

Medical students' perceptions towards e-cigarettes: highlighting the gap in universities' curricula

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Abstract

Background: Despite use of electronic cigarettes is having an increasingly disturbing proportion, limited attention has been paid to investigate knowledge of healthcare professionals and medical students towards it use, as well as medical curricula do not include specific training on this topic. The aim of the present study was to assess the level of perception, knowledge, and awareness towards electronic cigarettes amongst medical students.

Methods: A cross-sectional study was conducted in a sample of students of the School of Medicine of University of Barcelona, Spain, between September and December 2017.

Results: A total of 159 medical students returned the survey, being the majority female (82.4%) and first year students (79.9%). The 84.7% of interviewees never smoked, the 5.7% were former smoker, and the remaining 9.6% were current smokers. Responses to the questions about knowledge and awareness towards electronic cigarettes highlighted sub-optimal levels throughout the sample. The vast majority (87.4%) answered that ECs can generate addiction. Regarding EC use as smoking cessation method, only the 35.2% indicated ECs to be an effective. None of the collected characteristics was found as significantly associated with students' level of knowledge and perceptions.

Conclusions: As students are nowadays asked to build a complete passport of their medical skills, reviewing existing training programmes is necessary to address correct knowledge about this topic, also by implementing most effective educational paradigms applicable in school of medicine.

Abbreviation: EC: electronic cigarette

Background

As known, smoking is an important risk factor for several diseases and a major cause of mortality. Yet, it is preventable and previous studies demonstrated that the fraction of attributable risk of mortality can be reduced by sustained quitting [1].

Nowadays, the use of electronic cigarettes (EC) has been marked as alternatives to smoking and smoking cessation method, to such a point that it has exponentially grown and a large variety of devices is now available and distributed in western countries. Indeed, several studies showed that EC use is significantly associated with the smoking quitting rate; these researches also fostered further population, interventional, and tobacco control analysis [2-4].

ECs do not burn tobacco, since they are battery-operated electronic device that produces vapours, usually containing nicotine, propylene glycol, and other chemical additives and flavours [5,6]. Moreover, United States Food and Drug Administration (FDA) advised that ECs still contain several toxic chemicals and carcinogens suspected of being harmful to humans (anabasine, myosmine, and beta-nicotyrine) [7,8].

So that, ECs' impact on health is subject of study in the scientific community but many doubts remain expressed regarding the use of this device as a smoking cessation aid [9-11].

Nevertheless, limited attention has been paid to investigate knowledge of healthcare workers towards the use of ECs [12,13] and,

as far as we know, little or nothing has been investigated to assess the actual level of attention about this topics in medical students [14], when studying and training programmes should incorporate notional concepts, since its relevance for health research and practices. Indeed, medical students' attitudes towards smoking control and cessation are recognized to be related to training in their curricula and prevention efforts stand to gain from focused study programs [15].

Therefore, the aim of the present study was to delineate the level of perception, knowledge and awareness towards ECs amongst medical students.

Methods

A self-administrated cross-sectional survey was built and administrated to medical students of School of Medicine of University of Barcelona, Spain, between September and December 2017.

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For the purpose of the study included the following steps, students were invited and informed of the opportunity to participate in the survey, by making them known of the aims of the study. They were also assured their participation would be voluntary, that all information gathered would be anonymous, and that confidentiality would be maintained, as well as they were allowed to confirm their own informed consent by returning the survey. Involvement was voluntary and no incentives were offered to complete it. Subsequently, each student who agreed to participate received a copy of the questionnaire and instructed about how to complete it.

The research instrument comprised of questions to assess participants' characteristics (gender, faculty year) and smoking status and habits, as well as the following items through a series closed questions (Yes/No/Don't Know): 1) Are ECs less harmful than tobacco cigarettes? 2) Can ECs generate addiction? 3) Are ECs an effective device for smoking cessation? 4) Are ECs more safety than tobacco? 5) In Spain, is it possible to vaping with EC electronic cigarettes in public areas? 6) Is the use of ECs allowed to underage persons? 7) As a future doctor, would you recommend EC as smoking cessation aid to a patient? 8) As a future doctor, would you recommend EC as smoking reduction methods to a patient? 9) Do you think that the concomitant use of EC and tobacco will effectively reduce the number of smoked cigarettes? 10) Do you think that physicians should take position in favour of the EC? 11) Do you think that ECs should be prohibited? 12) Are ECs more expensive than normal tobacco? 13) Is the harmful effect of ECs due to the diethylene glycol?

