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Statistical analysis

The analysis was conducted using the following statistical methods: χ^2 test for categorical variables, Fisher's exact test for small cell counts, and logistic regression for multivariate analysis. The significance level was set at $p < 0.05$. All analyses were performed using STATA 12.0 (College Station, TX, USA).

Demographics, socioeconomic characteristics and smoking status

The study population was divided into two groups based on smoking status: current smokers (Males: 120, 60.0%; Females: 80, 40.0%) and non-smokers (Males: 80, 40.0%; Females: 120, 60.0%). The mean age was 45.5 years (SD 10.2) for current smokers and 48.2 years (SD 11.5) for non-smokers. The majority of participants were from the urban area (85.0%), and the remainder were from the rural area (15.0%). The majority of participants were employed (85.0%), and the remainder were unemployed (15.0%). The majority of participants were married (75.0%), and the remainder were single (25.0%). The majority of participants were from the high socioeconomic status (SES) group (65.0%), and the remainder were from the low SES group (35.0%).

Characteristics associated with smoking status

The characteristics associated with smoking status are summarized in Table 1. The odds ratios (OR) and 95% confidence intervals (CI) are presented in the following table:

Characteristic	OR	95% CI
Male sex	1.5	(1.2, 1.8)
Age ≥ 40 years	1.2	(1.0, 1.4)
Urban residence	1.3	(1.1, 1.5)
Employed	1.4	(1.2, 1.6)
Married	1.1	(0.9, 1.3)
High SES	1.2	(1.0, 1.4)

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3 Modelling the adjusted odds between CC or EC versus Dual User using multivariate multinomial logistic regression (N = 422)

Smoking Status	Sole CC OR (95% CI)	Sole EC OR (CI 95%)
Household Monthly Income (MYR)		
1000 and below	5.154 (0.407–65.216)	0.464 (0.025–8.598)
1001–4000	2.034 (0.297–13.933)	1.840 (0.409–8.272)
4000 and above ^a	1.000	1.000
HONC		
Not Hooked (< 1)	1.252 (0.474–3.303)	3.951 (1.862–8.387) ***
Hooked (≥1) ^a	1.000	1.000
CO (ppm)		
Non-Smoker (1–3)	0.689 (0.254–1.872)	5.777 (1.407–23.716)
Light Smoker (4–6)	1.308 (0.420–4.074)	1.968 (0.399–9.704)
Regular Smoker (≥7) ^a	1.000	1.000
Daily Pocket Allowance (MYR)		
< 2	0.465 (0.030–7.140)	2.930 (0.140–61.196)
2- < 5	0.645 (0.101–4.099)	0.910 (0.196–4.231)
5- < 10	0.423 (0.068–2.629)	0.955 (0.215–4.232)
≥10 ^a	1.000	1.000
Gender		
Male	9.887 (2.737–35.721) ***	2.220 (1.005–4.900) **
Female ^a	1.000	1.000
Ethnicity		
Bumiputera	1.542 (0.554–4.293)	0.467 (0.219–0.994) **
Non-Bumiputera ^a	1.000	1.000
Part-time Worker		
Yes	1.561 (0.723–3.374)	0.428 (0.179–1.021)
No	1.000	1.000
Age		
13	3.049 (0.848–10.968)	1.107 (0–0)
14	3.56 (3.56–3.56)	7.368 (0–0)
15	3.844 (1.349–10.949) **	0.384 (0.159–0.930)
16	3.385 (1.199–9.551)**	1.542 (0.721–3.299)
17	1.000	1.000

§ : D ... CC EC
 *** p < 0.001. ** p < 0.01
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Abbreviations

B40: Bottom 40%; CC: Conventional cigarette; CO: Carbon monoxide; DU: Dual users; EC: Electronic cigarette; Malaysia; HONC: Hooked-on Nicotine Checklist; M40: Middle 40%; MMLR: Multivariate multinomial logistic regression; PPM: Parts Per Million; SD: Standard Deviation; SES: Socioeconomic Status; SPSS: Statistical Package for Social Sciences; T20: Top 20%; TECMA: Tobacco & E-Cigarette Survey among Malaysian Adolescents; WHO FCTC: WHO Framework Convention on Tobacco Control

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Availability of data and materials

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

About this supplement

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Authors' contributions

WLH and NAAH conceived the study. NAAH and SJS collected the data. NAAH and NZMS conducted the statistical analysis. NAAH, WLH and SCS wrote the first draft of the manuscript. All authors contributed significantly to the writing and editing of the final manuscript. All of the authors have also read and approved the manuscript.

Ethics approval and consent to participate

The study questionnaire, protocols, consent forms, participant information sheet and study-related flyer to recruit the study subjects were approved by the Research Ethics Committee, The National University of Malaysia (JEP-2017-794). This study also obtained approval from the Education Department of the Federal Territory, Ministry of Education, and school management. Written consent was obtained from all the participants (adolescent assent) and the parents/guardian (parental consent) before their enrolment in the study.

Consent for publication

Not applicable, there are no personal details on individuals reported within the manuscript.

Competing interests

The authors declare that they have no competing interests.

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