

Brief original article

# Opinions and practices regarding electronic cigarette use among Romanian high school students



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## ABSTRACT

**Objective:** The study assessed awareness, opinions, practices regarding electronic cigarettes (e-cigarettes) and factors associated with their use among Romanian high school students.

**Methods:** A cross-sectional study was conducted in 2013 in two major Romanian cities, distributing anonymous questionnaires to 342 high school students aged 16–18.

**Results:** 52.3% of the smokers, 29.2% of the ex-smokers and 7% of the never-smokers had tried e-cigarettes at least once in their life; 7.8% of the smokers and 4.6% of the ex-smokers had used e-cigarettes in the last month. Among smokers, e-cigarette use was associated with lower participation in school health education regarding e-cigarettes and with having parents using e-cigarettes. Among ex-smokers and never-smokers, e-cigarette use was associated with intention to use e-cigarettes in the next year and with having friends who use e-cigarettes.

**Conclusion:** Health education programmes and regulatory interventions addressing e-cigarettes are needed in Romania. More research is necessary on how to develop effective public health messages.

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## Opiniones y prácticas en relación con los cigarrillos electrónicos en estudiantes rumanos

## RESUMEN

**Objetivo:** Este estudio evaluó el conocimiento, las opiniones y las prácticas en relación con los cigarrillos electrónicos (e-cigarrillos), y los factores asociados a su uso, en estudiantes de colegio de Rumanía.

**Método:** Se realizó un estudio transversal mediante cuestionarios anónimos en 2013 en dos grandes ciudades de Rumanía, en 342 estudiantes de colegio de 16 a 18 años de edad.

**Resultados:** El 52,3% de los fumadores, el 29,2% de los ex fumadores y el 7% de los nunca fumadores habían probado los e-cigarrillos al menos una vez en la vida; el 7,8% de los fumadores y el 4,6% de los ex fumadores utilizaron e-cigarrillos en el último mes. Entre los fumadores, la experimentación con e-cigarrillos se asoció a una menor participación en actividades de educación sanitaria escolar al respecto y a tener padres que usan e-cigarrillos. Entre los ex fumadores y los que nunca han fumado, la experimentación con e-cigarrillos se asoció con la intención de utilizarlos en el próximo año y con tener amigos que los utilizan.

**Conclusión:** Se necesitan programas de educación para la salud e intervenciones reguladoras que aborden los e-cigarrillos en Rumanía. Es necesaria más investigación sobre cómo desarrollar mensajes eficaces de salud pública.

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### Palabras clave:

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## Introduction

Electronic cigarettes (e-cigarettes) are devices that deliver to the lung aerosols usually containing nicotine and other compounds.<sup>1</sup>

They are promoted as an alternative to traditional tobacco cigarette smoking, but there are several concerns regarding their

use: evidence about their safety and efficacy for smoking cessation remains limited, while they may increase the risk of non-smokers developing nicotine dependence and of current smokers maintaining their dependence.<sup>1–5</sup> Moreover, their novel nature and flavouring combined with an unrestricted marketing and sale in several countries may appeal to youth and e-cigarette experimentation might result in use of other tobacco products.<sup>3,6,7</sup>

Nevertheless, similar with other developing countries from Europe, the effect of the growing popularity and availability of e-cigarettes on Romanian adolescents is inadequately characterised.

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Hence, this study has two objectives. First, it will assess awareness, opinions and practices regarding electronic cigarettes use among high school students from Romania. Second, it aims to identify correlates of experimentation with e-cigarettes among Romanian adolescents.

## Methods

### Participants and recruitment

A cross-sectional study was conducted in May 2013 in 6 high schools situated in 2 big cities from North-Western Romania – three high schools from Cluj-Napoca (a town with approximately 330,000 inhabitants) and three high schools from Sibiu (a town having approximately 147,000 inhabitants). The study was approved by the review committees of the management boards of the participating schools. From each high school there were randomly chosen 1-2 classes from 10th grade and 1-2 classes from 11th grade.

### Instrument

The students were informed that their participation in the study was voluntary and were asked to fill in an anonymous questionnaire. All students agreed to participate.

