

ORIGINAL ARTICLE

Study of E-Cigarette Usage among University Students in Perak using the Modified E-Cigarette Evaluation Questionnaire (MECEQ).

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Abstract

Background: E-cigarettes are devices of growing popularity worldwide, primarily containing nicotine. Despite the increasing number of e-cigarette users in Malaysia, there remains insufficient data on the subjective effects of e-cigarette use among young adults. This study aims to examine these effects among university students in selected universities in Perak, utilising the Modified E-Cigarette Evaluation Questionnaire (MECEQ). **Methods:** A study sample size of 236 respondents was determined using the OpenEpi online software, targeting e-cigarette users from six universities in Perak. The questionnaire, distributed via Google forms, and Whatsapp, comprised three sections: sociodemographic information, smoking status, and the Modified E-Cigarettes Evaluation Questionnaire (MECEQ). Data analysis was conducted using IBM SPSS version 23, employing frequency and chi-square tests to identify associations between e-cigarette use and various factors. A *p*-value of <0.05 was considered statistically significant. **Results:** The study revealed that most university students in Perak who participated were male (n=218, 92.4%), with a household income below RM 2000 (n=196, 83.1%). Most participants had been using e-cigarettes for 1-5 years. Analysis of the MECEQ showed a moderate average score for Vaping Satisfaction, while Psychological Reward, Enjoyment of Respiratory Tract Sensation, and Aversion had low average scores. **Conclusion:** This study highlights that e-cigarette users aged 18-24 scored moderately on Vaping Satisfaction. This suggests that colleges and universities can promote e-cigarette cessation through peer-led support, health campaigns, and incorporating the topic into curricula. Incentives and tobacco-free programs could also encourage quitting. Given the fairly mild subjective effect of e-cigarette use, authorities should prioritise on educating students about the harmful ingredients found in e-cigarettes. More research is needed to determine the health concerns in this population.

Keywords: E-cigarette, Modified E-Cigarettes Evaluation Questionnaire (MECEQ), Subjective effects.

Introduction

E-cigarettes are devices that allow users to inhale an aerosol containing nicotine, flavourings, and other additives. Despite differing in design, they function similarly and share common components [1]. The Centers for Disease Control and Prevention (CDC) states that e-cigarettes are known by various terms, such as "electronic nicotine delivery systems (ENDS)," "vape pens," and "e-cigs." Some resemble traditional cigarettes, cigars, or pipes, while others mimic everyday items like pens and USB drives [2]. According to the World Health Organization (WHO), e-cigarettes are detrimental to health and lack safety assurances. Although the long-term effects are not yet fully understood, they are known to emit toxic and carcinogenic substances, elevating the risk of heart and lung diseases [3].

In 2020, a study revealed 5.4% of Malaysian adults were daily e-cigarette users [4]. Among this group, more than half had nicotine in their e-cigarettes, leading to reports of strong nicotine addiction. The importance of ongoing surveillance is emphasised to track potential changes in e-cigarette initiation rates among youth, young adults, and non-smokers in Malaysia. Monitoring these trends is crucial for understanding the evolving landscape of e-cigarette use in the country [4].

In 2018, a study among university students in Malaysia uncovered widespread e-cigarette use. Participants were categorized into three groups: exclusive e-cigarette users, dual users of cigarettes and e-cigarettes, and non-users. Adverse effects such as dizziness, cough, and headaches have been reported. The study also revealed varied motivations for e-cigarette use, with 57.8% viewing them as a tool for smoking cessation, while others saw them as a means to enhance self-image or partake in social activities [5].

In 2021, research indicated that 69.08% of respondents were aware of the negative health impacts of using e-cigarettes use [6]. Additionally,

43.32% of participants believed that e-cigarette use could lead to significant health issues for smokers. Overall, the study aimed to discourage the use of e-cigarettes by enhancing university students' awareness and knowledge [6].

Consumer preferences for the choice of flavoured e-cigarettes varied among consumers demonstrating variations across age groups and smoking status, with flavoured options being preferred. The research indicated that certain flavours were linked to a reduced perception of harm, while tobacco flavour was associated with increased perception. Furthermore, specific flavour chemicals and sweeteners employed in e-cigarettes raised potential toxicological concerns. Lastly, preferences for nicotine strength and types were influenced by factors such as smoking status and e-cigarette use history. These findings highlighted the diverse factors influencing consumer choices and perceptions in the realm of e-cigarettes [7].

