



Knowledge and Habits of Brazilian Dental Students about Electronic Cigarettes

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Authors' contributions

This work was carried out in collaboration among all authors. Author ILM designed the study, managed the literature searches, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript and collected the data. Author MLMT assisted the literature searches, investigation, data collection and statistical analysis. Author BLS assisted the investigation, methodology and data collection. Author SAM designed the study, wrote the protocol, performed the statistical analysis, the project administration and supervised the investigation. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To analyze the knowledge level and usage habits of Dental students related to electronic cigarette (EC).

Study Design: Cross-sectional observational study.

Place and Duration of Study: This study was developed in the Dentistry Course at Campus VIII of State University of Paraiba located in Araruna, Brazil, between March and December of 2022.

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Methodology: This study included students over 18 years old, who answered a structured questionnaire containing 38 questions about their habits and knowledge about EC. Data were analyzed using descriptive and analytical statistics (Pearson's Chi-Square and Fisher's Exact tests), considering statistical significance at $p < 0.05$. The study was approved by the Research Ethics Committee.

Results: 192 Dental students participated of this research, most of them female, white, with family income above three minimum wages, coming from other cities. Most students are not smokers of any type of cigarette, nor passive smoker, they have already tried EC, but do not have it, knowing a student who has it. In addition, most students reported having low (college seniors- 5th to 10th periods) and intermediate/high (freshmen- 1st to 4th periods) knowledge about the electronic device. Students with less knowledge were statistically less prepared ($p < 0.001$) to advise their patients about the EC, and less likely to have already tried it ($p < 0.001$) and wanting to try it ($p < 0.001$). Students were aware that EC is harmful to health, has nicotine and can cause systemic diseases, including oral cancer. However, they were unaware that the device is prohibited from sale and import in Brazil.

Conclusion: Although students affirmed that EC is as harmful as conventional cigarette and it can cause diseases such as cancer, their knowledge about this device is still superficial and scarce. Therefore, more advertising campaigns are needed to prevent the device use among young people and about the damage caused to the health of its users.

Keywords: Electronic nicotine delivery systems; tobacco products; students; dental.

1. INTRODUCTION

Smoking remains a major impasse for global public health, being the main cause of preventable death. Tobacco use is a risk factor for developing cancer (mouth, esophagus, larynx, lung and pancreas), in addition to being related to lung and cardiovascular diseases. Thus, smoking was the cause for around six million deaths worldwide [1,2]. In Brazil, there has been a reduction in conventional cigarette smokers in recent years. However, the scenario remains worrying, as it is estimated that around 160,000 deaths per year are from users of various types of tobacco [3].

Over time, many other ways of using tobacco have emerged, such as electronic cigarettes (EC), which are becoming increasingly common among youngsters around the world [4]. EC emerged as a variation of conventional cigarettes, being an alternative to smoking cessation [5]. However, users of these devices mistakenly consider them to be harmless when compared to conventional cigarettes, which ended up spreading their use [4,6].

EC are electronic smoking devices maintained by a battery, containing an aerosolized solution that has chemicals such as nicotine, glycerol, propylene glycol, flavoring agents and dyes [7]. Due to the absence of combustion, EC are considered less harmful than conventional cigarettes, as they do not produce the same

harmful chemicals in the lungs [5,8], however they are not free from compromising the health of their users. Although there are fewer toxic products in the vapor from these electronic devices than those found in conventional cigarette smoke, there are still harmful products in this vapor, such as nicotine, carcinogens, lead and volatile organic compounds. Nicotine can harm fetal development in addition to affecting learning, concentration and mood in young people. Additionally, nicotine can increase dependence on other medications [9].

