E-cigarettes epidemic and the need for education

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Abstract: E-cigarettes are now the most used form of tobacco in the USA despite recently reported illnesses associated with them. E-cigarettes are still popular among 12 million Americans and hence nursing programs need to keep pace providing education. Descriptive statistics and logistic regression analysis were conducted using secondary data. The sample consisted of 21,177 participants. Findings indicate that participants consumed e-cigarettes to quit smoking, for enjoyment, or to reduce tobacco cigarette smoking. Age ($p = .024$, odds ratio of 1.038), insurance status ($p = .030$, odds ratio of .186), and education level ($p = .002$, odds ratio of 13.045) played a significant role in consumption. Study findings suggest that e-cigarette users consume the product for various reasons. This presents an educational opportunity for nursing programs to address e-cigarette misconceptions, particularly for first-time users. Utilisation of the 5As model for smoking cessation in addressing e-cigarette consumption is proposed.

Keywords: e-cigarettes; epidemic; smoking, interventions; nursing; education.

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1 Introduction

Current trends in the literature show that e-cigarettes are now the most used form of tobacco in the USA, but little is published about the reasons behind their consumption. Also, there is a lack of tailored interventions on e-cigarettes. According to the literature, e-cigarettes contain harmful ingredients including nicotine which is in a liquid form called e-juice or e-liquid (USDHHS, 2016). E-juice users are generally poorly informed about its negative health consequences (CDCP, 2019a). Operated by battery, the e-cigarette device is used to heat up a liquid substance which is then inhaled by the user (Tobacco Prevention and Cessation Commission, 2016). It should be noted that not all

e-cigarette devices contain nicotine, but when they do, the nicotine in e-liquids is from the tobacco plant (Prochnow, 2017). Data collected for the purpose of this study assumed that study participants who identified themselves as e-cigarettes users consumed the product that contained the drug nicotine. Recently, there have been numerous illnesses and deaths associated with e-cigarette consumption, causing a lot of stress among users within the e-cigarette community. For example, as of February 2020, there were 68 deaths and more than 2800 vaping related hospitalisations resulting from lung illnesses (National Center for Health Research, 2020). As a result, the Centres for Disease Control and Prevention (CDCP), the US Food and Drug Administration (FDA), and accompanying state and local health departments, together with other clinical and public health partners, have been investigating e-cigarettes as a potential cause of widespread lung illness that has resulted in a national outbreak (CDCP, 2020a, 2020b).

Despite the negative health consequences associated with e-cigarette consumption, the product is still popular among 12 million Americans in different age groups, with the majority of them being youth ages 18–24; followed by ages 25–44; and mildly among ages 45–66 years old's (E-Cigarettes: Facts, Stats, and Regulations, 2019). Further, the CDC warns that e-cigarettes are not safe for youth, young adults, pregnant women, or adults who have never used tobacco products as they are highly addictive, toxic, and can harm foetuses, adolescents, or young adults' brain development (CDCP, 2020a). As the rate of use increases, so does the frequency of use, implying that people are not just experimenting with the product but instead they are getting comfortable enough to use it habitually; hence, the need to create evidence-based, tailored interventions is crucial (CDCP, 2019a; Korfei, 2018).

Although several studies have documented why e-cigarette consumers are using the product, relatively few population-level studies have explored the rationale behind usage. This study draws from a sample of California residents surveyed in 2018. The goal is to conduct a root cause analysis that will help public health practitioners create evidence-based interventions, focusing on various types of misinformation that may lead consumers to continue using e-cigarettes despite their negative health consequences. This study reduces the current gap in the literature by not only explaining why consumers are still using e-cigarettes, but also providing evidence-based strategies that will address nicotine dependence among California adults. It should be noted that this research does not focus on illnesses and deaths resulting from using e-cigarettes. Instead, our focus is on understanding why consumers use the product and proposing evidence-based strategies that will reduce misinformation and consequently deter individuals from using or motivate them to quit using e-cigarettes.

More robust strategies for preventing tobacco consumption among users is critical to ending the tobacco epidemic in the USA. The literature suggests that among youth and young adults, e-cigarette use has more than doubled between 2013 and 2019, and the trend is still growing (CDCP, 2019a; Dai and Leventhal, 2019). Even when negative health effects are broken into categories by gender, race/ethnicity, education level, income level and others, rates of lung illness and injury are still on the rise across the board, exposing the need for public health professionals to provide a diversified education campaign so various subgroups are aware of the health consequences of e-cigarettes usage (Dai and Leventhal, 2019).

