [b,c], Manish S. Patel [a], Mary K. O'Connor [a], Daniel Gundersen [a,b], Cristine D. Delnevo [b], Michael B. Steinberg [a,b]

[a] *Division of General Internal Medicine, Department of Medicine, Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ, United States*
[b] *Rutgers Institute for Nicotine & Tobacco Studies, New Brunswick, NJ, United States*
[c] *Department of Biostatistics and Epidemiology, Rutgers School of Public Health, Piscataway, NJ, United States*

ARTICLE INFO

ABSTRACT

Introduction: Accelerating smoking cessation, particularly among young adults, is a national priority for decreasing tobacco-related disease. Healthcare providers play a critical role in delivering tobacco treatment interventions to this population. This study examined associations of demographic and tobacco use characteristics with young adults' self-reported past-year clinical encounters to identify opportunities to facilitate cessation.

Methods: We conducted cross-sectional, secondary analyses on a sample of 831 young adults aged 18–34 participating in the first wave of the National Young Adult Health Survey (NYAHS 2018–2019). Demographic and tobacco use characteristics were participants' sex, age, race, current cigarette use, and current other tobacco use. Clinical encounter outcomes were past-year self-report of (1) seeing a clinician, (2) being asked about tobacco use, and among those currently smoking, (3) being advised to quit smoking.

Results: After adjustment for covariates, women (vs. men) had 2.16 times greater odds of reporting seeing a clinician, while Non-White (vs. White) young adults and those currently (vs. never) smoking had 69% and 47% lower odds. Women and those currently smoking had 2.98 and 2.66 times greater odds, respectively, of being asked about tobacco use. Among those who currently smoked, being not confident (vs. confident) about quitting smoking was associated with 69% lower odds of being advised to quit; those who reported moderate (vs. low) nicotine dependence had 3.11 times higher odds of being advised to quit.

Conclusions: Sex, racial, and smoking status differences in young adults' clinical encounter outcomes suggest multiple opportunities for future smoking prevention and cessation intervention efforts.

1. Introduction

Although rates of combustible cigarette use in the United States (U. S.) reached a historic low of 11.5 % in 2021, (Cornelius et al., 2023) smoking remains the leading cause of preventable death (U.S. Department of Health and Human Services, 2014). Smoking cessation remains a national priority to further reduce tobacco-related morbidity and mortality (Office of the Assistant Secretary for Health, 2023). Young adults have embraced other, potentially less harmful, methods of consuming nicotine such as electronic cigarettes and nicotine pouches (Cornelius et al., 2023; Cornacchione Ross et al., 2024). Yet smoking

prevalence among young adults remains similar to the national average, (Cornelius et al., 2023) with many individuals initiating cigarette use during early adulthood rather than adolescence (Barrington-Trimis et al., 2020). Given that combustible cigarette smoking is the primary contributor to tobacco-related disease, encouraging smoking cessation among this population is critical for improving public health (Ganz and Delnevo, 2020).

Clinical interactions between patients and healthcare professionals are key opportunities for smoking prevention among individuals who do not regularly use cigarettes and for cessation counseling among individuals who smoke. The U.S. Public Health Service Clinical Practice

Guidelines recommend clinician interventions that have been shown to increase cessation rates (Clinical Practice Guideline Treating Tobacco Use and Dependence, 2008). However, young adults have historically made unassisted quit attempts (Solberg et al., 2007) and underutilize evidence-based cessation support (Watkins et al., 2020; Curry et al., 2007). It is unknown whether these disparities are due to young adults having less frequent clinical encounters than older populations or due to the nature of the encounters themselves.

The purpose of this study was to examine associations of demographic and tobacco use characteristics with young adults' clinical encounters related to tobacco use and cessation. Our goal was to identify potential opportunities to address cigarette use and encourage cessation among this population.