EC were introduced onto the market in 2004 and emerged as an alternative to replacing/interrupting conventional smoking. They are electronic devices that have four main elements: (a) a cartridge or reservoir, (b) a heating element, (c) a rechargeable lithium battery and (d) a mouthpiece, through which inhalation is performed. Cartridge contains an aerosolized liquid solution with chemicals such as nicotine, glycerol, propylene glycol, flavoring agents and coloring agents. When heated by the battery they generate liquid vapor, similar to conventional cigarette smoke, containing flavored nicotine, which is inhaled. "Vaping" is the term referring to the inhalation of liquid, which is generated by the vaporization of the device, which does not require combustion. Nicotine is therefore delivered by aerosolization rather than tobacco smoke, avoiding many toxic byproducts of traditional combustion. Electronic devices use developed quickly and globally, especially among

young people, even those who were not smokers which becomes a worrying issue [5,7,8,10,11].

In a survey carried out in Brazilian capitals in 2019, it was estimated that 6.7% of the population over 18 years old have already used EC at some point in their lives, and that currently, 2.32% of individuals use them daily or occasionally, with occasional use being the most frequent. The number of individuals who have already had contact with EC is around 2.4 million of which 835 thousand are currently using them. Young people were most impacted by the appearance of EC, as around 80% of individuals who have already used it were aged between 18 and 34 years. It is extremely important to highlight that half of the people who have used EC in their lives, or who currently use it, are participants in the never-smoker group. Among smokers, it is estimated that 6.86% currently use EC, thus demonstrating that around 242 thousand people have dual use of conventional cigarettes and EC [12].

The aim of this work was to analyze the level of knowledge and consumption habits of Dentistry students at the State University of Paraiba (UEPB) about EC.

2. MATERIALS AND METHODS

Cross-sectional observational study, using a questionnaire adapted from Guckert et al. [13], to analyze the consequences and repercussions that the use of EC causes on the systemic and oral health. The study was made between March and December of 2022 at Campus VIII of State University of Paraiba. The sample comprised students of the Dentistry Course at UEPB Campus VIII who answered a structured questionnaire and signed the Informed Consent Form. Students above 18 years old were included and questionnaires answered incompletely were excluded. The questionnaire presented eight sociodemographic questions (age, gender, family income, origin, race/ethnicity, etc.) and 30 questions related to students' contact and knowledge about the EC (if they have tried it, had it, or if they knew someone who has it. About any damage to health caused by the device and about Brazilian legislation regarding EC). According to the period enrolled, students were divided into freshmen (P1 to P4, pre-clinical periods) and seniors (P5 to P10, clinical periods). Data were analyzed using descriptive and analytical statistics, using the

Statistical Package for the Social Sciences (SPSS™) version 26.0 (SPSS Inc., Chicago, USA). Person's Chi-square and Fisher's exact tests were used, considering $p < 0.05$. This study was approved by the Research Ethics Committee of UEPB (CAAE 57334222.0.0000.5187), and all bioethical principles were respected, in accordance with Resolution 466/12 of the National Health Council/Ministry of Health and the Helsinki Declaration.

3. RESULTS AND DISCUSSION

3.1 Results

From 245 students enrolled in the Dentistry Course, 192 (78.4%) participated in the research. The majority were female ($n=126$, 65.9%), with family income above three minimum wages-MW (60.9%), concentrated in the clinical period ($n=110$, 57.3%), coming from other cities ($n=184$, 95.8%), self-declared white ($n=109$, 56.7%), residents with family ($n=92$, 47.9%) and with non-smokers ($n=168$, 90.8%) according to Table 1.

Most students never smoked; but they know what is EC and they know someone who has the EC, they have tried it (at least once), but doesn't have the device. The majority answered they would not try EC and that the COVID-19 pandemic could have influenced the start of EC use (Table 2). Initial confinement due to the pandemic and uncertainty surrounding the start of vaccination and return to school causing stress may have influenced this beginning of EC use by young people.

