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Rise in Electronic Cigarette Use Among Adolescents in Poland


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A B S T R A C T

Purpose: Despite the potential negative health effects of electronic cigarettes (e-cigarettes), these devices are increasing in popularity worldwide, especially among youth.

Methods: We compared data from two cross-sectional studies conducted in Poland among students aged 15–19 years in 2010–2011 and 2013–2014. We tested differences between samples in the prevalence of e-cigarette use, tobacco cigarette smoking, and simultaneous use of both tobacco and e-cigarettes (“dual use”) using a multilevel linear mixed model regression.

Results: We found that the current use of e-cigarettes among adolescents in Poland was significantly higher in the 2013–2014 sample than the 2010–2011 sample (29.9% vs. 5.5%, respectively; $p < .05$). Dual use of tobacco and e-cigarettes was also significantly higher (21.8% vs. 3.6%, respectively; $p < .05$). Interestingly, the prevalence of smoking tobacco cigarettes also increased (from 23.9% in 2010–2011 to 38.0% in 2013–2014; $p < .05$).

Conclusions: Observed parallel increase in e-cigarette use and smoking prevalence does not support the idea that e-cigarettes are displacing tobacco cigarettes in this population.

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IMPLICATIONS AND CONTRIBUTION

Concerns have been raised on the negative consequences of increasing popularity of electronic cigarettes (e-cigarettes) among youth. We monitored e-cigarette use among adolescents in Poland in 2010–2011 and 2013–2014. Observed increase in e-cigarette use and smoking prevalence does not support the idea that e-cigarettes are displacing tobacco cigarettes in this population.

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Electronic cigarettes (e-cigarettes) are gaining popularity around the world. These devices mimic tobacco cigarettes by delivering nicotine in a smoke-like vapor that is inhaled by the user. Since no tobacco is burnt during vapor generation, they reduce the exposure to cardiovascular toxicants and cancer-causing agents [1]. It has been suggested that e-cigarettes may have potential benefits on the population level by reducing mortality and morbidity resulting from smoking tobacco cigarettes [2–4]. However, concerns have been raised on the

potential negative effects of their increasing popularity among youth.

In March 2014, Dutra and Glantz [5] published results from cross-sectional analyses of survey data from representative samples of U.S. middle and high school students showing an increase in e-cigarette use between 2011 and 2012. Ever use of e-cigarettes among U.S. students increased from 3.1% in 2011 to 6.5% in 2012, and the current use increased from 1.1% to 2.0%, respectively. There are currently no data as to whether e-cigarettes are gaining popularity among adolescents in European countries.

Methods

We completed a cross-sectional study to investigate e-cigarette use among students aged 15–19 years in Poland between October 2013 and January 2014. The study was performed in the two regions of Poland using a three-staged stratified cluster sample as described previously [6]. To compare e-cigarette use between the two samples, we pooled the data for the same regions and participants' age ranges from a larger cross-sectional study conducted nationally in 2010–2011 and compared it with data from 2013 to 2014. The same methods were used to collect the 2013–2014 sample as for the 2010–2011 sample, with the restriction of sampling to two regions of Poland (as opposed to several) and high schools but not universities. The 2010–2011 sample used for comparison included 1,760 students (89% response rate) from 17 schools (94% response rate). The 2013–2014 sample included 1,970 students (89% response rate) from 21 schools (84% response rate). Thirteen schools participated in both studies. Both surveys were anonymous, self-administered, pencil-and-paper questionnaire that included closed and open-ended questions about demographic characteristics, current and previous tobacco and e-cigarette use. Students were asked both whether they had ever and currently (in the past 30 days) smoked tobacco cigarettes or puffed on e-cigarettes (even a single puff). Study protocols were reviewed and approved by the Ethical Review Board at the Medical University of Silesia, Poland.

We tested differences in the prevalence of e-cigarette use, tobacco cigarette smoking, and simultaneous use of both tobacco and e-cigarettes (“dual use”) using a multilevel linear mixed model regression with the dichotomized survey time as the independent variable and age (continuous), sex (categorical), and area of living (categorical: urban vs. rural) as covariates. The analysis adjusted for the clustering caused by the sampling structure.