This study proposes a best-practice nursing approach to be widely implemented in order to reduce e-cigarettes consumption. This approach has been shown to work in reducing cigarettes smoking in the USA prior to the popularity of e-cigarettes. Healthcare professionals (i.e., nurses) have opportunities to assess usage, discuss misinformation pertaining to e-cigarettes, and provide advice to quit e-cigarettes using evidence-based frameworks such as the 5As: Ask, Advice, Assess, Assist, and Arrange, a proven smoking-cessation method for tobacco users (Prochnow, 2017; Clinical Practice Guideline, 2008).

Undoubtedly, cigarette smoking is a difficult addiction to break; therefore, coming up with researched, evidence-based approaches to smoking cessation programs that educate e-cigarette users is crucial. Previously, e-cigarettes were thought to help smokers quit tobacco cigarettes. However, the current concern is that e-cigarettes may be used as supplements to cigarettes rather than a full substitution of nicotine dependency (Wackowski et al., 2016). Given the lack of research pertaining to e-cigarette safety and effectiveness in aiding smoking cessation, healthcare providers have a vital role in encouraging their patients to quit using them, particularly those with chronic conditions, or those who are younger, or pregnant (Kapella-Mshigeni et al., 2019; Prochnow, 2017).

2 Methods

With the goal of addressing e-cigarettes epidemic and propose evidence-based strategies, this study utilised secondary data from the 2018 California Health Interview Survey (CHIS). The purpose of this dataset is to select a representative sample of the diverse population of California adults with the goals of sharing existing health challenges in the state and/or providing any improvements in overall health outcomes. The data were collected through a random-digit dial telephone survey system on a wide range of health topics using either a landline or a cellular telephone. Interviewers collected data from California residents using a Computer-Assisted Telephone Interviewing (CATI) system. Institutionalised US populations were not included because they do not have access to telephones. Participants were California citizens, aged 18 and older, who agreed to participate in the data collection process. The study received IRB approval as an exempt research project by the authors.

2.1 Variable description summary

Once the data were cleaned and prepared for analysis, descriptives were provided on key variables to describe the sample set. Participants gender, age, race, education, marital status, poverty level, annual number of doctor visits, daily usage of e-cigarettes, health status, a sense of living purpose and ones' reasons for e-cigarette use was collected. All variables of interest were categorical or ordinal in nature. Pearson's chi-square cross-tabulations were conducted to determine if associations existed between demographics and other covariates, to assess potential multicollinearity issues in addition to potential relationships between demographics/covariates with outcome measures, and to determine relevant relationships for the primary analysis. This process narrowed the number of outcome measures to five reasons to engage in e-cigarette smoking: to quit tobacco

cigarette smoking; the perception that e-cigarettes were healthier than tobacco cigarette smoking; for social enjoyment; to reduce tobacco cigarette smoking; and one's curiosity. These reasons were regressed on a set of demographics and relevant covariates to determine if there were characteristics that could predict reasons for consumption.

The data for this project were obtained through a complex survey design with sample weighting that helps to estimate the effect of sampling error due to non-random sampling procedures. Replicate weights were created by the CHIS for use in analysis to account for sampling design and were applied to this dataset using the xi svy command in Stata. A jackknife variance estimation procedure was used to estimate the standard errors given the sample design (Efron, 1982). Descriptive statistics of the variables of interest are assessed using this procedure and Standard Errors (SE) of the estimate are provided. In terms of the primary analysis, the reasons for engaging in e-cigarette smoking were coded binarily as either yes or no. Multiple logistic regressions were conducted to predict the probability of the participant identifying a specific reason for e-cigarette consumption (Tabachnick and Fidell, 2007). To assess model fit using a logistic regression with a survey design, an *F*-adjusted mean residual test was used (Archer, 2001). The data preparation was conducted in IBM SPSS version 26 (IBM Corp., 2019) and analysis was conducted in Stata version 16 (StataCorp, 2019). The alpha level was set at .05.