Regarding self-assessment of the level of knowledge about EC, most freshmen reported having intermediate/high knowledge (52.4%), while the majority of seniors indicated low knowledge (54.5%). A slight majority of freshmen (50.7%) indicated that they prepared to provide guidance regarding the EC. Most senior students (64.4%) do not feel qualified to guide a patient who questions them. With regard to diseases, positive answers predominated regarding the EC ability to cause both oral and systemic disease (above 80%). There was a predominance of valid answers about the ban on the use of EC indoors (but most students reported not knowing this information) and that EC use influenced the reduction of conventional cigarettes (Table 3).

Table 1. Characterization of the sample according the periods from the Dentistry Course. Araruna, PB, Brazil. 2022

Variables	Freshmen (P1 - P4)		Valid sample/Missing sample	Seniors (P5 - P10)		Valid sample /Missing sample
	n	%		n	%	
Gender						
Female	50	61.7	81/1	76	69.1	110/0
Male	31	38.3		34	30.9	
Family Income						
< 3 Minimum Wage (MW*)	35	44.9	78/4	38	34.9	109/1
≥ 3 MW	43	55.1		71	65.1	
City						
Araruna	4	4.9	82/0	4	3.6	110/0
Others	78	95.1		106	96.4	
Race/Ethnicity						
White	47	57.3	82/0	62	56.9	109/1
Non-White	35	42.7		47	43.1	
Home						
Alone	37	45.1	82/0	23	20.9	110/0
With others (family, friends)	45	54.9		87	79.1	
Passive smoker (cigarette, electronic cigarette or narguile)						
Yes	8	10.1	79/3	9	8.5	106/4
No	71	86.6		97	91.5	

*1 MW=R\$1212.00.

Table 2. Characterization of students regarding the Electronic cigarette use. Araruna, PB, Brazil. 2022

Variables	Freshmen (P1 - P4)		Valid sample/Missing sample ⁺	Seniors (P5 - P10)		Valid sample/Missing sample ⁺
	n	%		n	%	
Smoker Status (any type)						
Smoker/ex-smoker	19	23.5	81/1	19	17.4	109/1
Never smoked	62	76.5		90	82.6	
Do you know electronic cigarette?						
Yes	79	96.3	82/0	108	99.1	109/1
No	3	3.7		1	0.9	
Have you tried (at least once) electronic cigarette?						
Yes	43	52.4	82/0	54	49.1	110/0
No	39	47.6		56	50.9	
Do you have an electronic cigarette?						
Yes	3	3.7	82/0	1	0.9	110/0
No	79	96.3		109	99.1	
Do you know someone from Dentistry Course who has electronic cigarette?						
Yes	44	53.7	82/0	80	72.7	110/0
No	38	46.3		30	27.3	
If a friend offered you an electronic cigarette, would you try it?						
Yes	34	42.0	81/1	40	36.4	110/0
No	47	58.0		70	63.6	
Could the Covid-19 pandemic influence the beginning of electronic cigarette use?						
Yes	56	83.6	67/15	64	71.1	90/20
No	11	16.4		26	28.9	

⁺Missing Sample: answered "I don't know"

Table 3. Students' self-assessment of knowledge about cigarettes and characteristics of electronic cigarette use. Araruna, PB, Brazil. 2022

Variables	Freshmen (P1 - P4)		Valid sample/Missing sample*	Seniors (P5 - P10)		Valid sample/Missing sample*
	n	%		n	%	
How would you rate your level of knowledge about electronic cigarette?						
Low knowledge	39	47.6	82/0	60	54.5	110/0
Intermediate/high knowledge	43	52.4		50	45.5	
Compared to conventional cigarettes, electronic cigarette is:						
Most harmful	14	17.3	81/1	14	13.5	104/6
Equally harmful	42	51.9		62	56.4	
Less harmful	25	30.9		28	25.5	
Did you receive any information during your course (from a professor) about the effects of electronic cigarette use on health?						
Yes	57	69.5	82/0	31	28.2	110/0
No	25	30.5		79	71.8	
Do you, as a student and future dental surgeon, feel prepared to guide a patient who asks you about electronic cigarette?						
Yes	37	50.7	73/9	32	35.6	90/20
No	36	49.3		58	64.4	
Can electronic cigarette use cause any oral or systemic disease?						
Yes, it causes oral disease	6	7.8	77/5	7	6.8	103/7
Yes, it causes systemic disease	5	6.5		10	9.7	
Yes, it causes both diseases	66	85.7		85	82.5	
It does not cause disease	0	0,0		1	1.0	
Is it allowed to smoke electronic cigarette in places where conventional cigarettes are prohibited, such as closed and public places?						
Yes	17	42.5	40/42	28	48.3	58/52
No	23	57.5		30	51.7	

