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Prevalence and awareness of vaping among the students: A cross-sectional study from a university campus in the Perak state of Malaysia

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ABSTRACT

Background
In recent years, there has been a remarkable increase in the vaping trend within the community, which has become a concerning issue in public health. This study aims to determine the prevalence and awareness of vaping among university students and its associated factors.

Material and methods
A cross-sectional questionnaire-based study was conducted on vaping habits in Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP). The questionnaire was distributed online, and 244 students from three levels of education (degree, diploma and foundation programmes) filled it out.

Results
101 (41.4%) males and 143 (58.6%) females aged 18-30 participated. Most respondents were from urban areas 145 (59.4%). Most of the volume consumed through vaping was 10.1-15.0 ml, with a frequency of 17 (29.8%). Regarding how often they had vaped, were 'never': 164 (67.8%). Most responded as a "social trend' 74 (30.3%) as a primary response for vaping.

Conclusion
The prevalence and awareness of e-cigarettes present a severe problem among young adults. Implementing more holistic intervention measures is a necessity for prevention and awareness of the rising trend in e-cigarette smoking within the community.

Keywords
Awareness, electronic cigarettes, students, vaping

Background

Electronic cigarettes, sometimes referred to as electronic nicotine delivery systems, are compact battery-powered devices that were initially created to mimic the appearance and sensation of conventional cigarettes by dispensing nicotine vapour to the user [1]. Electronic cigarettes, or vapes, are devices that release nicotine into the body and imitate the feeling of smoking traditional cigarettes [2]. The liquid droplet vaporises and quickly cools into tiny droplets of water or aerosol. Vaping stimulates and mimics tobacco smoking, leading many to consider it a healthier alternative to smoking, although it can cause harmful effects on the user [3, 4]. Most assume e-cigarettes are an alternative to quitting traditional smoking, viewing them as a healthier, cheaper, and more convenient alternative as they can be used in public areas [5, 6].

The prevalence of vaping is on the rise among teenagers and young adults in general; it is crucial to examine this behaviour within the context of college students specifically [7, 8]. A 2018 study indicates that 15% of students reported using e-cigarettes to vape nicotine within the past 30 days. This data represents a significant surge of 250% compared to the previous year, during which only 6% of students reported engaging in nicotine vaping [9]. The present e-cigarette advertising trends have made young adults aware of the device and its usage. This is because typical e-cigarette advertisements are created to suggest safety and smoking cessation, but unfortunately, they include health assertions that lack medical substantiation [10, 11].

Vaping causes oxidative stress, affecting the respiratory and brain [12, 13]. The use of e-cigarettes can cause acute and chronic inflammatory responses, thus impacting their health status [14]. The nicotine content in the liquid can also cause multiple respiratory diseases and addictions and lower the immune system. This leads to a lower quality of life, such as poor sleep quality, lack of attention, cognition, memory impairment, and depression [15, 16]. Vaping activities among youth could potentially cause financial strain, leading to future socioeconomic inequalities in society [17- 19].

Vaping has become a significant concern in Malaysia, and it is being used by many university students [5]. In 2011, the prevalence of electronic cigarette (EC) use among individuals aged 15 and older in Malaysia was 0.8% [20]. Data from a study showed that in 2016, 3.2% of Malaysians aged ≥18 used ECs [21]. By 2019, prevalence among Malaysians aged ≥15 years had reached 4.9%. Despite the regulation of nicotine sales in Malaysia since 1952 under the Poisons Act, the sales of electronic cigarettes (EC) in Malaysia had a significant surge from US$106 million in 2012 to US$514 million in 2015 [22, 23]. Although much research from different parts of Malaysia has already been done, the data from Perak State is deficient. So, this study aims to determine the students' awareness level, the prevalence of vaping and the different factors associated with it.

Material and methods

Study design and participants

A descriptive cross-sectional survey was conducted on students from Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP) from January to June 2023. A total of 244 participants responded, 134 from degree programmes, 104 from diploma programmes, and 6 from foundation programmes.

Questionnaire design, validity, and data collection

At the beginning, respondents were briefly explained the purpose of the research, and consent forms were provided with strict adherence to respondent confidentiality. Respondents completed the survey using an online Google questionnaire form within ten minutes.

The questionnaires were divided into three sections:
Section A consisted of sociodemographic characteristics, Section B was on awareness of e-cigarettes, and Section C was related to the prevalence of e-cigarettes. Questionnaires were modified from other reference research accordingly. There were 12 different programmes under Medical and Health Sciences in UniKL RCMP. All students were invited to complete the questionnaire. Respondents were unwilling to consent, and incomplete questionnaires were excluded to avoid study bias.

