



Use of electronic cigarettes in public and private settings in Barcelona (Spain)



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ARTICLE INFO

Keywords:

E-cigarettes
ENDS
Public places
Private places
Dual use
Secondhand exposure

ABSTRACT

Objectives: To describe the prevalence of e-cigarette users who use them in selected indoor public and workplaces, and private venues in Barcelona (Spain) in 2015.

Methods: This is a cross-sectional study of a sample of e-cigarette users (≥ 18 years) from Barcelona ($n = 600$). We calculated the proportion of e-cigarette users who used the device in public and private settings (in the last 30 days). We fit multivariate logistic regression models adjusted for sex and age to calculate the odds ratios (OR) with their 95% confidence intervals (CI) of e-cigarette use by socio-demographic factors, dual use and nicotine-containing e-cigarettes.

Results: The highest proportion of e-cigarette users who used them in public places was found at restaurants or bars (69.4%) and nightclubs or pubs (55.4%). Also being current conventional tobacco smokers (dual users) was significantly associated with lower use of e-cigarettes in workplaces (OR = 0.61, 95%CI:0.41–0.91), restaurants (OR = 0.66, 95%CI:0.45–0.97) and nightclubs (OR = 0.56, 95%CI:0.37–0.86). Moreover, being a nicotine-containing e-cigarette user was associated with higher odds of using the device in workplaces (OR = 2.01, 95%CI:1.34–3.01), and lower odds of using it in nightclubs (OR = 0.56, 95%CI:0.39–0.82). 96.8% of the included e-cigarette users declared to use the device at home. Being a current tobacco smoker was associated with increased odds of using e-cigarettes at home (OR = 3.17, 95%CI:1.22–8.22).

Conclusions: E-cigarette use in private settings and in public settings where their use is not regulated by law is high. Therefore, the public health administration in Spain should consider expanding the prohibition of e-cigarette use to indoor public places and should take into account the possibility of exposure to aerosol from e-cigarettes.

1. Introduction

According to data from the Institute for Health Metrics and Evaluation from 2015, 1.6% of total deaths (Institute for Health Metrics University of Washington, 2016a) and 1.2% of total disability adjusted life years (DALYs) were attributable to secondhand smoke (SHS) exposure worldwide (Institute for Health Metrics University of Washington, 2016b). For this reason, in the last few decades several countries have implemented smoke-free bans in order to protect non-smokers and vulnerable populations from SHS exposure, as noted

by Article 8 of the World Health Organization Framework Convention on Tobacco Control (World Health Organization (WHO), 2015). These bans establish that smoking should be prohibited in all indoor workplaces, public places, public transport facilities, health care facilities, schools and universities, as well as retail stores and shopping centers. The health impact of these smoking restrictions has already been widely described (Frazer et al., 2016; World Health Organization, 2014; International Agency for Research on Cancer, 2009). Moreover, smoke-free legislation has played an important role in reducing social acceptability and the denormalization of smoking (The Community

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<http://dx.doi.org/10.1016/j.envres.2017.07.019>

Received 22 March 2017; Received in revised form 29 May 2017; Accepted 9 July 2017

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Guide, 2012).

However, since 2007, the new phenomenon of electronic cigarettes (e-cigarettes), also called Electronic Nicotine Delivery Systems (ENDS) has become popularized. Thus, the denormalization of tobacco consumption in public and workplaces, particularly at bars and restaurants, has been threatened around the world due to the ability to use e-cigarettes anywhere (Chapman et al., 2016). Furthermore, since the popularization of e-cigarettes, an intense debate has been created among researchers and the population about their potential advantages (Specialists in Nicotine Science and Public Health Policy, 2014) and harmful (Centre for Tobacco Control Research and Education, 2014) health effects.

There are various reasons for the current ongoing debate by health-care professionals and legislators about the regulation of the use of e-cigarettes in smoke-free environments (Specialists in Nicotine Science and Public Health Policy, 2014; Centre for Tobacco Control Research and Education, 2014). First, it is complicated to know whether or not e-cigarettes could represent a danger to public health since the evidence concerning e-cigarettes is limited (Kaisar et al., 2016). In addition, the risks and benefits particularly at mid- and long-term, are still unknown (Kaisar et al., 2016). Moreover, mixed findings on the effectiveness of e-cigarettes for smoking cessation can be found in the literature. On one hand, e-cigarettes could supplement nicotine intake in a less harmful way and thus decrease tobacco consumption (Adriaens et al., 2014). In 2015, Public Health England (PHE), an agency of England's Department of Health, recommended that health professionals advise the use of e-cigarettes to smokers who cannot quit smoking by traditional methods (Mcneill et al., 2015). This controversial recommendation has been criticized by many public health researchers (Centre for Tobacco Control Research and Education, 2014) and has been linked to interests of tobacco companies (Gornall, 2015). On the other hand, dual use of e-cigarettes and tobacco has been described as not helping to reduce tobacco consumption, but as promoting greater nicotine dependence (Manzoli et al., 2016; Wetter et al., 2002). Finally, evidence supporting e-cigarettes as a device for quitting smoking was rated as “low” by the GRADE standards (Hartmann-Boyce et al., 2016).