2. Methods

2.1. Participants and procedures

We conducted secondary analyses among 831 young adults who participated in Wave 1 of the National Young Adult Health Survey (NYAHS), a nationally representative survey of 18- to 34-year-olds. The survey was designed to provide cross-sectional and longitudinal estimates of health behaviors using random digit dial (RDD) sampling of cell phone numbers and to test the feasibility and utility of integrating web surveys in surveillance systems that use RDD sampling (Gundersen et al., 2021). Data were collected between April 2018 and May 2019. After providing consent, respondents were randomly assigned to a survey mode (computer-assisted telephone interviewing or web-based survey). Compensation for completed surveys was a $15 gift card. The Rutgers Biomedical Health Sciences Institutional Review Board approved all procedures, which are detailed elsewhere (Gundersen et al., 2021).

2.2. Measures

Independent variables were demographic (sex, age, and race/ethnicity) and tobacco use (current use of cigarettes and other tobacco products) characteristics. Given social differences between younger and older adults, age was categorized as "college age" (18–21) vs. older than college age (22–34). Respondents who reported that they now smoked every day or some days were categorized as currently smoking cigarettes; those who reported now smoking not at all and reported smoking at least 100 or fewer than 100 cigarettes in their lifetime were categorized as having formerly and never smoked cigarettes, respectively. Respondents who had ever used another tobacco product (i.e., e-cigarettes, cigars, hookah, smokeless tobacco) and currently used it every day or some days were categorized as current other tobacco product users. Among those who reported current cigarette use, we additionally assessed nicotine dependence, plans to quit smoking, and quitting confidence. Because the time to an individual's first cigarette (TTFC) of the day after waking is a robust indicator of nicotine dependence independent of their daily cigarette consumption (Branstetter et al., 2020), TTFC was used to assess nicotine dependence, categorizing respondents who reported smoking their first cigarette of the day within 15 min of waking as highly dependent, 15–60 min of waking as moderately dependent, and over an hour after waking as low dependence. Plans to quit smoking were assessed by participants' "Yes" or "No" responses to the prompt, "Are you planning to quit smoking in the next 30 days?" Quitting confidence was assessed by the question "If you decided to give up smoking altogether, how likely do you think you would be to succeed?" with confidence being defined as responding "somewhat likely" or "very likely.".

Clinical encounter outcome measures were self-reported "Yes" or "No" responses to past year occurrence of (1) seeing a clinician ("In the past 12 months, have you seen a doctor, dentist or other health care professional?"), (2) being asked about tobacco use ("In the past 12 months, has a medical doctor, dentist, or other health professional asked you about whether you smoke cigarettes?"), and (3) being advised to quit smoking ("In the past 12 months, did a medical doctor, dentist, or other health professional advise you to stop smoking?").

2.3. Analytic plan

Unweighted descriptive statistics were first estimated to characterize the sample. We then fit three weighted multivariable logistic regression analyses to estimate adjusted odds ratios (AORs) to examine the associations between demographic and tobacco use characteristics with each outcome measure. Although we report sample characteristics for the full sample of 831 NYAHS participants, our regression analyses included only those for which complete data was available (i.e., participants who responded "don't know" or "refused" to any measures were excluded from analyses), resulting in an analytical sample of 783.

Weighted models predicting outcomes of seeing clinician and being asked about tobacco use contained the following predictor variables: sex, race, age, current cigarette use, and current use of other tobacco products. For the model predicting being advised to quit, analyses included only those reporting current cigarette use and the following additional predictors: nicotine dependence, plans to quit in the next 30 days, and confidence in ability to quit. Sample weights were calculated as the product of the inverse of the probability of selection and the number of cell phones on which a respondent receives calls, and calibrated to the population distributions for age, sex, education, and race/ethnicity using iterative proportional fitting (Gundersen et al., 2021). The population distributions were obtained from the 2018 American Community Survey conducted by the Census Bureau to update the decennial Census population estimates. All analyses were conducted using SAS software V.9.4 (SAS Institute, Cary, North Carolina, USA). Significance was determined based on a *p*-value of < 0.05.