The government, through its National Strategic Plan for the Control of Tobacco and Smoking Products 2021-2030, has outlined various mechanisms to combat the use of smoking products, including e-cigarettes. However, at the moment there is inadequate data on the usage and practice of e-cigarettes among youth in Malaysia which is crucial for improving strategies to curb this habit.

Thus, this study aimed to analyse the subjective effects of e-cigarettes usage among university students in Perak and its associated factors using MECEQ (Modified E-Cigarette Evaluation Questionnaire) [8].

Materials and methods

This was a cross-sectional study on the effects of E-cigarettes among 236 university students from selected universities in Perak, including Universiti Teknologi Petronas, UITM Seri Iskandar, Universiti Pendidikan Sultan Idris, Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP), Universiti

Kuala Lumpur Malaysian Institute of Marine Engineering Technology (UniKL MIMET) and Institut Pendidikan Guru Malaysia Kampus Ipoh. The sample size was calculated using the software Openepi.com. With a population size of 25,000, we initially received 378 responses. A post-hoc analysis was conducted, filtering out respondents who did not smoke e-cigarettes, which resulted in 236 responses. Recalculation, utilising an anticipated frequency of 5.4% for the prevalence of E-cigarette smokers showed a 99.9% confidence level with a sample size of 236 [4]. The study employed a non-probability, purposive sampling method. The inclusion criteria required respondents to be e-cigarette smokers, aged 18 to 24 and enrolled in selected universities. Exclusion criteria applied to university personnel who were not students. All data were collected via an online questionnaire (Google Form) distributed through WhatsApp. The questionnaire consisted of three sections: Section A, Section B, and Section C. Section A covered the socio-demographic details of the respondents. Section B addressed the status of smoking, and Section C contained the validated Modified E-cigarette Evaluation Questionnaire (MECEQ) from a study by Morean et al, which consists of four subscales: Vaping Satisfaction (3 items), Psychological Reward (6 items), Enjoyment of Respiratory Tract Sensation (1 item) and Aversion (2 items) [8]. Every item was scored on a 7-point Likert scale ranging from 1 (Not at all) to 7 (Extremely). The questionnaire was previously validated by Morean et al., and Cronbach's alpha for each item ranged from 0.71 (SE 0.02) to 1.00 (SE 0.00 [8]. For this study, the questionnaire was pre-tested by 10 university students before the actual data collection to ensure the questionnaire was clear, appropriate, and no redundancy. These 10 students were not included in the main study analysis. All data collected from the questionnaire were processed using IBM SPSS version 23 for analysis. The Chi-Square test was used to identify the association of categorical data. P value < 0.05 was considered statistically significant. ANOVA test was used to analyse the differences between two or more

independent variables on a continuous or ordinal dependent variable.

Results

Section A: Socio-demography

After data cleaning, 236 respondents were selected from 378 responses received. In Table 1, the majority were found to be under 21 years old (n=119, 50.4%) with most respondents identified as male (n=218, 92.4%) and female (n=18, 7.6%). The predominant race was Malay (n=213, 90.3%) and non-Malay (n=23, 9.7%). Most respondents were from public universities (n=145, 62.7%), with the remaining enrolled in private institutions (n=89, 37.3%). In terms of household monthly income, the majority of respondents came from families that earned less than RM2000.00 (n=196, 83.1%), while the remaining earned more (n=40, 16.9%).

Section B: Smoking status

The smoking status of the 236 respondents is outlined in Table 2. It was found that 157 respondents (66.5%) had used e-cigarettes in the past month while the remaining 79 respondents (33.5%) had not. Among e-cigarette users, 182 respondents (77.1%) never smoked regular cigarettes before, in contrast with 54 respondents (22.9%) who had used usual cigarettes. Only 43 respondents (18.2%) intended to quit smoking by using e-cigarettes. Fifty-one (21.6%) respondents were dual users, while 185 (78.4%) exclusively used e-cigarettes. Over half (66.5%) had been using e-cigarettes for 1 to 5 years. Friends' influence (35.2%), stress relief (27.0%), and saving money (18.4%) were identified as the primary reasons for e-cigarette use. The majority used "pod vapes or pod mods" (69.9%), followed by "vape pens or tank system" (19.7%).

