

## ORIGINAL ARTICLE

## PREVALENCE AND ASSOCIATED FACTORS RELATED TO E-CIGARETTE USE AMONG STUDENTS IN UNIVERSITI MALAYSIA SABAH

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## ABSTRACT

The health effects of e-cigarette use among the public is a new burden being faced by the public health community which will reflect on the future non-communicable disease problem. Currently, according to available data, usage of e-cigarettes shows an increase in trend among the younger generation. Furthermore, it scarcely investigated on perception and promoting factors of e-cigarette users among university students. Thus, this study aimed to estimate the prevalence and associated factors related to e-cigarette use among students at Universiti Malaysia Sabah (UMS). A cross-sectional study was conducted among the students in UMS, Kota Kinabalu district, and 383 respondents were involved, and a Google form questionnaire was used as the study tool. The prevalence of e-cigarette users among the students was 27.2%. There was a significant statistical association between the following variables and the use of e-cigarettes among UMS students. It was noted that male has a significant association with e-cigarette use which is aOR = 2.13 (95% CI 1.08, 4.18 with p-value 0.029) and the age group 22 - 24 years were less likely to use e-cigarettes compared to the age group 18 to 21 years (aOR = 0.25, 95% CI 0.11, 0.61, with p-value 0.002). The perception of whether it would be difficult to quit e-cigarettes is aOR = 2.40 (95% CI 1.21, 4.76 with p-value: 0.012). The acceptance of an offer to use a vape by best friends is aOR = 12.54 (95% CI 6.12, 25.68 with p-value <0.001). There were also higher odds of ever cigarette smokers starting using e-cigarettes which is aOR = 8.07 (95% CI 4.13, 15.77 with p-value <0.001). This study has identified some evidence-based information and associated factors related to e-cigarette use among UMS students which can be used in the future planning of programs or regulations to fight this new rising epidemic.

**Keywords:** E-cigarettes, Conventional cigarettes, University student, Vendor, Promoting, Perception, Smokers, Vapers

## INTRODUCTION

An e-cigarette or a vape is a battery-operated device that releases vapour containing nicotine and flavour that people use to inhale, imitating smoking. Manufacturers and retail sellers are promoting e-cigarettes as an alternative product for smoking cessation, apart from being safer and cheaper than smoking conventional cigarettes <sup>1</sup>. As vaping rapidly becomes a trending phenomenon, it starts to concern the public health community given the health effects of the new product, since not much information about e-cigarettes related to public health is available <sup>2,3</sup>.

Currently, according to available data, usage of e-cigarettes shows an increase in trend among the younger generation. A cross-sectional study done in Canada, England, and the United States between 2017 and 2018 concluded that the prevalence of vaping had increased <sup>4</sup>. Meanwhile, in Malaysia, there is no exact study assessing the vaping trend but the prevalence of e-cigarette use among students of higher institutions is considered high which is 39.9%, according to a survey conducted in Kuala Lumpur and Selangor in the year 2016 <sup>5</sup>. The same year, another researcher collected data from six universities in

Malaysia and reported 74.9% of the respondents smoke e-cigarettes, which indicated the severity of this issue <sup>6</sup>. Another concerning issue is that we are in a battle against the tobacco epidemic but there is a higher risk of these e-cigarette users picking up conventional cigarettes in the future and this will increase the prevalence of cigarette smokers which indirectly increases the burden of Non-communicable diseases <sup>7</sup>.

Several studies have reported diverse reasons for the use of e-cigarettes, but the common reason is as an alternative to conventional cigarette smoking <sup>8,9</sup>. This is because people has a perception that the health effect of e-cigarettes is much lesser compared to conventional cigarettes <sup>10</sup>. There is a systematic review published in 2014 reported there is significant evidence indicating that e-cigarettes are by far a less harmful alternative to smoking and significant health benefits are expected in smokers who switch to e-cigarettes. Likewise, in the same year, another study also concluded that e-cigarette aerosol contains fewer toxicants and carcinogens compared to conventional cigarettes. Unfortunately, both these studies are based on short-term effects because the long-term effects of e-cigarettes are scarcely investigated and on

top of that the recent COVID-19 pandemic might also create associated health effects on e-cigarette users which are yet to be investigated. As mentioned before e-cigarettes are marketed as an alternative but the prevalence of non-smokers starting to use e-cigarettes is increasing according to one of the surveys done in the United States among the younger generation <sup>11</sup>.