Results

We found that current e-cigarette use, dual use, and tobacco cigarette smoking were significantly higher in the 2013–2014 sample than the 2010–2011 sample ($p < .0001$). In 2010–2011, 16.8% (95% confidence interval [CI], 14.7–19.2) of the study sample had ever tried e-cigarettes and 5.5% (95% CI, 3.8–7.8) were current e-cigarette users. In 2013–2014, 62.1% (95% CI, 60.1–64.0) of the study sample had ever tried e-cigarettes and 29.9% (95% CI, 28.2–31.7) were current e-cigarette users. Current tobacco cigarette use was 23.9% (95% CI, 21.9–26.2) in 2010–2011 and 38.0% (95% CI, 36.0–40.1) in 2013–2014 ($p < .0001$). There was also a significant difference in current dual use of tobacco and e-cigarettes of 3.6% (95% CI, 2.2–5.8) in 2010–2011 and 21.8% (95% CI, 20.3–23.5) in 2013–2014 ($p < .0001$). In 2013–2014, 72.4% of

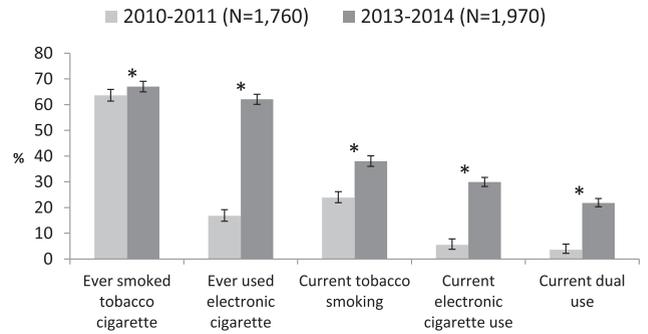


Figure 1. Tobacco and electronic cigarette use in cross-sectional samples of Polish adolescents obtained in 2010–2011 and 2013–2014. * $p < .05$, multilevel linear mixed model adjusted for sex, age, and area of living (urban vs. rural).

current e-cigarette users also smoked tobacco cigarettes (“dual use”), whereas in 2010–2011, 65.3% of current e-cigarette users were dual users. The results are presented in Figure 1. There were no significant differences in sample characteristics between the two surveys ($p > .05$).

Discussion

Our two cross-sectional samples of adolescents aged 15–19 years in Poland suggest that e-cigarette use is high and may be increasing among adolescents in Poland. We found higher rates of ever and current e-cigarette use in survey conducted in 2013–2014 than in 2010–2011. Interestingly, along with the higher prevalence of e-cigarette use in 2013–2014 compared with 2010–2011, the prevalence of smoking tobacco cigarettes was also higher (38.0% vs. 23.9%, respectively). Observed increase in smoking prevalence does not support the idea that e-cigarettes are displacing tobacco cigarettes in this population. Similar to the situation in the United States [5], dual use of conventional tobacco and e-cigarette is high among adolescents in Poland. Observed trends require confirmation in a larger nationally representative sample. Future research should carefully monitor national and global trends in the use of both products including dual use and switching between the products. Cohort observational studies are urgently needed to understand whether e-cigarette use may lead to smoking initiation (the so called “gateway” effect).

The 2010–2011 rates of e-cigarette usage among Polish students were higher than those among U.S. students. In a nationally representative sample, ever and current use of e-cigarettes among high school and university students in Poland in 2010–2011 were 23.5% and 8.2%, respectively, whereas among U.S. middle and high school students, the rates in 2011 were 3.1% and 1.1%, respectively [5,6]. The higher rates among students in Poland compared with those in the United States may be attributed to differences in the age range for the Polish sample in comparison with that of the U.S. sample (15–19 vs. 11–18 years, respectively), an earlier implementation of e-cigarettes on the national market as well as more aggressive advertisement campaigns, less comprehensive tobacco control policy that covers e-cigarettes, or a combination of these factors. Future studies should investigate how differences in tobacco control policies across various countries affect the popularity of e-cigarettes and whether the increasing popularity of these devices affects smoking prevalence among youth.

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