3   Results

The overall sample consisted of 21,177 participants. However, the sample of participants who engaged in e-cigarette consumption and answered questions about their reasons for consumption consisted of 925 participants. A logistic regression analysis using jackknifed replicate sample weights was conducted to predict if an individual consumed e-cigarette to quit smoking (see Table 1). Overall, the model was not significant, $F (25, 54) = 1.04$, $p = .443$. Participant age was a significant predictor, $p = .024$, and had an odds ratio of 1.038, indicating greater likelihood of consumption associated with this factor. Participants who were uninsured were also a significant predictor, $p = .030$, and had an odds ratio of .186, indicating greater likelihood of consumption associated with this factor. None of the remaining predictors were significant predictors of consumption of e-cigarettes to quit smoking at the $ps > .05$ level (see Table 1).

A logistic regression model was conducted to predict whether a participant consumed e-cigarettes because they were perceived to be healthier than tobacco cigarettes. Overall, the model was not significant, $F (25, 54) = 1.15$, $p = .325$. None of the predictors were significant predictors of consumption of e-cigarettes because they were perceived to be healthier than tobacco cigarettes, all $ps > .05$. Further, we conducted a logistic regression model to predict whether a participant consumed e-cigarettes for enjoyment (see Table 2). Overall, the model was significant, $F (25, 54) = 1.78$, $p = .039$. The only significant predictor was age, where $p = .029$, and had an odds ratio of .944, indicating greater likelihood of consumption associated with this factor. None of the remaining variables were significant for enjoyment, all p-values $> .05$ (see Table 2).

Table 1 Logistic regression analysis predicting reason for consuming e-cigarettes in order to quit smoking

DV: Reason for use: to quit smoking cigarettes	OR	Jackknife SE	p	95% CIs	
				LL	UL
Male[a]	1.072	.39	.849	.521	2.204
Less than HS diploma[b]	6.759	7.15	.075	.822	55.592
HS diploma or GED [b]	4.005	3.52	.118	.696	23.043
Some college, vocational or associates[b]	2.058	1.68	.381	.404	10.492
Bachelor's degree[b]	2.229	1.86	.339	.425	11.695
Health status	.927	.20	.727	.604	1.424
Sense of purpose	.949	.20	.803	.627	1.437
Medicaid[c]	.430	.27	.188	.121	1.523
Employer-based coverage[c]	.499	.27	.202	.170	1.464
Private coverage[c]	1.406	.74	.518	.495	4.000
Other coverage[c]	.295	.23	.128	.061	1.432
2 or more but always insured[c]	.860	.86	.881	.116	6.357
Uninsured[c]	.186	.14	.030	.041	.843
Age	1.039	.02	.024	1.005	1.073
Other single race[d]	1.756	1.73	.570	.247	12.487
American Indian/Alaskan Native[d]	1.315	1.96	.854	.068	25.454
Asian[d]	3.031	2.29	.146	.674	13.624
African American[d]	2.355	2.70	.457	.241	23.059
White[d]	2.005	1.49	.351	.458	8.781
Number of Doctor's visits in the past year	.993	.06	.909	.874	1.127
Married[e]	1.168	.68	.790	.367	3.722
Widowed/Separated/Divorced or Living w/ Partner[e]	1.091	.63	.881	.344	3.455
0–99% of the federal poverty level[f]	1.399	.79	.555	.453	4.323
100–199% of the federal poverty[f] level	.823	.49	.745	.252	2.693
200–299% of the federal poverty[f] level	1.632	.80	.323	.612	4.351
Constant	.030	.05	.033	.001	.751

Notes: N = 848, Population size = 1, 708,673, Replications = 79, F (25, 54) = 1.04, p = .443. [a]Compared to female; [b]Compared to graduate degree; [c]Compared to mix of insured and uninsured; [d]Compared to mixed race; [e]Compared to never married; [f]Compared to 300% or higher of the federal poverty level.