Section C: MECEQ Scores

Table 3 displays the frequency and percentage of MECEQ items among respondents, while Table 4 outlines the items by subscale. The highest mean scores were noted for "E-cigarettes or vapes are satisfying" (4.29) in the Vaping Satisfaction category, "Did you enjoy smoking e-cigarettes?" (3.69) in Psychological Reward, "Vaping makes me dizzy" (2.05) in Aversion, and "I enjoy the sensations of vaping in my throat and chest" (2.89) in Enjoyment of Respiratory Tract Sensation. A summary of the MECEQ questionnaire mean scores can be found in Table 5: Vaping Satisfaction (4.29), Psychological Reward (2.70), Enjoyment of Respiratory Tract Sensation (2.89), and Aversion (1.96). The scores were categorized into high, moderate, and low levels according to Bloom's cut-off points: high ($\geq 80\%$ of the maximum score, ≥ 5.6), moderate (60-70% of the maximum score, 4.2-5.6), and low (below 60% of the maximum score, < 4.2). Therefore, vaping satisfaction is considered moderate, while psychological reward, enjoyment of respiratory tract sensations, and aversion are rated as low.

As shown in Table 6, significant associations were found between e-cigarette use for smoking cessation and both the university of study ($p = 0.037$) and household income ($p < 0.001$). Students from public universities and from low household income ($< \text{RM } 2000$) were associated to use e-cigarettes without intention to stop smoking. Table 7 indicated that no significant associations were found between e-cigarette usage and sociodemographic characteristics, except for gender ($p = 0.010$). Table 8 displays the associations between the duration of e-cigarette use and sociodemographic characteristics. Significant associations were observed for all variables except the university of study. Factors such as being above 21 years old ($p < 0.001$), male gender ($p < 0.001$), Malay race ($p = 0.039$), and a household income of below RM2000 ($p < 0.001$), were associated with e-cigarettes use for 1-5 years.

Discussion

Association Between Sociodemographic Factors and E-Cigarette Usage

It is difficult to compare with the four previous studies on e-cigarettes usage in Malaysia [4,5,9] with this study, as those studies had larger sample sizes, except for Zainal Abidin N et al [9], and included older age groups. Therefore, this study is limited to university students aged 18-24, and its generalisability is confined to this group.

A key similarity across the studies is the predominance of male e-cigarette users. In our study, males ($n=218$, 92.4%) significantly outnumbered females ($n=18$, 7.6%). This aligns with findings from Driezen P et al. [4], who reported a male majority ($n=1024$, 50.3%) compared to females ($n=229$, 16.6%), and Sharifa Ezat Wan Puteh et al. [5], where males constituted an overwhelming majority ($n=1234$, 94.8%) versus females ($n=68$, 5.2%). The strong male predominance across different studies highlights a consistent gender pattern in e-cigarette usage. Another similarity observed was the predominance of Malay users in our study. Among our respondents, 90.3% were Malay ($n=213$), compared to 9.7% non-Malay ($n=23$). This is in concordance with Driezen P et al. [4], who reported that 35.5% of their e-cigarette users were Malay ($n=619$), although with a larger representation of Chinese ($n=461$, 21.2%) and other ethnic groups ($n=173$, 50.0%). Our findings also mirror those of Sharifa Ezat Wan Puteh et al. [5], where the distribution of Malay users ($n=979$, 75.2%) far exceeded that of Chinese ($n=98$, 7.5%), Indian ($n=162$, 12.4%), and other ethnic groups ($n=63$, 4.8%).