Furthermore, according to research, it is reported that male university students have a higher prevalence of smoking e-cigarettes compared to their female counterparts <sup>12</sup>. Several factors contribute to this trend, including social norms, peer influence, and marketing tactics by e-cigarette manufacturers <sup>13,14</sup>. One study published in the journal BMC Public Health in 2023 analyzed the e-cigarette use among university students in Guangzhou, China <sup>15</sup>. The study found that male students were more likely to use e-cigarettes compared to females. Another study conducted among Malaysian university students yielded similar results, with the majority of e-cigarette users being male students <sup>6</sup>.

Although many has the perception that e-cigarette helps to alleviate smoking addiction to the extent that will help to quit smoking, unfortunately, we are looking at the dual smokers trend at the moment <sup>16</sup> and dual users are less likely to quit smoking <sup>17</sup>. The young e-cigarette users also has perception that e-cigarettes are less addictive and not difficult to quit compared to conventional cigarette smoking <sup>18</sup>. However, a recent study among universities student proves otherwise, whereby the finding suggests that e-cigarettes may have higher addictive potential than conventional cigarette smoking according to the Fagerstrom score <sup>19</sup>. As we can observe, one of the associated risk factors contributing to the current increase in e-cigarette prevalence is an individual's perception of the harmfulness and addiction of e-cigarettes. <sup>20</sup>.

Peer pressure and targeted marketing techniques have consistently been identified as promoting risk factors to the use of e-cigarettes <sup>21,22</sup>. Peer pressure is a strong associated factor with many bad habits, including nicotine addiction among university students. A meta-analysis published in 2018 observed a positive association between friends and e-cigarette use among the young generation <sup>21</sup>. Furthermore having exposure to second-hand smoke and having smoker friends also has a positive effect on the increase of tobacco use prevalence which can be correlated with e-cigarettes as well <sup>23</sup>. Other than that, the marketing strategy by the vendors also plays a big role in contributing as a promoting factor, whereby giving free samples of e-cigarettes and e-juice by the vendor triggers curiosity among the students to experiment with it without any cost <sup>24</sup>. Besides that, being a smoker also is one of the promoting factors in e-cigarette use among the

younger generation. One of the main reasons is the product was created for the exact reason, as an alternative nicotine delivery device and young smokers are more likely to lean toward using e-cigarettes due to the bandwagon effect of vaping being trendy in their era.

The main objective of this article is to find out the prevalence of e-cigarette users among the students at Universiti Malaysia Sabah (UMS) and university students was chosen to represent the younger generation because individuals between the ages of 18-24 are considered as part of the young adult age group, which overlaps with the university student population. Besides that, looking into all the literature reviews we understand the importance of perception and promoting factors with e-cigarette use. Thus, we also explored the association between the perception and promoting factors related to e-cigarette use among UMS students. Perception is mainly addressing the belief and understanding of the students about e-cigarettes. Meanwhile, the promoting factor is mainly addressing surrounding variables such as friends, vendors, and being a smoker.

## METHODS

### Participants and procedures

The study was conducted among students in UMS, Kota Kinabalu District, Malaysia from April 2020 to May 2020 using a cross-sectional survey research approach. UMS was selected as a study location due to its diverse student population, which comprises individuals from various backgrounds and demographics. Additionally, UMS is recognized as one of the leading eco-friendly universities in Malaysia, with a strong commitment to sustainability and environmental stewardship which forbids smoking and vaping in the campus premises. Meanwhile, based on a previous study, the prevalence of e-cigarette users in Malaysia was 14% <sup>25</sup>, hence a sample size of  $n = 472$  (95% Confidence Interval = 1.96 and 3.5% margin of error) was obtained using Single Proportion Sampling <sup>26</sup>. The total population was 12751 and proportionate stratified random sampling was used in the sample selection according to the eight faculties' total population.

The eligibility criteria of this study were based on inclusion criteria which are UMS Sabah Kota Kinabalu district students who were at least 18 years old. The exclusion criteria were students who did not give consent to partake in the study by not clicking the "I Agree" button for their data to be used in the study. The students were reached out through the official UMS email and 383 students agreed to become participants and answer the google form questionnaire, giving it an 81.1% of response rate.