Table 2   Logistic regression analysis predicting reason whether a participant consumed e-cigarettes for enjoyment purposes

DV: Reason for use: for enjoyment purposes	OR	Jackknife SE	p	95% CIs	
				LL	UL
Male[a]	1.052	.43	.900	.468	2.366
Less than HS diploma[b]	2.854	3.22	.354	.304	26.794
HS diploma or GED[b]	1.115	1.13	.915	.149	8.315
Some college, vocational or associates[b]	1.749	1.85	.599	.212	14.414
Bachelor's degree[b]	1.467	1.52	.712	.187	11.534
Health status	1.179	.245	.430	.779	1.786
Sense of purpose	0.858	.168	.438	.582	1.267
Medicaid[c]	1.332	1.15	.742	.237	7.474
Employer-based coverage[c]	.664	.43	.527	.183	2.398
Private coverage[c]	.366	.33	.263	.062	2.155
Other coverage[c]	.781	1.39	.890	.023	26.703
2 or more but always insured[c]	1.404	1.25	.703	.239	8.234
Uninsured[c]	.738	.595	.699	.143	3.706
Age	.944	.025	.029	.895	.994
Other single race[d]	.664	.648	.676	.095	4.628
American Indian/Alaskan Native[d]	1.251	1.67	.867	.088	17.728
Asian[d]	.567	.498	.517	.100	3.209
African American[d]	.245	.292	.242	.023	2.633
White[d]	.312	.240	.134	.067	1.445
Number of Doctor's visits in the past year	.944	.067	.390	.827	1.078
Married[e]	.896	.759	.898	.166	4.844
Widowed/Separated/Divorced or Living w/ Partner[e]	1.172	.743	.803	.332	4.137
0–99% of the federal poverty level[f]	.456	.319	.266	.113	1.841
100–199% of the federal poverty level[f]	1.464	.723	.442	.548	3.912
200–299% of the federal poverty level[f]	.567	.340	.348	.172	1.873
Constant	3.939	6.464	.406	.150	103.372

Note: $N = 848$, Population size = 1,708,673, Replications = 79, $F_{(25, 54)} = 1.78$, $p = .039$. [a]Compared to female; [b]Compared to graduate degree; [c]Compared to mix of insured and uninsured; [d]Compared to mixed race; [e]Compared to never married; [f]Compared to 300% or higher of the federal poverty level.

A logistic regression model was conducted to predict whether a participant consumed e-cigarettes to cut down or reduce tobacco cigarette smoking (see Table 3). The insurance status variable needed to be removed from this analysis due to low frequency count in the variable. Jackknife replications would not run with the insurance status variable in the model. Overall, the model was significant, $F_{(25, 54)} = 1.89$, $p = .033$. Education was a significant predictor, specifically, if a respondent had a high school diploma or GED equivalent, $p = .002$, and had an odds ratio of 13.045, indicating greater likelihood of

consumption associated with this factor. In addition, there was a significant relationship if a respondent had some college, vocational education, or an associate degree, $p = .004$, and had an odds ratio of 9.418, indicating greater likelihood of consumption associated with this factor. Last, there was a significant relationship if a respondent had a bachelor's degree, $p = .038$, and had an odds ratio of 7.552, indicating greater likelihood of consumption associated with this factor. None of the remaining variables were significant predictors of consumption of e-cigarettes to cut down or reduce tobacco cigarette smoking, all $ps > .05$ (see Table 3).

Table 3 Logistic regression analysis predicting reason whether a participant consumed e-cigarettes to cut down or reduce tobacco cigarette smoking

DV: Reason for use: cut down or reduce tobacco cigarette smoking	OR	Jackknife SE	p	95% CIs	
				LL	UL
Male[a]	1.185	.683	.769	.375	3.739
Less than HS diploma[b]	1.749	2.564	.704	.094	32.359
HS diploma or GED[b]	13.045	10.716	.002	.541	66.962
Some college, vocational or associates[b]	9.418	7.166	.004	.070	42.846
Bachelor's degree[b]	7.552	7.244	.038	1.118	51.006
Health status	.979	.189	.908	.665	1.436
Sense of purpose	1.009	.188	.958	.696	1.464
Medicaid[c]	1.332	1.15	.742	.985	1.065
Employer-based coverage[c]	.664	.43	.527	.010	4.164
Private coverage[c]	.366	.33	.263	.001	14.563
Other coverage[c]	.781	1.39	.890	.006	2.649
2 or more but always insured[c]	1.404	1.25	.703	.028	9.098
Uninsured[c]	.738	.595	.699	.036	4.944
Age	1.205	.020	.216	.888	1.232
Other single race[d]	.205	.309	.298	.152	2.814
American Indian/Alaskan Native[d]	.143	.333	.405	.671	7.358
Asian[d]	.132	.198	.183	.172	2.976
African American[d]	.511	.738	.643	.259	3.947
White[d]	.424	.523	.489	.272	5.005
Number of Doctor's visits in the past year	1.047	.086	.580	.888	1.232
Married[e]	.655	.479	.565	.152	2.814
Widowed/Separated/Divorced or Living w/ Partner[e]	2.223	1.336	.188	.671	7.358
0–99% of the federal poverty level[f]	.716	.512	.642	.172	2.977
100–199% of the federal poverty[f] level	1.012	.691	.986	.259	3.947
200–299% of the federal poverty[f] level	1.168	.854	.832	.272	5.005
Constant	.005	.012	.020	.000	.428