3. Results

The full sample of 831 young adults was 58.3 % male and 41.7 % female; 26.4 % were aged 18–21 while 73.6 % were aged 22–34. 52.9 % of the sample identified as Non-Hispanic White, 8.9 % as Non-Hispanic Black, 20.4 % as Hispanic, and 17.8 % as non-Hispanic Other. 20.6 % reported current use of cigarettes; 13.9 % reported former use; and 65.5 % reported never using cigarettes. Among those who reported current cigarette use, 47.6 % reported low, 29.2 % reported moderate, and 23.2 % reported high nicotine dependence; the majority did not plan to quit smoking in the next 30 days (68.3 %) and were confident in their ability to quit smoking (78.2 %).

Among the analytic sample (n = 783), sex, race, and current cigarette use were significantly associated with seeing a clinician (Table 1). Women had 2.2 times greater odds of reporting seeing a clinician than men, while young adults identifying as Non-Hispanic Black, Hispanic, and Non-Hispanic Other had lower odds than Non-Hispanic White young adults of seeing a clinician. Compared to young adults who reported never using cigarettes, those reporting current cigarette use had lower odds of seeing a clinician.

Among those who reported seeing a clinician in the past year (n = 616), sex and current cigarette smoking were significantly associated with being asked about current cigarette use (Table 1). Women had nearly three-fold greater odds of being asked about cigarette use than men, and young adults currently using cigarettes had 2.66 times greater odds than never-users of being asked about cigarette use.

Among those currently using cigarettes (n = 114), nicotine dependence and quitting confidence were significantly associated with being advised to quit smoking (Table 1). Those with moderate (vs. low) nicotine dependence had three times greater odds of being advised to quit, while those confident in their ability to quit smoking (vs. not confident) had lower odds. Older young adults aged 22–34 had nearly three times greater odds of being advised to quit than young adults aged 18–21, but this was not statistically significant (*p* = 0.054).

Table 1

Associations of demographic and tobacco use characteristics with young adults' self-reported clinical encounters in the National Young Adult Health Survey (Wave 1; 2018–2019), presented as weighted adjusted odds ratios (AORs) and 95% confidence intervals (CI).

	Seen by Clinician (n = 783)			Asked About Cigarette Use Among Those Who Had Seen a Clinician (n = 616)			Advised to Quit Smoking Among Those Reporting Current Cigarette Use (n = 114)		
	AOR	95 % CI	p-value	AOR	95 % CI	p-value	AOR	95 % CI	p-value
Sex									
Male	Ref			ref			ref		
Female	2.16	1.30　3.60	**0.0031**	2.98	1.75　5.09	**0<.0001**	0.96	0.38　2.44	0.9323
Race									
Non-Hispanic, White	ref			ref					
Non-Hispanic, Black	0.43	0.20　0.95	**0.0355**	0.63	0.25　1.60	0.3277	3.76	0.68　20.87	0.1290
Hispanic	0.31	0.17　0.55	**0<.0001**	0.74	0.38　1.43	0.3644	1.25	0.26　6.01	0.7823
Non-Hispanic, Other	0.33	0.18　0.61	**0.0004**	0.91	0.45　1.84	0.7823	0.99	0.28　3.50	0.9856
Age									
18–21 years old	ref			ref			ref		
22–34 years old	1.01	0.60　1.70	0.9792	1.32	0.74　2.36	0.3423	2.90	0.98　8.55	0.0537
Current Cigarette Use									
Current Smoker	0.53	0.32　0.89	**0.0154**	2.66	1.42　4.98	**0.0022**			
Former Smoker	0.82	0.44　1.53	0.5352	1.71	0.85　3.45	0.1325			
Never Smoker	ref			ref					
Current Other Tobacco Product Use[a]									
Yes	1.14	0.69　1.87	0.6113	1.44	0.84　2.48	0.1848	0.65	0.24　1.75	0.3931
No	ref			ref			ref		
Tobacco Dependence (TTFC)[b]									
High							2.06	0.60　7.12	0.2501
Moderate							3.11	1.03　9.36	**0.0439**
Low							ref		
Plan to quit in the next 30 days									
Yes							1.24	0.46　3.35	0.6766
No							ref		
Confidence in quitting									
Yes							0.31	0.11　0.91	**0.0338**
No							ref		

