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Prevalence and Correlates of E-Cigarette Perceptions and Trial Among Early Adolescents in Mexico



James F. Thrasher, Ph.D.^{a,b,*}, Erika N. Abad-Vivero, M.Sc.^b, Inti Barrientos-Gutiérrez, M.M.N.I.^b, Rosaura Pérez-Hernández, M.Sc.^b, Luz Miriam Reynales-Shigematsu, Ph.D.^b, Raúl Mejía, Ph.D.^c, Edna Arillo-Santillán, M.Sc.^b, Mauricio Hernández-Ávila, Ph.D.^b, and James D. Sargent, M.D.^d

^a Department of Health Promotion, Education & Behavior, Arnold School of Public Health, University of South Carolina, Columbia

^b Department of Tobacco Research, Center for Population Health Research, National Institute of Public Health, Cuernavaca, México

^c Departamento de Salud, Economía y Sociedad, Centro de Estudios de Estado y Sociedad (CEDES), Buenos Aires, Argentina

^d Department of Pediatrics, Norris Cotton Cancer Center, Geisel School of Medicine, Dartmouth College, Hanover, New Hampshire

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ABSTRACT

Purpose: Assess the prevalence and correlates of e-cigarette perceptions and trial among adolescents in Mexico, where e-cigarettes are banned.

Methods: Cross-sectional data were collected in 2015 from a representative sample of middle-school students ($n = 10,146$). Prevalence of e-cigarette awareness, relative harm, and trial were estimated, adjusting for sampling weights and school-level clustering. Multilevel logistic regression models adjusted for school-level clustering to assess correlates of e-cigarette awareness and trial. Finally, students who had tried only e-cigarettes were compared with students who had tried: (1) conventional cigarettes only; (2) both e-cigarettes and conventional cigarettes (dual triers); and (3) neither cigarette type (never triers).

Results: Fifty-one percent of students had heard about e-cigarettes, 19% believed e-cigarettes were less harmful than conventional cigarettes, and 10% had tried them. Independent correlates of e-cigarette awareness and trial included established risk factors for smoking, as well as technophilia (i.e., use of more media technologies) and greater Internet tobacco advertising exposure. Exclusive e-cigarette triers (4%) had significantly higher technophilia, bedroom Internet access, and Internet tobacco advertising exposure compared to conventional cigarette triers (19%) and never triers (71%) but not compared to dual triers (6%), although dual triers had significantly stronger conventional cigarette risk factors.

Conclusions: This study suggests that adolescent e-cigarette awareness and use is high in Mexico, in spite of its e-cigarette ban. A significant number of medium-risk youth have tried e-cigarettes only, suggesting that e-cigarettes could lead to more intensive substance use. Strategies to reduce e-cigarette use should consider reducing exposures to Internet marketing.

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IMPLICATIONS AND CONTRIBUTION

This study finds that awareness and trial of e-cigarettes are high among Mexican middle-school students, in spite of e-cigarette marketing and sales bans. Utilization of media technologies and Internet advertising exposure distinguish youth who have of tried e-cigarettes from those who have not, highlighting the need for research on these topics.

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* Address correspondence to: Dr. James F. Thrasher, Ph.D., Department of Health Promotion, Education & Behavior, Arnold School of Public Health, University of South Carolina, Discovery I Building, 534D, 915 Greene Street, Columbia, SC 29208.

E-mail address: thrasher@mailbox.sc.edu (J.F. Thrasher).

Worldwide, use of electronic cigarettes, commonly known as “e-cigarettes,” is rapidly increasingly [1], with sales projected to exceeded sales of conventional cigarettes by 2023 according to some projections [2]. E-cigarettes are marketed to youth through the Internet [3,4], social media channels [5], music festivals [6], and even in television ads in countries that permit it [7]. Recent

studies show high levels of awareness and increasing rates of trying e-cigarettes among adolescents. However, these studies have been conducted almost exclusively in high-income countries where e-cigarette sales and, in most cases, marketing are allowed. In the middle-income country of Mexico, regulators banned e-cigarette marketing and sales [8,9], as in most other Latin American countries. This article aims to evaluate the prevalence and correlates of e-cigarette use among Mexican youth in the context of this regulatory environment.