The questionnaire assessed socio-demographic characteristics, awareness and sources of information regarding electronic cigarettes. Opinions about e-cigarettes, their use during lifetime and in the last month, reasons for using them, intention to use them in the next year and experimentation with e-cigarettes by people from the social environment were also investigated. Smoking behaviour was also evaluated; persons who smoked traditional cigarettes in the last month were defined as smokers, those who smoked in the past but not in the last month were considered ex-smokers and students who never smoked traditional cigarettes were never-smokers. Number of cigarettes smoked per day and the intention to quit smoking in the future was also investigated among smokers.

**Table 1**  
Opinions and practices regarding e-cigarette use by traditional tobacco cigarette consumption. High school students aged 16–18. Romania, 2013.

	Total sample N = 342 %	Smokers N = 128 %	Ex-smokers N = 65 %	Never smokers N = 149 %
<b>Awareness</b>				
Ever heard about e-cigarettes	93.9	93.8	96.9	92.6
<b>Sources of information about e-cigarettes</b>				
Internet	57.6	63.3 <sup>a,b</sup>	47.7 <sup>c</sup>	57
Sales points	27.1	25	23.1	30.9
Newspapers	14	17.2 <sup>b</sup>	15.4	10.7
Friends	65.2	74.2 <sup>a,b</sup>	67.7 <sup>c</sup>	56.4
People from the same school year	39.7	50.8 <sup>a,b</sup>	38.5	30.9
Parents	14.6	21.9 <sup>a,b</sup>	12.3	9.4
Siblings	7.9	7.8	7.6	8.1
School health education lessons	11.9	12.5	6.2	14.1
<b>Opinions</b>				
<i>E-cigarettes are less dangerous</i>				
I totally agree/I partially agree	54.3	57 <sup>b</sup>	55.5	49
I do not know	31.7	27.5 <sup>a,b</sup>	33.8	36.9
I totally disagree/I partially disagree	14	15.5	10.7	14.1
<i>E-cigarettes can help smokers to quit</i>				
I totally agree/I partially agree	52.6	54.7 <sup>b</sup>	61.5 <sup>c</sup>	47
I do not know	28.6	18.8 <sup>b</sup>	27.7 <sup>c</sup>	37.6
I totally disagree/I partially disagree	18.8	26.6 <sup>a,b</sup>	10.7	15.6
<i>E-cigarettes are used only by smokers</i>				
I totally agree/I partially agree	45.7	50 <sup>b</sup>	49.2 <sup>c</sup>	40.3
I do not know	33.6	25.8 <sup>b</sup>	26.2 <sup>c</sup>	43.6
I totally disagree/I partially disagree	20.7	24.2 <sup>b</sup>	24.6 <sup>c</sup>	16.1
<b>Social influences</b>				
Friends have tried e-cigarettes	67.1	70.3	61.5	67.1
People from the same school year have tried e-cigarettes	45.3	53.1 <sup>b</sup>	44.6	38.9
Parents have tried e-cigarettes	7.3	10.9	6.1	5.0
Siblings have tried e-cigarettes	8.8	19.5 <sup>a,b</sup>	4.6	1.3
<b>Behavior</b>				
Used e-cigarettes at least once during lifetime	28.9	52.3 <sup>a,b</sup>	29.2 <sup>c</sup>	8.7
Used e-cigarettes in the last month	3	7.8	4.6	0
<b>Reasons for trying e-cigarettes among high school students who experimented with them<sup>d</sup></b>				
E-cigarettes are less dangerous	20.2	22.7 <sup>a</sup>	10.5 <sup>c</sup>	23.1
To reduce the number of traditional cigarettes	-	17.7 <sup>b</sup>	10.5	0
To quit smoking	-	17.9 <sup>b</sup>	4.2	0
Curiosity	57.5	55.8 <sup>b</sup>	68.4 <sup>c</sup>	46.2
Other friends also tried e-cigarettes	18.2	13.4 <sup>b</sup>	15.7 <sup>c</sup>	46.2
<b>Intention to use e-cigarettes in the next year</b>				
Definitely yes/probably yes	13.9	32 <sup>a,b</sup>	12.3	7.4
I do not know	18.1	35.9 <sup>a,b</sup>	24.6 <sup>c</sup>	10.7
Definitely no/probably no	68	32.1 <sup>a,b</sup>	63.1	81.9

<sup>a</sup> Statistically significant differences ( $p < 0.05$  at chi-square test) between smokers and ex-smokers.

<sup>b</sup> Statistically significant differences ( $p < 0.05$  at chi-square test) between smokers and never smokers.