For the purpose of the analysis, a data spreadsheet was set and analysed with Stata statistical software version 12 [16]. Data were described as numbers and percentages. Chi-square (χ^2) and Fisher's exact tests were used to assess significant differences in correct knowledge according to students' gender, faculty year, and smoking status and habits. Significance cut-off was set at <0.05.

Results

Of the 227 questionnaires distributed among students, a total of 159 agreed to participate in the survey, yielding a responding rate of 70.0%: sample characteristics are reported in (Table 1). The vast majority was female (82.4%) and first-year students (79.9%). Regarding smoking status and habits, the 84.7% of interviewees declared that they never smoked, while the 5.7% were former smoker, and the remaining 9.6% were current smokers. None of them reported current or previous ECs use. Responses to the questions about knowledge and awareness towards ECs are listed in (Table 2). Main findings are as follows. More than three fourth (78.6%) of medical students recognized ECs as less harmful than tobacco cigarettes and two third (66.0%) also as more safety than tobacco cigarettes. The vast majority (87.4%) answered that ECs can generate addiction. Regarding its use as smoking cessation method, only the 35.2% indicated EC to be an effective device, and only

Table 1. Baseline characteristics of study participants (n=159)

Characteristic	n (%)
Gender	
Male	28 (17.6)
Female	131 (82.4)
Faculty year	
1	127 (79.9)
2 or upper	32 (20.1)
Smoking habits	
Never smoker	133 (84.7)
Former smoker	9 (5.7)
Current smokers	15 (9.6)

Table 2. Medical students' knowledge and perceptions towards electronic cigarettes use

	%		
	Yes	No	Don't know
1) Are ECs less harmful than tobacco cigarettes?	78.6	20.1	1.3
2) Can ECs generate addiction?	87.4	12.0	0.6
3) Are ECs an effective device for smoking cessation?	35.2	64.8	-
4) Are ECs more safety than tobacco?	66.0	31.6	2.5
5) In Spain, is it possible to vaping with EC electronic cigarettes in public areas?	33.3	64.8	1.9
6) Is the use of ECs allowed to underage persons?	12.6	87.4	-
7) As a future doctor, would you recommend EC as smoking cessation aid to a patient?	23.9	75.5	0.6
8) As a future doctor, would you recommend EC as smoking reduction methods to a patient?	66.7	32.0	1.3
9) Do you think that the concomitant use of EC and tobacco will effectively reduce the number of smoked cigarettes?	45.3	53.4	1.3
10) Do you think that physicians should take position in favour of the EC?	12.6	81.1	6.3
11) Do you think that ECs should be prohibited?	27.0	71.1	1.9
12) Are ECs more expensive than normal tobacco?	45.3	52.8	1.9
13) Is the harmful effect of ECs due to the diethylene glycol?	56.6	23.3	20.1
EC, electronic cigarette			

the 23.9% would recommend it to patients to quit smoking; about a half (53.4%) not even thought that concomitant use of EC and tobacco could effectively reduce the number of smoked cigarettes. Furthermore, when asked about what position physicians should take towards the EC use, the 81.1% of students replied that they would not be favourable. None of the collected characteristics was found as significantly associated with students' level of knowledge and perceptions (*p*-value greater than 0.05), probably because of small sample size that did not compensate for inherent differences.

Discussion

Our cross-sectional study, even though limited by the sample size, can be considerate as a preliminary research providing an interesting insight about the level of perception and knowledge towards ECs amongst students of medical faculties.

Firstly, the percentage of current smokers in our sample (9.6%) is along the lines of usual prevalence of smoker among medical students [17,18].

As can be expected, precipitants mainly consider EC as less harmful than tobacco cigarettes, in accordance with general population belief [19,20], while only the 66% of them agrees when answered about a major safety of ECs compared with tobacco.

However, the vast majority agrees with the idea that EC, like other smoking products, can generate addiction too.