Zainal Abidin N et al. [9] found that 74.8% of their respondents exclusively used e-cigarettes, which is similar to this study, where 78.4% ($n=185$) were exclusive e-cigarettes users. It is assumed that the lower price of e-cigarettes compared to conventional cigarettes has influenced the young population to adopt e-cigarettes use. [9]

This study also observed that 83.1% (n=196) of respondents with household income less than RM2000 use e-cigarettes in contrast with 16.9% (n=40) of respondents with more than RM2000. This may suggest that the student's main source of financial support, such as scholarships, could play a role in e-cigarette use. More students from public universities (n=148, 62.7%) use e-cigarettes compared to those from private universities (n=88, 37.3%). Among private university students, 25.0% used e-cigarettes to quit smoking, compared to 14.2% of public university students, indicating a higher tendency in private universities. Additionally, 42.5% of respondents with household incomes over RM 2000 used e-cigarettes to quit, while only 13.3% of those with incomes below RM 2000 did. This finding suggests that higher-income individuals are more likely to use e-cigarettes as a mean to stop smoking than those with lower incomes.

Association of Duration of E-Cigarette Usage with Sociodemographic Factors

We have found significant associations between the duration of e-cigarette usage and each of the four sociodemographic characteristics (age, gender, race, and household income) (p-value < 0.05)

With regards to age, most respondents of both groups (those under and over 21 years of age respectively) reported using e-cigarettes for 1 to 5 years. However, a notable number under 21 have used e-cigarettes for over 5 years, suggesting early initiation during teenage years.

When comparing the two genders, female respondents generally started using e-cigarettes more recently (less than 1 year) compared to males, who have used e-cigarettes for 1 to 5 years. However, among younger respondents, females are more likely to have used e-cigarettes for over 5 years compared to males, implying that females feature more predominantly in those who started smoking before 21 years of age compared to their male counterparts.

In terms of the difference seen between the different races, the majority of both Malay and

non-Malay individuals were reported to have used e-cigarettes for a duration ranging from 1 to 5 years. A higher percentage of non-Malay respondents (8.7%) reported using e-cigarettes for more than 5 years compared to Malay respondents (1.4%). One more thing of note is that respondents with incomes above RM 2000 exhibited a longer duration of e-cigarette use compared to those with lower incomes.

This study highlights variances in e-cigarette usage patterns based on socio-demographic factors and provides insights into the broader implications of e-cigarette use among different demographic groups.

MECEQ Scores

Our analysis showed that respondents had moderate satisfaction with vaping. When asked about enjoyment and taste, participants expressed satisfaction, which aligns with Dawkins et al.'s (2013) online survey that described e-cigarette use as "satisfying"[10]. This highlights the positive experiences reported by university students in Perak using e-cigarettes. However, our study found that respondents reported lower psychological benefit, such as "calming," "increased alertness," "enhanced concentration," and "reduced irritability." This contrasts with previous research by Bullen et al., 2010;[11] Dawkins et al., 2013;[10] and Vansickel & Eissenberg, 2012,[12] which reported higher psychological benefits from e-cigarettes. Additionally, participants in our study reported low satisfaction with throat and chest sensations from vaping, unlike previous research by DiPiazza et al., 2020[13]. This difference may be due to social desirability bias, where participants underreported positive effects because of societal views on e-cigarettes. The lack of a Malay translation, the respondents' primary language, may also have influenced their responses. We also looked at aversion to vaping, such as nausea and dizziness. The data showed low aversion, which aligns with DiPiazza et al.'s (2020) findings, where 90% of participants reported no nausea or dizziness[13]. Similarly, Polosa et al.

(2011) found that 96.3% of respondents did not experience these symptoms after 12 weeks of vaping[14]. Our study used the MECEQ questionnaire with a 7-point Likert scale, unlike earlier studies that used a 5-point scale. Research by Finstad (2010) suggested that the 5-point scale could lead to less accurate responses, as participants might try to choose between two values[15]. The 7-point scale is seen as more precise, especially for online, unsupervised surveys like the MECEQ, potentially capturing more accurate responses from our participants. E-cigarette user perceptions taken from Surajudeen et al.,[16] showed that participants in the study used e-cigarettes to reduce the urge and act of smoking, with some reports suggesting that e-cigarettes help with the complete cessation of smoking altogether. These findings are in line with our study as efforts in the cessation of smoking were found to be one of the leading causes of e-cigarette usage.

