Preventive Medicine xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Tobacco and nicotine delivery product use in a national sample of pregnant women

Allison N. Kurti [a,b,*], Ryan Redner [a,f], Alexa A. Lopez [a], Diana R. Keith [a,b], Andrea C. Villanti [a,b], Cassandra A. Stanton [g], Diann E. Gaalema [a,b], Janice Y. Bunn [d], Nathan J. Doogan [h], Antonio Cepeda-Benito [a], Megan E. Roberts [h], Julie Phillips [a,e], ; &, Stephen T. Higgins [a,b,c]

[a] University of Vermont Tobacco Center of Regulatory Science, University of Vermont, United States
[b] Department of Psychiatry, University of Vermont, United States
[c] Department of Psychological Science, University of Vermont, United States
[d] Department of Biostatistics, Obstetrics, Gynecology, University of Vermont, United States
[e] Department of Reproductive Sciences, University of Vermont, United States
[f] Rehabilitation Institute, Southern Illinois University, United States
[g] Westat, Center for Evaluation and Coordination of Training and Research (CECTR) in Tobacco Regulatory Science, Department of Oncology, Georgetown University Medical Center, United States
[h] The Ohio State University, United States

ARTICLE INFO

Article history:
Received 5 April 2017
Received in revised form 25 July 2017
Accepted 31 July 2017
Available online xxxx

Keywords:
Pregnancy
Tobacco
Nicotine
Cigarette smoking
E-cigarettes
Hookah
Cigars
Population Assessment of Health and Tobacco
Nationally representative sample

ABSTRACT

Monitoring use of tobacco products among pregnant women is a public health priority, yet few studies in U.S. national samples have been reported on this topic. We examined prevalence and correlates of using cigarettes, e-cigarettes, and other tobacco/nicotine delivery products in a U.S. national sample of pregnant women. Data were obtained from all pregnant women (≥18 years) in the first wave of the Population Assessment of Tobacco and Health (PATH, 2013–2014) Study ($N = 388$). Prevalence of current and prior use of tobacco/nicotine products was examined overall and among current cigarette smokers. Multiple logistic regression was used to examine correlates of use of cigarettes, e-cigarettes, hookah and cigars. Overall prevalence was highest for cigarettes (13.8%), followed by e-cigarettes (4.9%), hookah (2.5%) and cigars (2.3%), and below 1% for all other products. Prevalence of using other tobacco products is much higher among current smokers than the general population, with e-cigarettes (28.5%) most prevalent followed by cigars (14.0%), hookah (12.4%), smokeless (4.7%), snus (4.6%), and pipes (2.1%). Sociodemographic characteristics (poverty, low educational attainment, White race) and past-year externalizing psychiatric symptoms were correlated with current cigarette smoking. In turn, current cigarette smoking and past year illicit drug use were correlated with using e-cigarettes, hookah, and cigars. These results underscore that tobacco/nicotine use during pregnancy extends beyond cigarettes. The results also suggest that use of these other products should be included in routine clinical screening on tobacco use, and the need for more intensive tobacco control and regulatory strategies targeting pregnant women.

1. Introduction

Examining prevalence of use of tobacco (e.g., conventional cigarettes, hookah) and other nicotine delivery systems (e.g., electronic cigarettes, dissolvables) in pregnant women is critically important. Pregnant women represent a highly vulnerable population in whom exposure to the byproducts of combusted tobacco as well as nicotine are toxic to both mother and fetus (Thompson et al., 2009). For example, tobacco cigarette smoking and maternal use of smokeless tobacco are associated with comparable increases in the risk of preterm birth, stillbirth, and neonatal apnea (U.S. Department of Health and Human Services, 2014). Nicotine exposure in utero is neurotoxic while also impairing lung development in both first- and second-generation offspring, presumably through epigenetic mechanisms (Leslie, 2013).

Although surveillance systems such as the Pregnancy Risk Assessment Monitoring System (PRAMS) permit some level of monitoring of prevalence of tobacco cigarette smoking before, during, and after pregnancy (Tong et al., 2013), there are limitations. PRAMS is a state-level tool that does not include nationally representative samples, only queries respondents about conventional cigarettes, and is only administered with women who have delivered a live infant. To our knowledge, the most recent examination of tobacco cigarette smoking during pregnancy in a large U.S. national sample used the 2002–2009 National

* Corresponding author at: University of Vermont Tobacco Center of Regulatory Science, University of Vermont, United States.
E-mail address: akurti@uvm.edu (A.N. Kurti).

http://dx.doi.org/10.1016/j.ypmed.2017.07.030
0091-7435/

Survey on Drug Use and Health (NSDUH) Restricted-Data Analysis System (R-DAS), where month-specific cigarette smoking prevalence estimates were reported among pregnant women aged 12–44 years (Alshaarawy and Anthony, 2015). Prevalence was approximately 25% during Months 1–2 of pregnancy, 17.6% during Month 3, between 13.1%–14.6% during Months 4–8, and 11.3% during Month 9. Although the report provides informative data regarding smoking prevalence and changes during the course of pregnancy starting before the end of the first trimester, it did not examine prevalence of non-cigarette tobacco or nicotine product use. To our knowledge, only two reports have examined prevalence of non-cigarette tobacco and nicotine product use among pregnant women drawn from a nationally representative sample (Brown et al., 2016; Syamlal et al., 2016). However, these reports aggregated use across products to form a single measure of past month tobacco use. Thus an updated estimate of tobacco cigarette smoking prevalence, along with prevalence of other tobacco and nicotine delivery product use, is needed to address this gap.