Background

Prior research indicates a substantial range in adolescents' awareness and use of e-cigarettes. For example, recent studies indicate that awareness is as high as 93% among Romanian university students (year = 2013) [10] and 85% among Finish adolescents (age 12–18 years; year = 2013) [5] and as low as 43% among 16–30 year olds in Canada (year = 2012) [11], where the sales of e-cigarettes with nicotine are banned. Trial and current use of e-cigarettes appears on the rise. Among US high school students, current e-cigarette use increased substantially from 2011 to 2014 (1.5%–13.4%) [12]. Similar trends have been reported in New Zealand, where the prevalence of trying e-cigarettes among 14- and 15-year-old youth tripled from 7% in 2012 to 20% 2014 [14]. Recent prevalence estimates for trial of e-cigarettes are particularly high in European countries, ranging from 17% among 12- to 18-year-old Finish youth (year = 2013) [5] and 19% among 14–17 year olds in North West England (year = 2013) [15] up to 24% in Poland (aged 15–19 years; year = 2010–2011) [16], 24% in Ireland (aged 16–17 years; year = 2014) [17], and 25% in Romania (aged 19–24 years; year = 2013) [10]. No estimates regarding youths' awareness or trial of e-cigarettes have been published for Latin American countries or other low- and middle-income countries (except Romanian studies of university students).

The correlates of trying e-cigarettes are generally similar to those reported for cigarettes, and include being male, Caucasian (in the United States), having a history of cigarette smoking, having parents and friends who smoke, and having higher sensation seeking tendencies [10,13,15,16]. Furthermore, perceiving e-cigarettes as less harmful than conventional cigarettes is associated with trial [13]. Focus groups and survey data indicate that the top reasons for e-cigarette experimentation among adolescents are curiosity, appealing flavors, and peer influences [16,18,19].

Some data suggest that the percentage of youth who only smoke e-cigarettes and not conventional cigarettes is increasing. For example, although traditional cigarette use declined among middle and high school youth in the United States between 2011 and 2014, current use of e-cigarettes increased significantly [12]. Indeed, the 2014 US National Youth Tobacco Survey indicated that current e-cigarette use has surpassed current use of cigarettes [12]. Some evidence indicates that exclusive e-cigarette use is being undertaken by adolescents whose levels for established smoking-related risk factors are intermediate between the levels among nonusers of any cigarette type and those among adolescents who use either just cigarettes or both types of cigarette [18]. Exclusive e-cigarette use among these “medium risk” youth is of potential public health concern because they may not have initiated nicotine use in the absence of e-cigarettes, and their use of e-cigarettes may prompt progression to conventional cigarette use.

E-cigarettes in Mexico

The Federal Commission for the Regulation of Sanitary Risks (COFEPRIS) regulates tobacco products and has banned the importation, distribution, marketing, and sales of e-cigarettes in Mexico [8]. Nevertheless, in 2012, approximately 5% of adult Mexican smokers had tried e-cigarettes, comparable to other middle-income countries [20]. The Internet provides information about e-cigarettes in Mexico. For example, the main auction website in Mexico (i.e., Mercadolibre, which is similar to E-bay), recently had >80 e-cigarette ads, and Google searches for e-cigarettes provide >80,000 hits with >20 online stores in the first six pages of the search. Advertising claims include implicit and explicit health-related and smoking cessation messages, as in other research [21].

Mexican adolescents' Internet use may increase their exposure to e-cigarette marketing, however, Internet and e-cigarette use may both reflect tendencies to adopt new technologies. The concept of “technophilia” draws attention to the “pleasure, affection, and emotional qualities” that accompanies new technology adoption [22]. To the extent that e-cigarettes represent new technologies, their adoption may also be associated with greater technophilia and resulting use of diverse novel technologies.

For this study of early adolescents in Mexico, we hypothesize that e-cigarette awareness and trial will be relatively low compared to countries allowing e-cigarette sales and marketing. We also hypothesize that e-cigarette awareness and trial will be associated with established risk factors for conventional cigarette use, as well as with Internet use and “technophilia.” Finally, we hypothesize that adolescents who only tried e-cigarettes will have a profile of established cigarette risk factors that is intermediate between that which characterizes adolescents who have not tried any cigarette type and adolescents who have tried conventional cigarettes.

Methods

Sampling

We analyzed cross-sectional data from first year students in public middle schools (i.e., usually 12–13 years) selected using stratified random sampling in Mexico's three largest cities (Mexico City, Guadalajara, and Monterrey). Sampling strata were based on: (1) high and low socioeconomic marginalization using 2010 census data for census tracts where schools were located; and (2) city-specific tertiles of retail establishment density, using Mexico's National Statistical Directory of Economic Units to identify commercial establishments likely to sell tobacco within school census tracts. Within each of these six strata, three or four schools were randomly selected with selection probability proportional to the number of students in each school, with a quota of 20 schools per city. Where a school did not agree to participate, a replacement school was selected randomly from the same stratum. Passive parental consent was used, with students providing active consent. Spanish language, self-administered questionnaires were based on prior, validated surveys and pretested to ensure comprehension. The protocol was approved by the Mexican National Institute of Public Health ethics committee, and data were collected in February and March 2015.

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