<sup>c</sup> Statistically significant differences ( $p < 0.05$  at chi-square test) between ex-smokers and never-smokers.

<sup>d</sup> The percentages are calculated for students who ever tried e-cigarettes.

## Data analysis

Chi-square tests were used in order to compare smokers, ex-smokers and never-smokers with regard to the investigated issues.

Logistic regression analyses using the stepwise forward method were performed to assess the correlation of e-cigarettes experimentation and several variables among smokers (students who smoke in the last month) and non-smokers (comprised of ex-smokers and never smokers).

Data analysis was performed with the SPSS-20 statistics programme. Significant results are reported at  $p < 0.05$ .

## Results

### Study sample

The study included 342 students aged 16–18 (mean age 17.02 years,  $SD = 0.68$ ) from the 10th and 11th grade (41.2% in the 10th grade and 48.8% in the 11th grade), living in two big cities of Romania (46.8% from Cluj-Napoca and 53.2% from Sibiu). Out of these, 46.5% were girls and 53.5% were boys.

The results showed that 37.4% of the students were smokers 19% were ex-smokers, while 43.6% were never-smokers.

### Awareness, opinions and social influences regarding e-cigarettes use

Table 1 show that the majority of the students reported having heard about e-cigarettes. The main sources of information were friends (65.2%), internet (57.65%) and people from the same school year (39.7%); smokers were more interested to search information from these sources. One out of four students has got his information from the sale points, 14.6% from their parents and around 12% from school based health education lessons.

Half of the study sample believed that e-cigarettes were less dangerous than traditional cigarettes and considered that e-cigarettes could help in quitting smoking; 45% of the students have

believed that e-cigarettes are only for smokers, with never-smoking students being statistically significant less convinced about this (Table 1).

The use of e-cigarettes perceived by students among their social environment was 67.1% among friends, 45.3% among people from the same school year, 7.3% among parents and 8.8% among their siblings.

### Experimentation with e-cigarettes and its correlates

52.3% of the smokers, 29.2% of the ex-smokers and 8.7% of the never-smokers declared that they had tried e-cigarettes at least once during their lifetime, while 7.8% of the smokers and 4.6% of the ex-smokers declared having used e-cigarettes in the last month. Intention to use them in the next year was declared by 32% of the smokers, 12.3% of the ex-smokers and 7.4% of the never-smokers.

Half of the smokers declared they used e-cigarettes because of curiosity, 21% because they are less dangerous than traditional cigarettes, while less than 20% used them to quit smoking or to reduce the number of cigarettes. Ex-smokers and never smokers tried e-cigarettes mainly because of curiosity and friend influences.

The results of the logistic regression analyses show that among smokers, e-cigarette experimentation was associated with lower participation in school health education regarding e-cigarettes and having parents using e-cigarettes. Among ex-smokers and never-smokers e-cigarettes experimentation was associated with intention to use e-cigarettes in the next year and with having friends using e-cigarettes (Table 2).

## Discussion

This study is one of the few studies performed among adolescents from European developing countries.<sup>3–14</sup>

Experimentation with e-cigarettes among smokers was associated with e-cigarettes use among parents, proving, similar to other studies,<sup>10</sup> the importance of the family environment. Lack of school educational activities regarding e-cigarettes was also associated

**Table 2**

Factors associated with e-cigarette experimentation<sup>a</sup> by traditional tobacco cigarette consumption. High school students aged 16–18. Romania, 2013.

Independent variables <sup>b</sup>	Smokers <sup>f</sup>		Non-smokers <sup>g</sup>	
	OR <sup>c</sup>	95%CI	OR <sup>c</sup>	95%CI
<i>Sources of information about e-cigarettes</i>				
Internet <sup>d</sup>	NS		NS	
Sales points <sup>d</sup>	NS		NS	
Newspapers <sup>d</sup>	NS		NS	
Friends <sup>d</sup>	NS		NS	
People from the same school year <sup>d</sup>	NS		NS	
Parents <sup>d</sup>	NS		NS	
Siblings <sup>d</sup>	NS		NS	
School health education lessons <sup>d</sup>	0.241	0.078–0.747	NS	
<i>Social influences</i>				
Friends have tried e-cigarettes <sup>d</sup>	NS		6.331	1.650–24.287
People from the same school year have tried e-cigarettes <sup>d</sup>	NS		NS	
Parents have tried e-cigarettes <sup>d</sup>	3.302	1.009–10.805	NS	
Siblings have tried e-cigarettes <sup>d</sup>	NS		NS	
<i>Intention to use e-cigarettes in the next year<sup>e</sup></i>				
	NS		2.747	1.741–4.333

95%CI: 95% confidence interval; NS: non-significant; OR: odds ratio.