Note: $N = 848$, Population size = 1,708,673, Replications = 79, $F (25, 54) = 1.89$, $p = .033$. [a]Compared to female; [b]Compared to graduate degree; [c]Compared to mix of insured and uninsured; [d]Compared to mixed race; [e]Compared to never married; [f]Compared to 300% or higher of the federal poverty level.

A logistic regression model was conducted to predict whether a participant consumed e-cigarettes out of curiosity. Overall, the model was not significant, $F (25, 53) = 1.55$, $p = .322$. A significant variable was insurance status, specifically those participants who had "Other" types of coverage, $p = .008$, and had an odds ratio of .051, indicating greater likelihood of consumption associated with this factor. None of the remaining variables were significant predictors of consumption of e-cigarettes out of curiosity at the $p > .05$ level.

4   Discussion

Overall, the findings suggest that e-cigarette consumers use the product for various reasons, most of which relate to misinformation that they receive from the media, peers, or manufactures (Korfei, 2018; Prochnow, 2017). Owing the growing public health concerns of lung illnesses as a result of e-cigarettes use, data collected for the purpose of this study assumed that study participants consumed the product that contained the drug nicotine. Upon the completion of data analysis, this study found out that study participants were using e-cigarettes for a variety of reasons, some of which were more significant than others, i.e., to quit smoking, for enjoyment purposes, and to cut down on tobacco cigarette smoking. Less common reasons were curiosity or the perception that e-cigarettes are healthier than tobacco products. Logistics regression indicates greater likelihood in using e-cigarettes in order to quit smoking. This finding is supported by current literature which states that as age increases, many consumers use e-cigarettes to help them quit or reduce consumption of regular cigarettes (Korfei, 2018).

Consequently, studies continue to show a positive correlation between age increase and use of e-cigarettes whereby the numbers have now tripled among our nation's youth, with one out of every six high school students using the product (CDC, 2019b; Korfei, 2018; Murthy, 2017). Among youths and young adult groups, early introduction to nicotine is said to alter neurological pathways and may expand the risk of addictions to other substances that can interfere with brain development and affect memory, learning and attention spans (U.S. Office on Smoking and Health, 2014; Benowitz, 2017). It will take a whole community to be open to discussions about e-cigarettes and how harmful they can be to consumers, especially those with existing medical conditions, weak immune systems, pregnancies, or younger persons whose brains are still developing. Other professionals (i.e., teachers, counsellors, administrators and parents) working in middle and high schools, academic institutions, churches and youth centres who come in contact with youth should constantly endeavour to plant the seed in the minds of the younger generations about the health consequences of e-cigarettes. Stronger restrictions supported by the law on the sale and purchase of e-cigarettes is highly recommended in order to reduce and control consumption (Korfei, 2018). Discouraging consumption by raising awareness of increasing prices of tobacco products is one of several good strategies to employ (Pandey and Dixit, 2018).

Among pregnant women, utero nicotine exposure can cause preterm births that result in negative health outcomes of the baby such as low birth weight (Prochnow, 2017; CDCP, 2019b). Given the documented health concerns of e-cigarettes in different groups of people, it is apparent that there is an insufficient effort to educate the

public regarding negative side effects. For example, when persons with diabetes consume nicotine, it can produce insulin resistance, which may lead to further health complications (Prochnow, 2017).