*Missing Sample: answered "I don't know."

Table 4. Students' self-assessment of knowledge about electronic cigarettes. Araruna, PB, Brazil. 2022.

Variables	Freshmen (P1 - P4)		Valid sample/Missing sample*	Seniors (P5 - P10)		Valid sample/Missing sample*
	n	%		n	%	
Electronic cigarette can help people stop smoking conventional cigarette.						
Yes	40	66.7	60/22	42	56.8	74/36
No	20	33.3		32	43.2	
Electronic cigarette has a pleasant taste and aroma.						
Yes	54	90.0	60/22	68	88.3	77/33
No	6	10.0		9	11.7	
Electronic cigarettes have carcinogenic substances in their composition.						
Yes	56	94.9	59/23	68	91.9	74/36
No	3	5.1		6	8.1	
Electronic cigarettes may contain nicotine in their composition.						
Yes	63	90.0	70/12	71	92.2	77/33
No	7	8.5		6	7.8	
Electronic cigarettes generate passive/secondhand smoke.						
Yes	57	98.3	58/24	70	90.9	77/33
No	1	1.7		7	9.1	
The annual cost of electronic cigarettes is cheaper than conventional cigarettes.						
Yes	9	23.7	38/44	8	16.7	48/62
No	29	76.3		40	83.3	
In Brazil the sale and import of electronic cigarettes is prohibited.						
Yes	16	32.0	50/32	13	19.4	67/43
No	34	68.0		54	80.6	
Electronic cigarette increases the risk of oral cancer.						
Yes	62	96.9	64/18	80	97.6	82/28
No	2	3.1		2	2.4	

*Missing Sample: answered "I don't know."

Table 5. Association between the self-reported knowledge of dentistry students regarding the use of electronic cigarettes and their experiences of using them. Araruna, PB, Brazil. 2022

Variable	Electronic Cigarette	
	Low knowledge n (%)	Moderate/High knowledge n (%)
Smoker Status (any type)		
Smoker/ex-smoker	15 (38.5)	24 (61.5)
Never smoked	83 (54.6)	69 (45.4)
p-value	0.072*	
Do you know electronic cigarette?		
Yes	95 (50.5)	93 (49.5)
No	4 (100.0)	0 (0)
p-value	0.122**	
Have you tried (at least once) electronic cigarette?		
Yes	33 (33.7)	65 (66.3)
No	67 (70.5)	28 (29.5)
p-value	<0.001	
Do you have an electronic cigarette?		
Yes	0 (0)	4 (100.0)
No	100 (52.9)	89 (47.1)
p-value	0.052**	
Do you know someone from Dentistry Course who has electronic cigarette?		
Yes	58 (46.4)	67 (53.6)
No	42 (61.8)	26 (38.2)
p-value	0.041*	
If a friend offered you an electronic cigarette, would you try it?		
Yes	26 (34.7)	49 (65.3)
No	74 (63.2)	43 (36.8)
p-value	<0.001*	
Could the Covid-19 pandemic influence the beginning of electronic cigarette use?		
Yes	54 (45.0)	66 (55.0)
No	24 (63.2)	14 (36.8)
p-value	0.051*	

*Pearson's Chi-Square Test. **Fisher's Exact Test.