### Measurement

Data were collected using a questionnaire that was adapted from a local study on Tobacco and E-Cigarette Survey Among Malaysian Adolescents 2016 (TECMA 2016). Google form questionnaire in bilingual, English, and Bahasa Malaysia, was used which contained closed-ended multiple-choice questions, divided into three sections: 1) socio-demographic, 2) perception factor, and 3) promoting factor. The socio-demographic section included age, gender, faculty, and ethnicity. Meanwhile, questions about conventional cigarettes and e-cigarettes were “Yes” or “No” answers. Ethical approval for the study was granted by UMS Ethical Board (Code: JKEtika 1/20 - 32). Inform consent forms were included in the Google form and all participants were notified that their participation in the study was voluntary. They were also informed that their identity would remain anonymous.

### Statistical analysis

The data were analyzed using IBM Statistically Package for Social Sciences (SPSS) version 28 analytic software. All data collected were presented using descriptive statistics. Furthermore, simple logistic regression was used to obtain crude odds ratio and multiple logistic regression was used to obtain the final associated factors. Significant level was set at p value <0.05.

### RESULTS

The response rate among all the faculty was more than 80% except for Faculty of Humanities, Arts and Heritage (FKSW) and Faculty of Psychology and Education (FPP) (65%) but overall response rate was 81.1% (n=383) and the respondents were between 19 and 38 years old with a mean age of 23 years (SD: 1.74). Among the 383 respondents, 258 (67.4%) participants were females and 125 (32.6%) were males; ethnic Sabah Bumiputera (46.0%) was the majority. The Faculty of Business, Economics, and Accountancy contributed the highest number of respondents (n=97, 25.3%). As shown in Table 1, the overall prevalence of ever e-cigarette users among the students is 27.2% (n=104) and the majority of them are male students (63.5%).

In the simple logistic regression analysis (Table 2) of socio-demographic factors and e-cigarette use among students at UMS in the Kota Kinabalu district, several key findings emerged. First, the analysis revealed that male students were 6.5

times (95% CI: 3.96,10.59 with p-value <0.001) more likely to use e-cigarettes compared to female students. Second, students in the age group of 22 - 24 years old were 46.5% (95% CI: 0.29, 0.97 with a p-value: 0.045) less likely to use e-cigarettes compared to the younger age group (18 - 21 years old). These results suggest that gender and age are important factors to consider when studying e-cigarette use among university students.

Moreover, the analysis found that students' perceptions of e-cigarettes also played a significant role in their use. Specifically, students who believed that e-cigarettes are less harmful than traditional cigarettes were 5.3 times (95% CI: 2.74, 10.25 with p-value: <0.001) more likely to use e-cigarettes. Similarly, those who believed that it is not difficult to quit smoking had 3.6 times (95% CI: 2.23, 5.84 with p-value <0.001) higher odds of using e-cigarettes. The study also revealed that peer influence and vendor behaviour were important factors. Students who were offered free samples of e-cigarette products by vendors had 2.49 times (95% CI: 1.38, 4.51 with a p-value: 0.003) higher odds of using e-cigarettes, while those who had friends who used e-cigarettes had 21.2 times (95% CI: 11.70, 38.25 with p-value <0.001) higher odds of using e-cigarettes. Lastly, the study found that ever cigarette smokers were 15.9 times (95% CI: 9.20, 27.46 with p-value <0.001) more likely to use e-cigarettes compared to non-smokers.

Table 2 also shows a multiple logistic regression analysis by including all the significant factor with p-value <0.25 from the simple logistic regression analysis<sup>27</sup>. The final model shows there is a significant association between gender, age, perception of quitting e-cigarettes, friends' influences, and smoking habit with e-cigarette use among the respondents. The most prevailing associated risk factors are influenced by friends and smoking habits. The students have 12.5 times (95% CI: 6.12, 25.68 with p-value <0.001) higher odds of using e-cigarettes being offered by their best friends while adjusted for gender, age, perception of quitting e-cigarettes, and smoking habit. Meanwhile, students with a smoking habit have 8 times (95% CI: 4.13, 15.8 with p-value <0.001) higher odds of using e-cigarettes compared to the other counterpart while adjusted for gender, age, perception of quitting e-cigarettes, and friends' influences.