To contravene this growing health crisis, the use of evidence-based frameworks such as the 5As for smoking cessation by healthcare professionals (i.e., nurses) should be utilised to address e-cigarette consumption among users because they have been widely promoted and succeeded in reducing regular tobacco dependence in the USA (Kapella-Mshigeni et al., 2019). As stated in the Clinical Practice Guidelines, "Treating Tobacco Use and Dependence" that was updated in 2008, this strategy is efficient for healthcare professionals as well as counsellors in understanding the root cause analysis as to why people use e-cigarettes and other tobacco products, and consequently, so they can provide evidence-based treatment options and counselling services to their patients. For many users, lack of information is what causes their desire to use the product thinking that they are opting for a healthier nicotine delivery option rather than conventional cigarettes, but e-cigarettes can actually lead to more dangerous usage patterns than smoking regular cigarettes (CDCP, 2020b; National Center for Health Research, 2020). With what is currently known about the health consequences of e-cigarettes, it is a disservice not to inform and educate consumers of its toll on one's health because many people are only learning about the product from the manufacturers and social acquaintances who are already using e-cigarettes (Prochnow, 2017). One optimistic/promising finding from our study is the trend that shows the higher the education one has had, the less likely they were to use e-cigarettes, which encourages increasing education efforts pertaining to tobacco products. Hence, using an evidence-based approach (5As) can be highly instrumental to helping e-cigarettes consumers make informed decisions about the product.

5 Strengths and limitations

Findings of this study should be interpreted in the context of several strengths and limitations. Limitations include self-reported data on the reason behind e-cigarettes which can lead to social desirability bias. A strength is the large sample size drawn from one of the largest states in the nation in population size, among California residents.

5.1 An Implication for practice: the 5As model – ask, advise, assess, assist and arrange

1) *Ask:* Healthcare professionals (e.g., nurses) should ask their patients about and document their tobacco use during routine medical care. We recommend that healthcare professionals should specifically ask their patients if they are using electronic cigarettes because some consumers do not consider themselves to be tobacco users.

2) *Advise*: In a clear manner, healthcare professionals should advise their patients to quit using e-cigarettes and provide them with a brief summary of research that is available to demonstrate the negative side effects of the product.

3) *Assess:* Using a scale of 1–10, healthcare professionals should assess patients' willingness to quit using e-cigarettes by identifying their rationale for using the

product (i.e., enjoyment, healthier option, or simply curiosity). This is where an opportunity to provide evidence-based education is most powerful. Educating e-cigarettes users about the negative health consequences and providing them with the facts versus the myths of the product will help them make reduce usage, and perhaps lead them to cease using e-cigarette products altogether. It is also wise to share with them that the FDA has not confirmed this product to be safe, unlike other approved tobacco cessation products (e.g., gum, lozenges, nicotine patches; Prochnow, 2017; Clinical Practice Guideline, 2008).

4) *Assist:* During this stage, healthcare professionals are encouraged to use non-shaming language and provide consumers with resources that will help with evidence-based quitting options such as online counselling, telephone support, or clinic visits that are supported with the use of over the counter or, if necessary, prescription medications to assist people in quitting tobacco products (USDHHS, 2016; Clinical Practice Guideline, 2008).

5) *Arrange*: Healthcare professionals should arrange resources and help their patients with a cessation plan and assist them in creating a timeline that they will follow to initiate the quitting process. Customised planning is necessary because current users go through a different time frame from the moment, they make the decision to quit, access resources, and follow through with the plan. It is also helpful to discuss potential barriers that may result along the way because of the challenges of nicotine dependence (Prochnow, 2017; Clinical Practice Guideline, 2008).

6   Conclusion

To best support individuals in becoming free from nicotine dependence, the public health workforce, healthcare professionals, and the community are encouraged to be open and learn about e-cigarette products and how they can impact one's overall health. Currently, there is mixed evidence to verify claims that equivalent usage of e-cigarettes to regular cigarettes is safer and healthier than conventional cigarettes. There is growing evidence that usage has both negative, and frequently severe, health effects. As a result, this product is not an FDA approved tobacco-cessation method (Prochnow, 2017; U.S. Food and Drug Administration, 2015). Sadly, there are many uninformed e-cigarettes users who need to be educated about the product they think of as a good tobacco cessation method. For those who are consuming e-cigarettes just out of curiosity, it is important to convince them to put their experiments on hold until much more information is provided to clarify e-cigarette's potential dangers. Also, our findings suggest that uninsured participants were more than five times less likely to consume e-cigarettes in order to quit smoking, compared to participants who had a mix of being uninsured or insured throughout the year. This provides an educational opportunity for health care professionals, specifically nurses, to address nicotine dependence with their patients, and to utilise the 5As model for smoking cessation. Further research and investigation utilising secondary data from multiple sources is highly recommended.

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