NOTES: a = Other tobacco products were e-cigarettes, cigars, hookah, and smokeless tobacco; b = Time to first cigarette (TTFC); Of the 665 (unweighted, or 80.3 % weighted, 95 % CI: 76.81 % − 83.82 %) young adults who reported visiting a clinician in the past year, 504 (unweighted, or 74.8 % weighted, 95 % CI: 70.36 %-79.29 %) were asked whether they smoked cigarettes.

4. Discussion

This study explored associations of demographic and tobacco use characteristics with young adults' past-year clinical encounters to identify opportunities to address smoking and encourage cessation among this population. Our findings suggest that broad public health education is needed to emphasize the importance of routine healthcare visits among young adults, as many key demographic groups within this population (e.g., men, non-White individuals, and those who smoke) reported less utilization of clinician visits. These findings are consistent with the literature demonstrating lower likelihood of visiting among young adults in these groups and may reflect inequities in insurance coverage (Wisk and Sharma, 2019). They suggest the need for public health efforts to increase access to healthcare among young adult males, minorities, and those who currently smoke cigarettes.

Our findings demonstrating inequities in assessing tobacco use suggest that clinician education is also needed to reinforce the importance of interventions. Clinicians should be reminded of the importance of addressing tobacco use among all patients, especially men, as our findings could reflect clinicians prioritizing tobacco assessment among young women in their child-bearing years. Nevertheless, a universal requirement to ask patients about their tobacco use could increase this behavior, and likely reduce inequities, regardless of whether the patient is a current tobacco user or not. These measures have been implemented as part of the Center for Medicare and Medicaid Services (CMS) Merit-Based Incentive Payment System (MIPS) quality standards (American Medical Association, 2022).

Finally, among those who currently smoke, differences in being advised to quit based on nicotine dependence and quitting confidence also reinforce the need for clinician education. Even individuals with lower levels of dependence or confidence about quitting may find it difficult to successfully abstain from smoking, emphasizing the importance of broadly advising those who smoke to quit, independent of their age or smoking behaviors, such as through "opt-out" interventions.

Our findings must be interpreted in the context of some limitations. First, clinical encounter measures relied entirely on self-report and may be subject to measurement error (Althubaiti, 2016). Second, the small size of our sample prevented us from exploring associations with additional tobacco use behaviors and characteristics (e.g., the association of being advised to quit with use of other tobacco products like e-cigarettes), as well as interactions among predictor variables; it is possible the associations we observed between variables may differ if including omitted variables (e.g., income, education). Future studies may wish to replicate these findings using larger nationally representative datasets or using additional predictors.

Despite these limitations, study findings highlight the existence of sex, racial, and smoking status differences in clinical encounter outcomes and call into question how best to close such gaps. Certain demographic groups including men, young adults, and people of color are more likely to 'fall through the cracks'; they are less likely to see a clinician or receive intervention during the encounter. While broader efforts such as continued public education, greater access to primary care, and legal regulation remain important, much of the onus is on the clinician to ensure all patients receive equitable care. Possible clinical steps include standardizing the social history taking process (particularly regarding tobacco use habits), developing a consistent and systematic approach to address smoking cessation, and acknowledging and checking implicit biases throughout the encounter. These reflect only a few of the possible opportunities for future smoking prevention and cessation efforts to address demographic "blind spots" and reduce these disparities.