Table 1: Socio-demographic characteristics of the students.

Factors	Category	E-cigarette use		n (%) (383)
		Yes, n (%) (104,27.1)	No, n (%) (279,72.9)	
<b>Socio-demographic</b>				
Gender	Male	66 (52.8)	59 (47.2)	125 (32.6)
	Female	38 (14.7)	220 (85.3)	258 (67.4)
Age (years)	18 - 21	20 (36.4)	35 (63.6)	55 (14.4)
	22 - 24	70 (23.4)	229 (76.6)	299 (78.1)
	25 - 40	14 (48.3)	15 (51.7)	29 (7.6)
Ethnicity	Malay	23 (25.0)	69 (75.0)	92 (24.0)
	Chinese	9 (20.5)	35 (79.5)	44 (11.5)
	Indian	5 (16.7)	25 (83.3)	30 (7.8)
	Sabah Bumiputera	53 (30.1)	123 (69.9)	176 (46.0)
	Sarawak Bumiputera	6 (27.3)	16 (72.7)	22 (5.7)
	Others	8 (42.1)	11 (57.9)	19 (5.0)
Faculty*	FPEP	35 (36.1)	62 (63.9)	97 (25.3)
	FKI	8 (42.1)	11 (57.9)	19 (5.0)
	FKJ	12 (29.3)	29 (70.7)	41 (10.7)
	FSMP	5 (22.7)	17 (77.3)	22 (5.7)
	FKSW	15 (22.4)	52 (77.6)	67 (17.5)
	FPSK	12 (36.4)	21 (63.6)	33 (8.6)
	FPP	12 (33.3)	24 (66.7)	36 (9.4)
	FSSA	5 (7.4)	63 (92.6)	68 (17.8)
<b>Perception</b>				
Would it be difficult to quit e-cigarettes?	Yes	54 (19.6)	222 (80.4)	276 (72.1)
	No	50 (46.7)	57 (53.3)	107 (27.9)
An E-cigarette is less harmful, equally harmful, or more harmful than cigarette smoking	Equally harmful	41 (21.0)	154 (79.0)	195 (50.9)
	Less harmful	44 (53.7)	38 (46.3)	82 (21.4)
	More harmful	19 (17.9)	87 (82.1)	106 (27.7)
<b>Promoting</b>				
The vendor offered free e-cigarette/vape liquid	Yes	24 (44.4)	30 (55.6)	54 (14.1)
	No	80 (24.3)	249 (75.7)	329 (85.9)
Offered by best friends, would you use it?	Yes	67 (75.3)	22 (24.7)	89 (23.2)
	No	37 (12.6)	257 (87.4)	294 (76.8)
Ever Cigarettes smokers	Yes	73 (67.0)	36 (33)	109 (28.5)
	No	31 (11.3)	243 (88.7)	274 (71.5)

\* Faculty of Business, Economics and Accountancy (FPEP), Faculty of Computing and Informatics (FKI), Faculty of Engineering (FKJ), Faculty of Food Science and Nutrition (FSMP), Faculty of Humanities, Arts and Heritage (FKSW), Faculty of Medicine and Health Science (FPSK) , Faculty of Psychology and Education (FPP), Faculty of Science and Natural Resources (FSSA).

**Table 2: Association between socio-demographic, perception, and promotion factors, and ever cigarette smoker with e-cigarette uses among the respondents.**