A certain sensitivity on tobacco control strategy is commonly traceable among health professional students: [21] in this aspect, it worth to be underlined that only two third of respondents considered EC an effective device for quitting smoking, and this number remained constant regarding the idea that EC would be a harm reduction method, to such an extent that 66.7% of the sample affirmed they would recommend it to patients. Nevertheless, interviewees' opinion on the concomitant use of ECs and tobacco with the aim to reduce the number of smoked cigarettes is discordant, likely because they might not have received yet the properly education on tobacco and smoking during their training. Only the 23.9% of students would recommend

it as smoking cessation aid. The vast majority of them (81.1%) were careful not agreeing that physicians should take position in favour of the EC though.

Three more questions were designed to investigate knowledge and beliefs of the students regarding the regulatory policies on ECs.

Little more than a tenth (12.6%) of students thought that ECs' use is allowed to underage persons and disparity was shown when they were asked if it was possible to vaping in public areas, in accordance with regional policies. The uncertainty on these aspects may be explained with the fact that the control measures on ECs are still sub-optimal and should be better widespread among policy-makers [4].

The 27% strongly answered that ECs should be prohibited, but this item could be slanted by the high number of never smoker in our sample.

Interesting is the finding of the noticeable percentage (20.1%) of non-responders at the question about diethylene glycol contained in refill liquids for ECs, while more than a half of them indicated it as harmful a organic compound unlikely to cause systemic toxicity, when not exceeding safety standards [7,22,23].

Assessing students' knowledge on a variety of topics has long been a validated method to tailor educational program on the actual educative needs of student body; in medicine, due to his constant changes, the effectiveness of surveys is even a key element for gathering a correct training to students themselves. Indeed, regarding smoking topics, there is a consolidated practice of investigating knowledge, attitudes, and practices amongst medical students [24-26].

On ECs, a recent published study [14] evaluated EC use and awareness of health professional students, in academic centre of Unites States. That research found scarce level of knowledge and highlighted the importance of improve healthcare workers' preparedness about ECs themselves, since several population-based studies showed that ECs are worldwide spread among consumers [2,3].

In a general analysis, our findings can persuade of multi-faceted level of different perception amongst medical students, emphasizing the importance of make them aware about this topic, as well as on all smoking related topics. Medical students and recent graduates are often not confident with smoking control strategies, although when aware of the importance of their role as physicians in anti-tobacco campaigns [15,24].

Curricular revision processes for medical schools, on the other hand, should always take in count changes in population's behaviours, as their clinical implications, particularly in public health and preventive medicine fields, in order to promote health itself and address risk determinant factors [27].

Moreover, specifically referring to preventive medicine teaching and training paradigms, they can beneficiate of the introduction of "real life" problems, such as smoking/harm reduction and cessation and EC concepts, being case-based and problem-based learning a successful key for fostering students' professional formation in such fields [28,29].

A main limitation of this study is that enrolled participants are early-years students and might not have appropriately trained on tobacco dependence. Nevertheless, the number of early-years students is explained by the structure of pre-hospital curricula in the university. We acknowledge that results are based on self-reported information and any potential reporting bias may have occurred due to misinterpretation of the questions.

Despite of these limitations and of the sample size, we believe that the aims of this research have been achieved, by offering pioneer information on medical students' perceptions towards EC and encouraging further studies of appropriate methodological quality to better highlight determinant factors for students' preparedness to facing challenges that could come out in their future clinical practice.

Briefly, the attention on the presented topic should represent part of professional background of future physicians, in order to better respond to the need to make fundamental changes in studying and training programmes, based on the best evidences available so far. Important implications come out from our findings, listed as follows: public health and preventive medicine trainers in medical schools should always consider the inclusion of information about health promotion, smoking/harm reduction and cessation, as well as about electronic cigarettes use in medical curricula; future researches and interventions are needed to evaluate medical students' training needs about this topic, in order to address programs at university level.

Ethics approval and consent to participate

The Institutional Review Board of the Hospital Universitari de Bellvitge granted the approval to carry out this research. Invited participants were informed about the aims of the study. Consent to participate was implied with the completion of the surveys.

Consent for publication

Not applicable.

Availability of data and materials

Data and supporting materials associated with this study will be provided upon request by the corresponding author.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

CMA and JMRT designed the study and the research tool, and supervised the field collections. PF performed the data analysis. PF and JMRT wrote the manuscript. All authors read and approved the final manuscript.

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