Sample size calculation and sampling technique

Proportionate probability stratified random sampling was applied to determine the sample size using the proportion method with OpenEpi software version 3.01.

Data analysis and statistical tests

An independent student's t-test and an ANOVA test were performed to assess the prevalence and awareness of the participant students. Statistical analysis was done in SPSS Version 26.0. Proportions of respondents' awareness and prevalence of e-cigarette usage were calculated and presented as frequencies (%). The association of prevalence and awareness between vapers and non-vapers was calculated using independent students' t-tests and ANOVA tests. P-values <0.05 were considered statistically significant.

Ethical committee approval

Ethical approval was obtained from the UniKL Medical Research Ethics Committee (reference number: UniKLRCMP/MREC/2022-23/MBBSYR2-SSM-272).
Consent was taken from the participants before the study.

Results

Table 1: Sociodemographic details of the respondents

Sample Characteristics		Frequency	Percentage (%)
Gender (n=244)	Male	101	41.4
	Female	143	58.6
Age	18 -20	126	51.6
	21 - 23	107	43.9
	24 - 30	11	4.5
Residential area	Rural	33	13.5
	Sub urban	66	27.0
	Urban	145	59.4
Race / Ethnic	Malay	220	90.2
	Chinese	14	5.7
	Indian	6	2.5
	Others	4	1.6
Religion	Islam	219	89.8
	Others	25	10.2
Family income	< RM1000	15	6.1
	RM1001-RM3000	41	16.8
	RM3001-RM5000	69	28.3
	RM5001-RM8000	44	18.0
	RM8001-RM10000	28	11.5
	>RM10000	47	19.3
Education level	Degree	134	54.9
	Diploma	104	42.6
	Foundation	6	2.5

The sociodemographic characteristics of the respondents are shown in Table 1. 101 (41.4%) males and 143 (58.6%) females aged 18-30 participated. The highest number of respondents were between 18 - 21 years old, comprising 126 (51.6%), while the lowest was 24- 30 years old, accounting for 11 (4.5%) individuals. Most respondents were from 145 (59.4%) urban areas and Malay 220 (90.2%). Islam 219 (89.8%) was a major religion, and RM 3001-RM5000 was a family income for 69 (28.3%), while only 15 (6.1%) respondents earn below RM 1000. Almost half of the respondents (n=134: 54.9%) had a bachelor's degree, followed by a diploma of 104 (42.6%) and a foundation of 6 (2.5%).

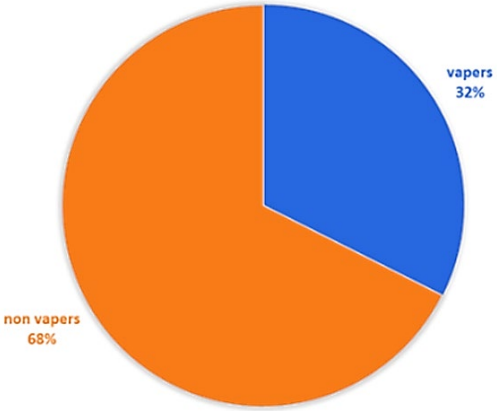

Figure 1 represents, among the 244 participants, 166(68%) were non vapers, and 78 (32%) were vapers.

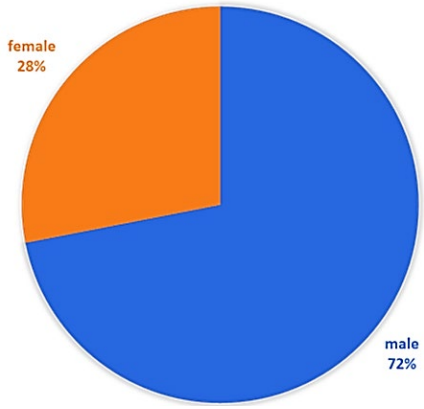

Figure 2 shows the relationship between gender and prevalence in the percentage of vaping, where 56(72%) were males, and 22 (28%) were females.