The prevalence of e-cigarette use has increased rapidly in Europe and the United States (King et al., 2013; Filippidis et al., 2016), as well as the prevalence of e-cigarette ever use (King et al., 2013; Filippidis et al., 2016). The prevalence of e-cigarette use and ever use was 2% and 10.3% respectively in 2014 in Spain (Lidón-Moyano et al., 2016a). That same year, the use of e-cigarettes in specific Spanish public and workplaces was regulated. These places included public administration buildings, in and around schools, in universities and health centers, on public transport, and at children's parks (Spanish Government, 2014). The legislation also required the proper signage to be posted at the entrances of buildings and around the areas where e-cigarettes are banned.

Despite ongoing debate about the regulation of e-cigarettes and their use in public and workplaces, there is a lack of evidence about the prevalence of use of e-cigarettes in public places where e-cigarettes, conventional cigarettes or both are banned, and also in private settings where children are more exposed. Therefore, the objective of this study is to describe the prevalence of e-cigarettes users who use them in selected public and workplaces, and private venues in Barcelona (Spain) in 2015.

2. Methods

2.1. Study population and data collection

This is a cross-sectional study of a sample of adult e-cigarette (≥ 18 years) users, residents of Barcelona ($n = 600$) (Matilla-Santander et al., 2017). The market research technique known as ‘consumer panels’, which has been previously described elsewhere (Matilla-Santander et al., 2017), was used to enroll individuals who were e-cigarette users

at the moment of the interview. Briefly, current e-cigarette users were recruited in all neighborhoods of the city of Barcelona between February and June of 2015 by sensors (specifically trained personnel for the recruitment of uncommon product consumers, in this case, e-cigarette users). A brief face-to-face interview was conducted with the participants who agreed to participate at that time and again in 2016. The final sample was of 600 adult e-cigarette users. The sample size for this study was calculated using the formula for simple random samples ($Z\alpha^2 pq/e^2$) for an expected prevalence of 50% ($p = q = 0.5$) to yield the maximum sample size and ensure statistical power. A 95% confidence level was used ($Z\alpha/2 = 1.96$) and absolute error 0.04. We used 50% as the expected prevalence because we did not know the prevalence of the patterns of use among e-cigarette users and this prevalence maximizes the sample size.

2.2. Study variables

The main variables used in this study were those referring to the use of e-cigarettes in public or private settings by e-cigarette users. Public places included workplaces, public transport, hospitals, schools and hospitality sector settings. Private places included homes and private cars. We asked e-cigarette users if they had used e-cigarettes during the last 30 days in their indoor workplaces, enclosed public transport (bus, train, tram, metro), taxis, airplanes, hospitals or other health care centers, schools or educational centers, bars or restaurants, nightclubs or pubs, their home and their private vehicles. The answers to those questions could be: “yes”, “no”, and “don't know”. Those who declared that they had not been in those places in the last 30 days were excluded from the analysis. For each variable, we dichotomized the answers as “yes, I have used it” and “no, I have not used it”. We considered those who declared that they did not know if they had used e-cigarettes in these places as missing values. Moreover, for the variable “use of e-cigarette in the workplace”, we excluded those who were not working as they had not been in the workplace during the last 30 days ($n = 101$).

We also obtained information about sex, age (categorized as < 45 years old, 45–64 years old and > 65 years old), educational level (categorized as low (no qualification up to middle school diploma), intermediate (high school) and high (university degree)), smoking status (non-smokers and smokers), nicotine containing e-cigarettes (no and yes) and living with children from 0 to 17 years old (categorized as no and yes). These variables were used as covariates.

2.3. Statistical analysis

We calculated the proportion of e-cigarette users who used the device in public and private settings. We fit multivariate logistic regression models adjusted for sex and age to calculate the odds ratios (OR) with their 95% confidence intervals (CI) of e-cigarette use. Analyses of public places were stratified by sex, age, educational level, smoking status and use of nicotine-containing e-cigarettes. The analyses of private places were stratified for the same variables as for public places and also for living with children. Multivariate logistic regression models for the use of e-cigarettes in airplanes were not calculated due to the small sample size ($n = 17$). The level of statistical significance was set to a two-sided p -value < 0.05 . All analyses were conducted using Stata 14.0 statistical software.

3. Results

63.5% of the e-cigarette users included in the study were women, the majority were under 45 years old (72.5%), 42.3% had a university education and 26% of them were living with children. Moreover, more than the half were smokers of tobacco (65.2%) and used nicotine-containing e-cigarettes (56%).

Table 1 shows the proportion of e-cigarette users who used them in

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