Table 6. Association between students' self-reported knowledge regarding the use of electronic cigarettes and information about it. Araruna, PB, Brazil. 2022

Variables	Electronic Cigarette	
	Low knowledge n (%)	Moderate/High knowledge n (%)
Compared to conventional cigarettes, electronic cigarette is:		
Most harmful	12 (42.9)	16 (57.1)
Equally harmful	57 (54.8)	47 (45.2)
Less harmful	27 (50.0)	27 (50.0)
p-value	0.515*	
Did you receive any information during your course (from a professor) about the effects of electronic cigarette use on health?		
Yes	39 (44.3)	49 (55.7)
No	61 (58.1)	44 (41.9)
p-value	0.056*	
Do you, as a student and future dental surgeon, feel prepared to guide a patient who asks you about electronic cigarette?		
Yes	20 (29.0)	49 (71.0)
No	68 (71.6)	27 (28.4)
p-value	<0.001*	
Can electronic cigarette use cause any oral or systemic disease?		
Yes, it causes oral disease	6 (46.2)	7 (53.8)
Yes, it causes systemic disease	7 (46.7)	8 (53.3)
Yes, it causes both diseases	78 (51.7)	73 (48.3)
It does not cause disease	0 (0)	1 (100.0)
p-value	0.843**	
It is allowed to smoke electronic cigarette in places where conventional cigarettes are prohibited such as closed and public places.		
Yes	19 (42.2)	26 (57.8)
No	27 (50.9)	26 (49.1)
p-value	0.389*	
Electronic cigarette can help people stop smoking conventional cigarette.		
Yes	33 (39.8)	50 (60.2)
No	29 (55.8)	23 (44.2)
p-value	0.069*	
Electronic cigarette has a pleasant taste and aroma.		
Yes	54 (43.9)	69 (56.1)
No	8 (53.3)	7 (46.7)
p-value	0.488*	

*Pearson's Chi-Square Test. **Fisher's Exact Test.

Most students indicated that EC has a pleasant flavor and aroma, and that it contains carcinogenic and toxic substances in its composition, as well as nicotine. Furthermore, they responded affirmatively that EC generates passive/secondhand smoke, with their annual cost being more expensive than conventional cigarettes, and their sale in Brazil is not prohibited (Table 4).

Regarding the students' self-reported level of knowledge (low or moderate/high) about EC, there were no statistically significant differences ($p > 0.05$) in relation to gender, family income (up to 3MW, above 3MW) and period studied (1st-4th or 5th-10th). There was a statistically significant relationship between knowledge level about EC and the report of having tried it at least once ($p < 0.001$), so those students with the lowest knowledge level were those who had not tried it. Regarding knowledge level about EC an association was observed with the variables of knowing a friend who has one ($p = 0.041$) and trying it if a friend offers a cigarette ($p < 0.001$), so that low knowledge prevailed among those who do not know and would not try it (Table 5).

Table 6 demonstrates the association between students' self-reported knowledge regarding EC use and information about it, with statistically significant associations observed between knowledge level regarding EC and preparation to guide patients ($p < 0.001$) with low knowledge predominating among those students who do not feel prepared.

3.2 Discussion

Dentistry Course at UEPB Campus VIII, located in Araruna, Paraiba has 245 students, of which 78.4% ($n = 192$) participated in this research. The vast majority were women being more concentrated from second half of the course onwards (seniors). There was a predominance of white students coming from other cities with family incomes above three minimum wages. This socioeconomic profile remained similar to another study carried out nine years ago on the same Campus with 109 Dental students, in which women (59.6%) also predominated with family income above three minimum wages (66%), coming from other cities (89.9%) [14].

