Evidence-based tobacco treatment utilization among dual users of cigarettes and E-cigarettes ☆

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ABSTRACT

Dual users of e-cigarettes and cigarettes may represent a unique and receptive population for evidence-based tobacco dependence treatment. We measured the frequency of quit attempts during the past year, and the use of evidence-based tobacco dependence treatments (i.e., behavioral and/or pharmacological treatments), among adult smokers who are current e-cigarette users (dual users) compared with those who do not use e-cigarettes (exclusive smokers). Data were analyzed from the 2015 National Health Interview Survey. Multivariate-adjusted regression models were used to examine the correlates of tobacco treatment use among adult smokers, comparing current e-cigarette users with those who did not use e-cigarettes, stratifying by age group, and adjusting for sociodemographic characteristics. Analyses were based on 5415 adult current cigarette smokers. Compared to exclusive smokers, dual users were more likely to report a quit attempt in the past year among adults < 65 years: 18–24 years (odds ratio [OR] = 2.25), 25–44 years (OR = 1.60), and 45–64 years (OR = 1.96). With the exception of adults ≥65 years, dual users reported low rates of using combination (behavioral and pharmacological) treatments that were not statistically different from exclusive smokers: 18–24 years (0.1% vs. 2.1%, respectively), 25–44 years (4.3% vs. 4.7%), and 45–64 years (3.0% vs. 8.3%). Despite higher likelihood for dual users to make a quit attempt, their use of evidence-based tobacco treatment is low, similar to exclusive smokers. Dual users of cigarettes and e-cigarettes represent a prime target for interventions to expand access and utilization of evidence-based tobacco use treatments.

1. Introduction

Tobacco dependence treatment delivered by primary care providers is effective at promoting abstinence and preventing tobacco-related morbidity and mortality (Fiore and Baker, 2011). Clinical practice guidelines promote the routine assessment of tobacco use, delivering brief advice to quit, and referring patients to pharmacological and behavioral evidence-based tobacco treatments (United States Preventive Service Task Force). Yet, evidence-based tobacco dependence treatments are traditionally underused, with many patients and providers reporting a lack of enthusiasm for their use due to a perceived lack of effectiveness (McMenamin et al., 2006).

With the rising popularity of electronic cigarettes (e-cigarettes), some smokers and providers seem to be embracing e-cigarettes as cessation aids (Dawkins et al., 2013; Goniewicz et al., 2013; El-Shahawy et al., 2016; Kollath-Cattano et al., 2016; Kandra et al., 2014), despite limited evidence regarding their effectiveness and inconclusive evidence regarding their health consequences (R. Grana et al., 2014; Harrell et al., 2014; McRobbie et al., 2013; Brandon et al., 2015; Hartmann-Boyce et al., 2016). E-cigarettes deliver nicotine to smokers, which may maintain nicotine dependence, while simultaneously exposing dual users (i.e., cigarettes and e-cigarettes) to additional, as-yet-unknown health risks associated with chronic e-cigarette use (R. Grana et al., 2014; Harrell et al., 2014). Some studies have reported

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associations between e-cigarette use and smoking reduction or cessation (Adriaens et al., 2014; Biener and Hargraves, 2014; Bullen et al., 2013; Hitchman et al., 2015; Polosa et al., 2014; Tseng et al., 2016), while others have found no evidence that e-cigarette use can help smokers quit (Brose et al., 2015; R.A. Grana et al., 2014).

Use patterns of e-cigarettes vary widely across age groups in the US population. Between 2012 and 2014, prevalence of current e-cigarette use (i.e., daily, some days, or rarely) was highest among adults aged 18–24 years (10.8%), followed by adults aged 24–44 years (7.0%), 45–64 years (4.1%), and ≥65 years (1.3%) (Sharapova et al., 2017). Meanwhile, the proportion of current e-cigarette users who used e-cigarettes daily was lowest among adults aged 18–24 years (12.2%) compared with adults aged 25–44 years (19.9%), 45–64 years (24.3%), and ≥65 years (26.2%) (Sharapova et al., 2017) The differences in use patterns may reflect different reasons for e-cigarette use among smokers of different age groups. Studies have reported that more intense and continuous e-cigarette use is associated with intention to quit smoking, whereas infrequent use is associated with experimentation (Coleman et al., 2017; Pepper et al., 2014; Wackowski et al., 2016; Pulvers et al., 2015).

Currently, US clinical practice guidelines do not recommend e-cigarettes as tobacco treatment aids, and instead recommend that physicians deliver evidence-based treatments to all e-cigarette users, including dual users of cigarettes and e-cigarettes. These include combinations of behavioral and pharmacological tobacco dependence treatments.(United States Preventive Service Task Force; American Academy of Family Physicians; American Heart Association, 2014) In recent US national surveys, current cigarette smokers endorsed that they try e-cigarettes because they are interested in reducing their harm from cigarette smoking or in quitting tobacco and nicotine use altogether (Wackowski et al., 2016; Harrell et al., 2015). Therefore, this group of patients is a prime target for intervention. Nevertheless, little is known about the prevalence of quit attempts and the use of evidence-based tobacco dependence treatments among dual users.