Conclusion

Most e-cigarette users in this study had been using for 1 to 5 years and were predominantly over 21 years old, male, Malay, and from low-income households. They reported moderate satisfaction with e-cigarettes and low psychological rewards, suggesting that an intervention program aimed at helping them quit could be effective. However, further research utilizing MECEQ is needed before these findings can be generalized. This study focused on 18-24-year-olds who use e-cigarettes, either exclusively or hybrid usage, and suggests universities can promote cessation

through peer-led support, health campaigns, and curriculum integration. Incentives and tobacco-free policies could further encourage quitting. With only moderate subjective effects to e-cigarette use, authorities should prioritize educating students on the harmful substances in e-cigarettes. More research is needed on the health risks in this group.

Conflict of interest:

The authors declare that no conflict of interest may arise from the research publication.

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Ethics

Ethical approval was granted by the UniKL Medical Research Ethics Committee, under reference number UniKLRCMP/MREC/2023-2024/SSM-010.

Authors' contribution:

NHH.: Methodology, writing - Original Draft; NSA & SNHMG: Formal analysis, Writing, and Review; NAZ.: Writing, Review & Editing, Project administration. MFF: Review and Project administration; MZZ: Writing and Review; RMN: Concept, Review, Edit, and final formatting.

Table 1. Sociodemographic characteristics

		n (%)
Age	Under 21	119 (50.4)
	Above 21	117 (49.6)
Gender	Male	218 (92.4)
	Female	18 (7.6)
Race	Malay	213 (90.3)
	Non-Malay	23 (9.7)
University of study	Public	148 (62.7)
	Private	88 (37.3)
Household income	Below RM2000.00	196 (83.1)
	Above RM2000.00	40 (16.9)

Table 2. Status of smoking

		n (%)
Have used e-cigarettes recently (< 1 month)	Yes	157 (66.5)
	No	79 (33.5)
Have smoked regular cigarettes prior to smoking e-cigarettes	Yes	54 (22.9)
	No	182 (77.1)
Using e-cigarettes to stop smoking	Yes	43 (18.2)
	No	193 (81.8)
Dual user	Yes	51 (21.6)
	No	185 (78.4)
Duration of usage of e-cigarettes	< 1 year	74 (31.4)
	1 year - 5 years	157 (66.5)
	> 5 years	5 (2.1)
*Reason of starting e-cigarettes smoking	To stop smoking regular cigarettes	45 (10.0)
	To save money	83 (18.4)
	To relieve stress or anxiety	122 (27.0)
	Friends' influence	159 (35.2)
	Social media influence	43 (9.5)
*Types of e-cigarette	Cigalikes	16 (5.2)
	Pod vapes or pod mods	216 (69.9)
	Vape pens or tank system	61 (19.7)
	Box kits or box mods	14 (4.5)
	DotMod or VapeTape	1 (0.3)
	What my friends have	1 (0.3)

*These questions are multiple response question

Table 3. Responses to MECEQ

No.	Responses	Not at all, n (%)	Very little, n (%)	A little, N (%)	Moderately, n (%)	A lot, n (%)	Quite a lot n (%)	Extremely n (%)
1	E-cigarettes/vapes are satisfying.	8 (3.4)	16 (6.8)	30 (12.7)	82 (34.7)	60 (25.4)	25 (10.6)	15 (6.4)
2	Vaping tastes good.	2 (0.8)	15 (6.4)	30 (12.7)	64 (27.1)	67 (28.4)	30 (12.7)	28 (11.9)
3	I enjoy the sensations of vaping in my throat and chest.	40 (16.9)	66 (28.0)	57 (24.2)	44 (18.6)	18 (7.6)	4(1.7)	7(3.0)
4	Did you enjoy smoking e-cigarettes?	7 (3.0)	30 (12.7)	65 (27.5)	86 (36.4)	31 (13.1)	8 (3.4)	9 (3.8)
5	Vaping calms me down.	21 (8.9)	61 (25.8)	83 (35.2)	53 (22.5)	12 (5.1)	2 (0.8)	4 (1.7)
6	Vaping makes me feel more awake.	28 (11.9)	89 (37.7)	64 (27.1)	39 (16.5)	3 (1.3)	8 (3.4)	5 (2.1)
7	Vaping makes me feel less irritable.	76 (32.2)	90 (38.1)	36 (15.3)	17 (7.2)	9 (3.8)	3 (1.3)	5 (2.1)
8	Vaping helps me concentrate.	45 (19.1)	76 (32.2)	72 (30.5)	28 (11.9)	5 (2.1)	6 (2.5)	4 (1.7)
9	Vaping reduces my hunger for food.	107 (45.3)	78 (33.1)	30 (12.7)	12 (5.1)	3 (1.3)	2 (0.8)	4 (1.7)
10	Vaping makes me dizzy.	88 (37.3)	96 (40.7)	28 (11.9)	11 (4.7)	5 (2.1)	5 (2.1)	3 (1.3)
11	Vaping makes me nauseous.	109 (46.2)	87 (36.9)	22 (9.3)	8 (3.4)	4 (1.7)	2 (0.8)	4 (1.7)
12	I enjoy vaping.	7 (3.0)	16 (6.8)	42 (17.8)	112 (47.5)	37 (15.7)	13 (5.5)	9 (3.8)