Currently, EC is being quite widespread among young people, especially university students [4] so that in Brazil it is already being considered a public health problem [15]. Although over 90% of

the students in this research are aware of EC, the vast majority have never smoked any type of cigarette, not even conventional cigarettes. However approximately half of the students stated they had already tried the EC. Perhaps a single experience with the device was not considered by them, in addition to the fact that experimentation began at an earlier age, since among freshmen this percentage was a slightly higher.

Most students had a family income above three MW with sufficient purchasing power to buy the device. However most students did not have an EC nor did they live with anyone who smoked cigarettes. Furthermore only eight (4.2%) students were from Araruna city, with the students coming mainly from neighboring cities (data not shown). Perhaps this is one of the reasons why they did not start smoking because they live with parents and family who are not smokers and because of the behavior and guidance of these family members about the harms of smoking to health. Kim et al. [16] in their systematic review, observed that parental monitoring and support and the mother's higher education level reduced the likelihood of EC use.

Although many self-report little knowledge about EC, the vast majority of students indicated that EC is as harmful as conventional cigarettes and it can cause oral and/or systemic diseases (above 82% positive answers for both diseases), demonstrating knowledge about compromised health of its users. Over 91% of students were aware that EC has carcinogenic substances in addition to containing nicotine in its composition (over 90% of valid positive responses) and increasing the risk of oral cancer. EC has fewer toxic products compared to conventional cigarettes, however there are still other harmful products in addition to nicotine such as lead, carcinogens and volatile organic compounds [8,9,17]. Nicotine is an EC component that brings many harms to the individual's general health, being responsible for smoking addiction [18]. Through its vasoconstrictive action nicotine also causes changes in oral tissues reducing scarring, bleeding and crevicular fluid flow, masking periodontal problems [1,8,11]. Daily use of EC is related to a greater chance of experiencing periodontal problems and tooth loss [11] with a statistically significant association between smoking habits (EC and conventional cigarettes) and periodontal disease [1].

EC use is associated with lung diseases; acute poisonings due to accidental or intentional

ingestion of nicotine; traumatic injuries due to explosions and fires resulting in burns, lacerations and bruises on the lips [5]. EC is also a risk factor for respiratory problems associated with coughing in young smokers being considered an agent of respiratory and inhalation toxicities [19]. After the American Center for Diseases Control and Prevention (CDC) issued an alert in 2019 about reports of severe lung disease related to EC use, a month later the Brazilian National Health Surveillance Agency (ANVISA) also issued an alert about these lung diseases caused by EC with an online electronic form being made available for reporting this type of lung disease [20].

For the vast majority of dental students, EC use generates passive smoke (over 90% of positive responses) denoting knowledge regarding this issue, as EC causes exposure to vapor emissions to non-smokers. Constant updating to launch different types of EC allows consumers to personalize the way they smoke making it possible to intensify the total amount of liquid vaporized per unit of inhalation and exhalation. This affects not only the health of those who use it but also the property of indoor air. In this way, both smokers and people who are nearby in the same environment are subject to exposure to EC emissions [21]. Aerosols resulting from EC vaporization contain dangerous chemicals and passive smokers may experience eye and upper airway irritation due propylene glycol and glycerol, as well as elevations in systolic blood pressure and heart rate, consequences of nicotine systemic effects. Although passive smokers are subject to health risks these effects are milder than those of active smokers [22].

Regarding supposed benefits brought by EC use, when students were asked about its assistance in stopping conventional smoking, of valid answers 66.7% of freshmen and only 56.8% of seniors answered affirmatively, confirming that in the initial periods students are better informed than in more advanced periods of the course. However 28.6% (n=55) of students marked the option 'I don't know' on this question. For Berry et al. [23] the daily EC use associated with conventional cigarettes makes smokers more likely to both reduce conventional cigarettes use and stop smoking, at least for 30 days. However, according to the systematic review and meta-analysis by Soneji et al. [18] EC was associated with current conventional smoking such that those who used EC also used conventional cigarettes and were more likely to be introduced

to conventional smoking than those who never smoked using both cigarettes. The presence of nicotine in the aerosol can lead to chemical dependency among young people making them even more likely to use conventional cigarettes. In the present work freshmen were more interested (42.0%) in trying EC than senior students (36.4%) and a small part (n=39, 40.2%) of the students who had already tried the EC (n=97) at least once revealed that they intend to use it again (data not shown).