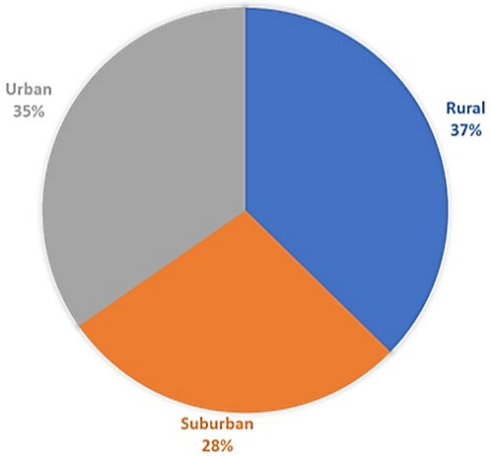

Figure 3 shows that 90 (37%) of the vapers live in rural areas, 68 (28%) in suburban areas, and 85(35%) in urban areas.

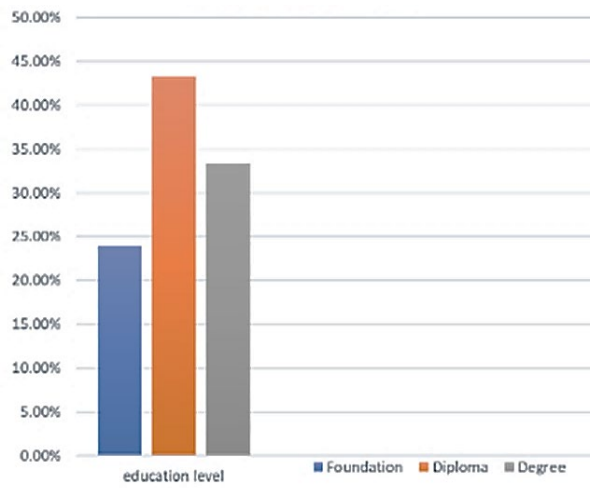

Figure 4 shows the prevalence of vaping in correlation with education level.

Table 2: Awareness of the respondents on vaping

Questions	N	Mean	SD
A1-Have you heard of e-cigarettes?	244	4.39	1.007
A2-Overall, do you think usage of e-cigarette has negative effects?	244	4.03	1.232
A3-Do you think using e-cigarette is better than traditional tobacco smoking?	244	2.93	1.341
A4-Do you think vaping helps people quit smoking?	244	2.81	1.428
A5-Are you aware that vaping poses the same negative effects as cigarettes?	244	3.96	1.266
A6-How would you rate your university education on educating students regarding consequences of vaping?	244	3.06	1.343
A7-How often can you observe campaigns that spread awareness on e-cigarettes usage in Ipoh?	244	1.75	0.97235

Table 3: Awareness of respondents regarding campaigns for e-cigarette use in the community

Question		Frequency	Percentage
A7- How often can you observe campaigns that spread awareness on e-cigarette usage in Ipoh?	1- None	128	52.5
	2- Once a week	68	27.9
	3- 2-3 times a week	35	14.3
	4- 4-5 times a week	7	2.9
	5- >5 times a week	6	2.5

Table 2 explains the respondents' awareness of vaping e-cigarettes. To evaluate their knowledge about the causes and effects of using e-cigarettes, as shown in Table 3.

Table 4: Prevalence of E-Cigarette

Questions		Frequency	Percentage
B1-Have you ever tried vaping?	Yes	79	32.4
	No	165	67.6
B2- If yes, how many cartridges do you consume per month?	1. 0.1-5.0 ml	8	14.0
	2-.5.1-10.0 ml	12	21.1
	3. 10.1-15.0 ml	17	29.8
	4- 15.1-20.0 ml	12	21.1
	5. >20.0 ml	8	14.0
B3- If yes, how much does it cost per month?	1. <RM20	15	19.7
	2. RM20-RM50	30	39.5
	3. RM50-100	21	27.6
	4. >RM100	10	13.2
B4- If yes, have you tried to quit vaping?	Yes	38	15.6
	Never	30	12.3
	Maybe	20	8.2
B5- How often do you vape?	1. Never	164	67.8
	2. Once in a lifetime	13	5.4
	3. Rarely	13	5.4
	4. Sometimes	20	8.3
	5. Frequently	23	9.5
	6. Always	9	3.7
B6- What is the primary reason for people vaping?	1. Social trend	74	30.3
	2. Peer pressure	64	26.2
	3.To cope with stress	51	20.9
	4. Alternative to smoking	41	16.8
	5. Cost reason	7	2.9
	6. Other	7	2.9

Table 4 Most participants had not tried vaping, 166 (68%). Questions B2, B3, and B4 were only answered by students who had tried e-cigarettes. In response to question B2 about the cartridge consumption per month, the majority of the volume that they consumed was 10.1-15.0 ml for 17 (29.8%) respondents. In question B3, most of them spend RM20-RM50, 30 (39.5%) monthly. In question B4, the majority answered 'yes' 38 (15.6%) regarding the effort to quit vaping, whereas 'maybe' was a response for 20 (8.2%). Questions B5 and B6 had to be answered by e-cigarette users and non-users. Most answers regarding how often they had vaped were 'never': 164 (67.8%). Question B6 asked about the primary reason for vaping. Most responded as a "social trend' 74 (30.3%).