Factors	Simple logistic regression		Multiple logistic regression	
	cOR (95%, CI)	p-value	aOR (95%, CI)	p-value
<b>Socio-demographic</b>				
Gender (reference = Female)				
Male	6.48 (3.96, 10.59)	<0.001	2.13 (1.08, 4.18)	<b>0.029</b>
Age (reference = 18 - 21)				
22 - 24	0.54 (0.29, 0.97)	0.045	0.25 (0.11, 0.61)	<b>0.002</b>
25 - 40	1.63 (0.656, 4.07)	0.292	0.74 (0.21, 2.63)	0.641
**Ethnicity (reference Non-Bumiputera)				
Bumiputera	1.27 (0.740,2.18)	0.382	-	-
***Faculty (reference = Medical related)				
Non-Medical	0.74 (0.44, 1.23)	0.253	-	-
<b>Perception</b>				
Would it be difficult to quit e-cigarettes? (reference = Yes)				
No	3.61 (2.23, 5.84)	<0.001	2.40 (1.21, 4.76)	<b>0.012</b>
An E-cigarette is less harmful, equally harmful, or more harmful than cigarette smoking (reference = More harmful)				
Equally harmful	1.22 (0.67, 2.23)	0.520	-	-
Less harmful	5.30 (2.74, 10.25)	<0.001	-	-
<b>Promoting</b>				
Vendor offered free e-cigarette/vape liquid (reference = No)				
Yes	2.49 (1.38, 4.51)	0.003	-	-
Offered by best friends, would you use it? (reference = No)				
Yes	21.15 (11.70, 38.25)	<0.001	12.54 (6.12,25.68)	<b>&lt;0.001</b>
Ever Cigarette smoker (reference = No)				
Yes	15.90 (9.20, 27.46)	<0.001	8.07 (4.13,15.8)	<b>&lt;0.001</b>

\* cOR: Crude Odds Ratio; aOR (95% CI): Adjusted OR with 95% Confidence Intervals. (While adjusted for gender, age, perception of quitting e-cigarettes, friends' influences, and ever cigarette smoker); R<sup>2</sup> = 0.65. \*Ethnicity: Non-Bumiputera (Chinese, Indian, Others). \*\*Bumiputera: (Malay, Sabahan Bumiputera, Sarawakian Bumiputera). Faculty: Medical related: FPSK, FSMP, FPP and Non-Medical related: FPEP, FKI, FKJ, FKSJ, FSSA. \*\*\* Faculty: Medical Related: FPSK, FSMP, FPP and Non-Medical Related: FPEP, FKI, FKJ, FKSJ, FSSA.

## DISCUSSION

This study shows that the prevalence of ever e-cigarette users among UMS, Kota Kinabalu district students are higher compared to other previous studies which were done in Jordan and Qatar <sup>28,29</sup>. Meanwhile, compared with studies that were conducted in Malaysia in the past years, noted our study yielded lower prevalence, for example, a study which was conducted among six universities student revealed that 74.9% of the respondents used e-cigarettes <sup>6</sup> and International Tobacco Control Malaysia Wave 1 Survey also reported 34.5% of e-cigarettes users among people aged 18 to 24 years old <sup>30</sup>. This difference can be because technology such as e-cigarettes spreads faster in West Malaysia compared to East Malaysia. Accessibility also is one of the reasons whereby in West Malaysia e-cigarette shops are more widely available compared to Sabah (East Malaysia). It is concerning that young vapers regularly tend to continue the habit into adulthood, and this may lead to a decline in health because the long-term effect of e-cigarettes yet to be identified and the long-term effects are also been scarcely investigated <sup>31</sup>.

More than half of the e-cigarette users in this study were male students. It is shown that the males have two times higher odds of using e-cigarettes compared to the females. It is similar to a previous study that reported that there is a significant association between gender and ever e-cigarette users <sup>32</sup>. The possibility behind this is that the male students are more likely to stay away from home than the female students, and the males are more likely to have many peers who are e-cigarette users assuming the number of male e-cigarette users are more in the male group. Some studies have proven that there is a high chance of a non-smoker that stays with a peer who smokes becoming a smoker too, and less likely if the person lives with the parents because parents tend to be protective and are generally against smoking <sup>33,34</sup>.

In our study, we found that individuals aged 22-24 had lower odds of using e-cigarettes compared to those aged 18-21. This finding is consistent with another study that categorized age similarly, which also reported that individuals aged 26-34 are less likely to use e-cigarettes compared to those aged 18-25 <sup>35</sup>. Additionally, a modelling study that investigated the probability of e-cigarette use with age found that the probability of using e-cigarettes gradually declines after the age of 19 years old among students <sup>36</sup>. This decline in e-cigarette use with increasing age may be due to the fact that younger adults (18-21 years old) perceive e-cigarettes as not harmful to health compared to older adults <sup>37</sup>. Moreover, as people age, they tend to become more cautious about their health compared to their younger selves <sup>38</sup>.