The majority (57.5% of freshmen and 51.7% of seniors from valid sample) reported that EC use in public places was prohibited. In this question a little more than half (50.6%) of freshmen and 47.3% of seniors answered "I don't know". So almost half (48.4%) students were unaware of this prohibition. In this present work the vast majority (68% of freshmen and 80.6% of seniors) answered negatively regarding the prohibitions on the sale and import of EC in Brazil. However since 2009, through ANVISA Resolution of the Collegiate Board (RCB) No. 46/2009, electronic smoking devices are prohibited in Brazil for sale and import as well as advertising [24]. Furthermore 39% of students answered "I don't know" (not valid sample) denoting a lack of information. Considering these devices dissemination in Brazil ANVISA began a regulatory process in 2019 to debate and update technical information about EC [20]. In July 2022, ANVISA approved a technical report that confirms the permanence of EC ban besides to additional parameters to control the irregular EC market [25].

Most freshmen reported to have an intermediate/high level (52.4%) of knowledge about EC with information about the device passed on to them by professors (69.5%). Most senior students stated that they had a low level (54.5%) of knowledge about EC with 71.8% reporting they had not received information about its effect on health. This could be justified by few theoretical classes and a large workload related to clinical activities in the second half of Dentistry Course or even by the students forgetting information previously received.

A statistically significant relationship was observed between students' low knowledge about the device and not trying the EC and also with a lower probability of wanting to try it, denoting students' fear of the new and the unknown. However it is of fundamental importance students acquire this evidence-based

knowledge to avoid their own EC use and to be able to guide patients regarding device harms, since this low knowledge showed a statistically significant relationship with the lack of preparation to guide patients regarding EC. This is concerning because EC has a pleasant taste and aroma [7] making it very inviting for experimentation by those who have never smoked. According to Bertoni and Szklo [12] half of those who use or have used EC at some point in their lives had never smoked.

Despite the small sample this work provided a profile of behavior and knowledge about EC of Dental students at a Brazilian public state university. One of its limitations was the 'I don't know' option contained in the questionnaire, as when marked it was disregarded in the research (not valid sample). However many students marked this option in many questions denoting a real lack of knowledge on the subject.

Unfortunately people involved in the EC industry prefer to sell the device's image as safe and harmless regardless the extensive scientific evidence, but health promotion and protection must go beyond the addictive nicotine. Therefore regulatory actions to control EC based on evidence of its damage to the heart, lungs and brain are essential to restrict EC use [26]. Government preventive and educational campaigns aimed at young people who have never smoked are extremely important reinforcing the harm to health caused by EC. Many are unaware of or believe in the device harmlessness and also in its prohibition in Brazil, as verified in the present work. New research should also be carried out, monitoring EC users to verify its real long-term health impact of its users.

4. CONCLUSION

Sociodemographic profile of Dentistry Course at UEPB Campus VIII was mostly made up of non-smokers female white students with a good family income (>3MW), from other cities and more concentrated in clinical periods of the Course.

Freshmen had self-reported intermediate/high level and senior students revealed a low level of knowledge about electronic cigarette. However, they were aware that even with pleasant aromas and flavors, the device is as harmful as conventional cigarettes containing toxic substances and it can cause systemic and/or oral diseases including oral cancer.

However most students do not feel prepared to guide a patient regarding EC, especially students with little knowledge about it. Furthermore the vast majority of students were unaware of the ban on these devices in Brazil. It was also found that the lower the student's EC knowledge provided significantly lower chances of future use and having already tried it, denoting they avoided the device because they did not have a clear understanding of it.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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