Discussion

Findings from this study may indicate the necessity for medical education on vaping and its detrimental consequences. There is a need for more investigation into the educational training that medical students receive regarding vaping. Most students participating in the survey expressed concerns with their medical education on vaping and acknowledged that their professional school curriculum had little influence on their perspective regarding this issue. Research conducted at a medical school in Minnesota found that 94.8% of medical students felt that their curriculum did not provide sufficient instruction on vaping [24]. Of the 244 respondents in our research, 78 (32.4%) were found to use e-cigarettes, similar to a study among Malaysian adults aged ≥18 years old in 2020, which was 33.7% [25].

In this study, the female numbers were more compared to males. This is probably due to the fact that males do not want to disclose their vaping habits. Among the 78 respondents who admitted having tried vaping, males were more than females. Regarding education level, most vaping students were from diploma programmes, followed by degree programmes, and only a few were from foundation programmes. A 2022 study reported that e-cigarette users were higher among older respondents and those living in urban areas, similar to our findings [26]. It is necessary to implement a formal medical education programme on vaping and its harmful effects among university students. The result might be different if the study was done among various communities in Ipoh.

No relationship was seen between awareness of vaping and its usage. Students generally rated neutral regarding the university's medical education on the consequences of vaping. This signifies that formal education at the university can bring about a favourable change in the prevalence of vaping. This study also observed that many students had never seen any campaign that helped raise awareness of e-cigarette usage in Ipoh. It aligns with studies from the USA and Great Britain conducted on a large population [27].

A survey of 3,030 adult patients revealed that a mere 7.3% engage in conversations about e-cigarette smoking with their physicians [28]. Given the lack of discussion by physicians regarding the potential risks of e-cigarettes with their patients, it can be deduced that there is a requirement for more educational opportunities during their medical training to acquire proficiency in addressing vaping habits with their

patients. Vaping not only causes physical harm to the body but also has adverse effects on mental health. A survey study conducted on adolescent students revealed that those who use e-cigarettes have elevated levels of sadness and suicidality compared to their peers who do not use e-cigarettes [29]. Henceforth, there is a need for more educational opportunities about awareness of e-cigarette usage among medical students and the general population [30, 31]. Local governments must take the necessary actions to ramp up campaigns to raise awareness of e-cigarette usage.

Conclusion

All respondents have moderate awareness of e-cigarettes. To improve the high prevalence of e-cigarette smoking, continuous initiatives must be taken in the future. Education institutions, the government, and other organisations are suggested to participate in preventive measures. Constant education programmes can provide sound knowledge about prevention and awareness. Moreover, laws about e-cigarettes need to be implemented among Malaysians since the prevalence is high. This research provides valuable insights for implementing interventions and developing campus policies.

Limitation and future scope of the study

The sample size might not be sufficient to represent the community in Ipoh. In this study, the participants are only students of UniKL RCMP, so in the future, a larger sample from other teaching institutions in Malaysia is strongly recommended. There is always room for improvement for the subjective questionnaires because they might not be accurate and have the potential to over or underrate. Participants might be reluctant to reveal their smoking status, feeling guilty about using e-cigarettes. There were more female respondents in this study, as many male subjects refused to join, contributing to the discrepancies.

Relevance of the study

This study explored the prevalence and awareness of vaping among students in the Perak state of Malaysia in a university set-up. Findings suggest large-scale research is required to explore more insight into the rising problem.

Abbreviations

Good sleep quality (GSQ), Pittsburgh Sleep Quality Index (PSQI), Poor Sleep quality (PSQ), Reaction time (RT), Subjective cognitive decline (SCD)

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Authors' contribution

All authors have participated equally for study planning, data collection, data analysis/ interpretation, manuscript writing, manuscript revision, final approval and agreement to be accountable for all aspects of the work.

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Availability of data and materials

All data underlying the results are available as part of the article.

Competing interests

The authors declare no conflicts of interest to disclose about this manuscript.

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