Funding

CRediT authorship contribution statement

Melissa Mercincavage: Writing – review & editing, Writing – original draft. **Catherine Chen:** Writing – review & editing. **Isabel Trenholm:** Writing – review & editing. **Nishi J. Gonsalves:** Writing – review & editing, Formal analysis. **William J. Young:** Writing – review & editing, Formal analysis. **Michelle T. Bover Manderski:** Writing – review & editing, Formal analysis. **Manish S. Patel:** Writing – review & editing. **Mary K. O'Connor:** Writing – review & editing. **Daniel Gundersen:** Writing – review & editing, Methodology, Funding acquisition. **Cristine D. Delnevo:** Writing – review & editing, Funding acquisition. **Michael B. Steinberg:** Writing – review & editing, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

References

Althubaiti A. Information bias in health research: definition, pitfalls, and adjustment methods. J. Multidiscip. Healthc. Published online May 2016:211.

American Medical Association. Quality ID #226 (NQF 0028) Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention. Published online, 2022.

Barrington-Trimis, J.L., Braymiller, J.L., Unger, J.B., et al., 2020. Trends in the Age of Cigarette Smoking Initiation Among Young Adults in the US From 2002 to 2018. JAMA Netw Open. 3 (10), e2019022.

Branstetter, S.A., Muscat, J.E., Mercincavage, M., 2020. Time to First Cigarette: A Potential Clinical Screening Tool for Nicotine Dependence. J. Addict. Med. 14 (5), 409–414.

Clinical Practice Guideline Treating Tobacco Use and Dependence 2008 Update Panel, Liaisons, and Staff. A Clinical Practice Guideline for Treating Tobacco Use and Dependence: 2008 Update. *Am. J. Prev. Med.* 2008; 35(2):158-176.

Cornacchione Ross, J., Kowitt, S.D., Rubenstein, D., et al., 2024. Prevalence and correlates of flavored novel oral nicotine product use among a national sample of youth. Addict Behav. 152, 107982.

Cornelius, M.E., Loretan, C.G., Jamal, A., et al., 2023. Tobacco Product Use Among Adults – United States, 2021. MMWR Morb Mortal Wkly Rep. 72 (18), 475–483.

Curry, S.J., Sporer, A.K., Pugach, O., Campbell, R.T., Emery, S., 2007. Use of tobacco cessation treatments among young adult smokers: 2005 National Health Interview Survey. Am. J. Public Health. 97 (8), 1464–1469.

Ganz, O., Delnevo, C.D., 2020. Young Adults as a Tobacco Control Priority Population in the US. JAMA Netw Open. 3 (10), e2019365.

Gundersen, D.A., Wivagg, J., Young, W.J., Yan, T., Delnevo, C.D., 2021. The use of multimode data collection in random digit dialing cell phone surveys for young adults: feasibility study. J. Med. Internet Res. 23 (12), e31545.

Office of the Assistant Secretary for Health, Office of the Secretary, Department of Health and Human Services. *Request for Information: Draft HHS 2023 Framework To Support and Accelerate Smoking Cessation.* Vol 88 FR 42377; 2023:42377-42379.

Solberg, L.I., Asche, S.E., Boyle, R., McCarty, M.C., Thoele, M.J., 2007. Smoking and cessation behaviors among young adults of various educational backgrounds. Am. J. Public Health. 97 (8), 1421–1426.

U.S. Department of Health and Human Services. *The Health Consequences of Smoking - 50 Years of Progress: A Report of the Surgeon General.* Government Printing Office; 2014.

Watkins, S.L., Thrul, J., Max, W., Ling, P.M., 2020. Cold Turkey and Hot Vapes? A National Study of Young Adult Cigarette Cessation Strategies. Nicotine Tob Res. 22 (5), 638–646.

Wisk, L.E., Sharma, N., 2019. Inequalities in young adult health insurance coverage post-federal health reform. J. Gen. Intern. Med. 34 (1), 65–74.