<sup>a</sup> Never tried e-cigarettes (0) or tried e-cigarettes at least once during lifetime (1).

<sup>b</sup> The independent variables included in the logistic regression analyses were gender, sources of information about e-cigarettes, opinions about e-cigarettes (E-cigarettes are less dangerous; E-cigarettes can help smokers to quit; E-cigarettes are used only by smokers), social influences, intention to use e-cigarettes in the next year; among traditional tobacco cigarettes smokers the independent variables included also the number of traditional cigarettes smoked per day and intention to quit traditional cigarettes smoking in the next year.

<sup>c</sup> The logistic regression used the stepwise forward method; all correlations with depicted OR are significant:  $p < 0.05$ .

<sup>d</sup> Possibilities of answer: no (0) or yes (1).

<sup>e</sup> Possibilities of answer: from I totally disagree (–2) to I totally agree (+2).

<sup>f</sup> Comprised of smokers (have smoked traditional tobacco cigarettes in the last month).

<sup>g</sup> Comprised of ex-smokers (have smoked traditional tobacco cigarettes in the past, but not the last month) and never-smokers (never smoked traditional tobacco cigarettes).

with experimentation with e-cigarettes among smokers, underlying the role of school education. Experimentation with e-cigarettes was not associated with intention to quit smoking in the future. Moreover, the smokers declared the main reasons for using e-cigarettes curiosity and the fact that they are less dangerous. Hence, similar with other studies, our results underline that unlike older, more established cigarette smokers, e-cigarette use by high school students does not appear to be motivated mainly by the desire to quit cigarette smoking.<sup>7–11</sup>

Among ex-smokers and never-smokers, experimentation with e-cigarettes was associated with peer influence. Moreover, the main reasons declared by these adolescents for experimentation with e-cigarettes were curiosity and the peer influences. Similar with other studies, these results show that curiosity of trying these new products plays an important role, being important to further investigate if this type of experimentation is an isolated event or if it could lead to a frequent use.<sup>5,6,11</sup> In our study, experimentation with e-cigarettes among ex-smokers and never-smokers was associated with intention to use these types of products again in the next year.

The study has several limitations. It involved only a small sample of high school students from two big towns of Romania, which limits the generalization of the results beyond its sample, didn't allow for the analysis of the data separately for boys and girls and might interfere with the detection of some factors associated with e-cigarette experimentation. Due to the cross-sectional design, the identification of causal relationship is not possible.

Similar with other studies from Europe,<sup>5–15</sup> this study shows that health education programs and regulatory interventions addressing e-cigarettes are necessary in Romania. More research is needed on how to develop effective public health messages.

#### Editor in charge

M<sup>a</sup> José López.

#### Transparency declaration

The corresponding author on behalf of the other authors guarantee the accuracy, transparency and honesty of the data and information contained in the study, that no relevant information has been omitted and that all discrepancies between authors have been adequately resolved and described.

#### What is known about the topic?

Electronic cigarettes are devices that deliver to the lung aerosols usually containing nicotine and other compounds. Because e-cigarettes are relatively new, data on usage patterns and factors which influence them are needed, in order to shape educational and public health policies.

#### What does this study add to the literature?

This is one of the few studies performed among adolescents from European developing countries regarding e-cigarette use and presents data regarding opinions and practices with respect to this issue among Romanian high school students. The study shows that e-cigarettes are a phenomenon very present in the Romanian society and health education programs and regulatory interventions addressing e-cigarettes are needed, while more research is necessary on how to develop effective public health messages.

#### Authorship contributions

L.M. Lotrean was involved in development of the study design and instrument, supervised data collection efforts, performed data analyses and writing the article. B. Varga performed data collection. M. Popa was involved in development of the study design and instrument. C.R. Loghin, M.A. Man and A. Trofor provided assistance in interpretation of results and writing the article. All authors read and approved the final manuscript.

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#### Conflicts of interest

None.

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