The purpose of the present study was to obtain prevalence estimates across a relatively broad list of commercially available tobacco and nicotine delivery products among pregnant women drawn from a U.S. nationally representative sample. We were particularly interested in the prevalence of e-cigarette use, which was excluded from the NSDUH survey used in each of the three studies described above. Studies conducted using other nationally representative surveys show substantial increases in e-cigarette use in the general U.S. adult and youth populations (e.g., National Health Interview Survey [NHIS; Singh et al., 2016], National Youth Tobacco Survey [NYTS; Arrazola et al., 2014]), including women of reproductive age [King et al., 2015]). The present study characterizes prevalence and examines correlates of the use of tobacco cigarettes, e-cigarettes, hookah, cigars (i.e., traditional cigars, filtered cigars, cigarillos), smokeless tobacco (i.e., moist snuff, dip, spit, or chewing tobacco), pipe, snus, and dissolvable tobacco.

2. Method

2.1. Data source

Data were drawn from the Public Use File of the first wave (2013–2014) of the Population Assessment of Tobacco and Health (PATH) Study, a household-based, nationally representative, longitudinal cohort study of 45,971 youth (aged 12–17 years) and adults in the U.S. non-institutionalized population. Data were collected from September 12, 2013, through December 15, 2014. Weighting procedures adjusted for varying selection probabilities and differential non-response rates, while appropriately accounting for the complex study design. The overall weighted response rate was 74.0%. For additional details on adult sampling and weighting procedures, see Kasza et al. (2017). Analyses in the current study were restricted to a subsample of 388 adult women (aged ≥18 years) who reported being pregnant at the time they completed the survey.

2.2. Measures

We obtained data on respondents' age, race/ethnicity, education, U.S. census region, and poverty status. Age was defined as a continuous variable ≥18 years. Race/ethnicity was defined in terms of four categories: White, Black, Hispanic or Other. The Other category encompassed respondents of races other than White or Black, and respondents who endorsed more than one race. Education was defined in terms of four categories: Less than high school/GED, high school graduate, some college/associate's degree, and bachelors/advanced degree. U.S. census regions included the Northeast, Midwest, South, and West. Poverty status was defined as living below versus at or above the U.S. federal poverty line, which was based on annual household income and current Health and Human Services poverty guidelines.

We defined psychiatric status in terms of respondents' scores on two of the four subscales of the GAIN Short Screener (GAIN-SS; Dennis et al., 2013). More specifically, we were interested in respondents' scores on the subscales reflecting possible internalizing psychiatric disorders and possible externalizing psychiatric disorders. Regarding internalizing disorders, depressive symptomatology is a well-established risk factor for tobacco use across the lifespan (Audrain-McGovern et al., 2009). Regarding externalizing disorders, the symptoms assessed on this subscale can be conceptualized as reflecting impulsivity, which is associated with cigarette smoking in both pregnant women (White et al., 2014) and non-pregnant women of reproductive age (Chivers et al., 2016). On each subscale, participants earned one point for each item that they endorsed experiencing within the past year (range = 0–4 for internalizing and 0–5 for externalizing). Thus higher scores on each subscale indicate more past-year symptoms.

Gestational age was defined as the number of weeks pregnant a respondent reported at the time of survey completion. In order to better interpret the logistic regression parameters, gestational age was recoded such that a one-unit increase in gestational age is equivalent to a 4-week period.

Respondents were identified as current smokers, former smokers, or never-smokers. Current smokers were defined as respondents who (a) reported smoking ≥100 lifetime cigarettes and smoking every day or some days at the time of survey completion (i.e., current established smokers), or (b) did not report smoking ≥100 lifetime cigarettes but were smoking every day or some days at the time of survey completion (i.e., current experimental smokers). Former smokers were defined as respondents who (a) reported smoking ≥100 lifetime cigarettes but not smoking at all at the time of survey completion (i.e., former established smokers), or (b) reported previously smoking but not ≥100 lifetime cigarettes and were not smoking at all at the time of survey completion (i.e., former experimental smokers). Never-smokers were respondents who reported no lifetime or current tobacco cigarette use.

Prevalence of current, former, or never-use was also obtained for the following products: e-cigarettes, hookah, traditional cigars, filtered cigars, cigarillos, smokeless tobacco (i.e., moist snuff, dip, spit, or chewing tobacco), pipe, snus, and dissolvable tobacco. Traditional cigars, filtered cigars, and cigarillos were combined to form an aggregate "any cigar" category. For all products, current users were defined as respondents who (a) reported having ever used the product fairly regularly and using some days or every day now (i.e., current established users), or (b) reported using the product previously but not fairly regularly and using some days or every day now (i.e., current experimental users). Former users were defined as respondents who (a) reported having ever used the product fairly regularly but not using at all now (i.e., former established users), or (b) reported using the product previously but not fairly regularly and not using at all now (i.e., former experimental users). Never-users were respondents who reported no lifetime or current use of the product in question.

Alcohol use was defined as any alcohol consumption within the past year. Illicit drug use was defined as using at least one of the following substances in the past year: marijuana, cocaine or crack, prescription drugs such as painkillers or sedatives used without a prescription, stimulants like methamphetamine or speed, or any other drugs such as heroin, inhalants, solvents, or hallucinogens.

2.3. Statistical methods

Frequencies and percentages (weighted to account for the complex sampling scheme) were generated across all respondents aged ≥18 years of age who endorsed being pregnant at the time they completed the survey. Frequencies and weighted percentages of current, former, and never-use of all tobacco and nicotine delivery products examined in this report were evaluated overall and separately within groups defined by tobacco cigarette smoking status (i.e., current,

Please cite this article as: Kurti, A.N., et al., Tobacco and nicotine delivery product use in a national sample of pregnant women, Prev. Med. (2017), http://dx.doi.org/10.1016/j.ypmed.2017.07.030