Using a nationally representative sample of US adults, we sought to investigate potential differences in the reported use of tobacco dependence treatment by e-cigarette use status among cigarette smokers who had visited a health professional in the past year, stratified by age group. The aims of this study were to: 1) describe motivation to quit, receipt of healthcare advice, and prevalence of quit attempts between smokers who use e-cigarettes and those who do not (i.e., dual users vs. exclusive smokers), and 2) examine differences in the use of evidence-based tobacco treatment between dual users and exclusive smokers.

2. Material and methods

2.1. Data source

We used nationally representative data from the National Health Interview Survey (NHIS), an annual cross-sectional, face-to-face, computer-assisted household survey of the civilian, noninstitutionalized U.S. adult population (18 years or older) (National Center for Health Statistics, 2015). We analyzed responses gathered from 5415 current cigarette smokers sampled in the 2015 NHIS. Respondents were interviewed in either English or Spanish, based on their language preference (National Center for Health Statistics, 2015). The survey comprised a basic (core) questionnaire and additional supplements. The core survey included questions on demographics (e.g., gender, age, education, employment, race and ethnicity). The 2015 survey included a cancer control supplement with a section on tobacco use that included questions about motivation to quit, quit attempts, and use of a variety of tobacco use treatments. Adults were sampled within families that were sampled within households. The adult sample for 2015 consisted of 33,672 persons with a conditional response rate of 79.7% of persons identified as eligible; the unconditional or final response rate was 55.2%, calculated as the final family response rate (69.3%) multiplied

by the conditional rate (79.7%).

2.2. Tobacco-related measures

Current smokers were defined as respondents who indicated that they had smoked 100 or more cigarettes in their lifetime and that they currently smoked cigarettes every day or some days. They were asked for their age at smoking initiation and for the number of cigarettes smoked per day. Quit attempts in the past year were assessed with a question that asked current smokers whether they had stopped smoking for more than one day "because they were trying to quit smoking." To assess motivation to quit smoking, current smokers were asked whether they would "like to completely quit smoking cigarettes." They were also asked whether they visited a doctor or dentist in the past 12 months. Those who endorsed the latter question were further assessed on whether a health professional asked them about their smoking and advised them to quit. Current smokers who reported a quit attempt in the past 12 months were also asked a series of questions about their experiences with the following evidence-based tobacco treatments within the context of their last quit attempt: nicotine patch; nicotine gum or lozenge; nicotine containing spray or inhaler; prescription medications (Chantix or varenicline, and Zyban, Wellbutrin, or bupropion); telephone help or quit line; one-on-one counseling; and stop-smoking clinic, class, or support group. Using these specific treatments, we created the following aggregate variables: use of any evidence-based behavioral treatment (i.e., telephone help line, stop-smoking clinic, or one-on-one counseling), any pharmacological treatment (i.e., nicotine gum, patch, other nicotine product, or prescription pill), and both behavioral and pharmacological treatment.

The cigarette smoking section of the NHIS questionnaire started with the introductory text: "These next questions are about cigarette smoking…" whereas the e-cigarette questions were found in a separate section of the questionnaire and started with the following text: "The next question is about electronic cigarettes or e-cigarettes. You may know them as vape-pens, hookah-pens, e-hookahs, or e-vaporizers. Some look like cigarettes, and others look like pens or small pipes. These are battery-powered, usually contain liquid nicotine, and produce vapor instead of smoke." Current e-cigarette users were defined as respondents who indicated that they now use e-cigarettes every day or some days.

2.3. Sociodemographic measures

Variables assessed as independent correlates and potential confounders included gender (male or female), race/ethnicity (non-Hispanic white, non-Hispanic black, non-Hispanic Asian, Hispanic/Latino, or non-Hispanic Other), annual income (< $20,000, $20,000–$54,999, $55,000–$74,999, or ≥$75,000), education level (< high school, high school graduate, some college, graduate level, or post-graduate), and U.S. Census region (Northeast, Midwest, South, or West).

2.4. Data analysis

Prevalence estimates were calculated using weighting procedures that accounted for differential sampling probabilities and nonresponse rates. The weights included post-stratification adjustments for gender, age, race and ethnicity based on U.S. Census Bureau population control totals. Prevalence of e-cigarette use was calculated by cigarette smoking status – i.e., current, recent quitter (< 1 year), long-term quitter (≥1 year), and never smoker. Rao-Scott chi-square testing was used to evaluate statistical significance of demographic differences by e-cigarette use status. The *t*-test was used to compare weighted means for these continuous measures. Weighted proportions were calculated for smokers who reported a quit attempt in the past year, wanted to completely quit smoking, those who visited a healthcare provider in the past