Based on this study, most of the students has a perception that it is not difficult to quit using e-cigarettes once started. Similar to another study which was conducted among young adults aged 18 to 35 years old reported that the participants perceived e-cigarettes as less addictive compared to conventional cigarettes <sup>18</sup> but it is not true and has been proved in a previous study <sup>19</sup>. It is also concerning, whereby if the person is unable to perceive e-cigarettes can cause nicotine addiction, thus definitely they are unable to quit if they want to because according to one of the articles published on the United States Food and Drugs website, 70% of nicotine-addicted adult want to quit, 55% attempted to do so but only 7% were successful <sup>39</sup>. Furthermore, the nicotine contained in some e-juice is higher than the limits established which can cause an even worse addiction compared to conventional cigarettes <sup>31,40,41</sup>.

This study also found that best friends play a significant role in influencing the use of e-cigarettes among new users. There is a significant association between best friends' offers to vape and the use of e-cigarettes among students. This risk factor has been proven in many studies which show that peer pressure has a major influence <sup>24,42,43</sup> on a person to start a habit. Best friends are generally people whom you trust and with whom you feel safe, thus there is a possibility that it is easier for new users to pick up the habit when introduced by best friends. Furthermore, students in a university spend more of their time with friends than at home, therefore it is likely that they will accept to experiment with e-cigarettes when offered by peers who vape <sup>44</sup>.

In our study we observed that student which is an ever smoker has eight times higher odds of using e-cigarettes, compared to individual which is not an ever smoker. This finding is consistent with previous research that has shown a strong link between cigarette smoking and e-cigarette use. A study published in 2018 found that there is a bidirectional association between ever smoking and e-cigarette initiation, meaning that individuals who have ever smoked are more likely to initiate e-cigarette use, and those who initiate e-cigarette use are more likely to later initiate cigarette smoking <sup>45</sup>. Another study conducted among Malaysian university students found a higher prevalence of e-cigarette use among current smokers and ex-smokers, suggesting that cigarette smoking is an associated factor for e-cigarette initiation among the student population <sup>6</sup>.

### Limitations and way moving forward

The study had limitations due to the simplicity of the study tool, which only captured a small fraction of the associated risk factors, limited by insufficient resources. In the future, a more elaborate study tool that combines quantitative and qualitative methods could be conducted to

investigate these factors further. Additionally, the sampling method used in the study did not allow for generalization to all students and other universities. Therefore, a larger scale study that includes a variety of universities could be conducted in the future to represent the entire university population in Malaysia. Despite these limitations, the study was able to capture some important factors associated with e-cigarette use among university students in Sabah, which could serve as a foundation for prevention programs. Moreover, this kind of study is more cost-effective and faster than other study designs.

## CONCLUSION

In conclusion, this study has revealed that the prevalence of e-cigarette use among university students in the Kota Kinabalu district is concerning. The study found that male students have a higher likelihood of using e-cigarettes. Meanwhile, certain age groups among the university students have lower odds of using e-cigarettes. The perception that e-cigarettes are less addictive than conventional cigarettes is prevalent among the study participants, which is concerning since nicotine addiction can be challenging to overcome. Peer pressure from best friends is also a significant risk factor for e-cigarette use among university students. Finally, the study found that current or ex-cigarette smokers have a higher likelihood of e-cigarette use, which suggests that e-cigarettes may be a gateway to cigarette smoking. Overall, the findings suggest that there is a need for more comprehensive and effective measures to prevent e-cigarette use among university students, particularly among males, and to educate them on the potential health risks of e-cigarette use.

### List of abbreviations

- i. UMS - Universiti Malaysia Sabah (Name of the University)
- ii. FPEP - Faculty of Business, Economics, and Accountancy
- iii. FKI - Faculty of Computing and Informatics
- iv. FKJ - Faculty of Engineering
- v. FSMP - Faculty of Food Science and Nutrition
- vi. FKSJ - Faculty of Humanities, Arts and Heritage
- vii. FPSK - Faculty of Medicine and Health Science
- viii. FPP - Faculty of Psychology and Education
- ix. FSSA - Faculty of Science and Natural Resources

### Ethics approval and consent to participate

Ethics approval was obtained from Universiti Malaysia Sabah Ethical Board (Code: JKEtika 1/20 - 32)

### Human and animal rights

The procedures of this study complied fully with the provisions of the Helsinki Declaration regarding research with human participants.

### Consent of publication

All participants provided informed consent electronically before enrolment.

### Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

### Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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