Table 4. Analysis of MECEQ by subscale

Analysis of items by subscale		Mean score (±SD)
Vaping Satisfaction	1. E-cigarettes or vapes are satisfying.	4.29 (1.37)
	2. Vaping tastes good.	4.61 (1.40)
	12. I enjoy vaping.	3.98 (1.20)
Psychological Reward	4. Did you enjoy smoking e-cigarettes?	3.69 (1.26)
	5. Vaping calms me down.	2.98 (1.18)
	6. Vaping makes me feel more awake.	2.76 (1.29)
	7. Vaping makes me feel less irritable.	2.25 (1.34)
	8. Vaping helps me concentrate.	2.60 (1.28)
Enjoyment of Respiratory Tract Sensation	9. Vaping reduces my hunger for food.	1.93 (1.21)
	3. I enjoy the sensations of vaping in my throat and chest	2.89 (1.44)
	10. Vaping makes me dizzy	2.05 (1.24)
Aversion	11. Vaping makes me nauseous	1.87 (1.18)

Table 5. Analysis of MECEQ in total

Analysis of MECEQ in total	Mean score (±SD)	Categorized based on Bloom's cut-off points*
Vaping Satisfaction	4.29 (1.32)	Moderate
Psychological Reward	2.70 (1.26)	Low
Enjoyment of Respiratory Tract Sensation	2.89 (1.44)	Low
Aversion	1.96 (1.21)	Low

*Bloom's cut-off points: high ($\geq 80\%$ of the maximum score, ≥ 5.6), moderate (60-70% of the maximum score, 4.2-5.6), and low (below 60% of the maximum score, < 4.2).

Table 6. Association between e-cigarette usage and cessation of smoking

Variable		Using e-cigarettes to stop smoking		p value
		Yes n (%)	No n (%)	
Age	Under 21	22 (18.5)	97 (81.5)	0.915
	Above 21	21 (17.9)	96(82.1)	
Gender	Male	38 (17.4)	180 (82.6)	0.274
	Female	5 (27.8)	13 (72.2)	
Race	Malay	40 (18.8)	173 (81.2)	0.498
	Non-Malay	3 (13.0)	20 (87.0)	
University of study	Public	21 (14.2)	127 (85.8)	0.037
	Private	22 (25.0)	66 (75.0)	
Household income	Below RM2000.00	26 (13.3)	170 (86.7)	<0.001
	Above RM2000.00	17 (42.5)	23 (57.5)	

Table 7. Association between e-cigarette usage and sociodemographic characteristics

Sociodemographic characteristics		Have used e-cigarettes recently (< 1 month)		p value
		Yes n (%)	No n (%)	
Age	Under 21	73 (61.3)	46 (38.7)	0.089
	Above 21	84 (71.8)	33 (28.2)	
Gender	Male	150 (68.8)	68 (31.2)	0.010
	Female	7 (38.9)	11 (61.1)	
Race	Malay	144 (67.6)	69 (32.4)	0.285
	Non-Malay	13 (56.5)	10 (43.5)	
University of study	Public	105 (70.9)	43 (29.1)	0.062
	Private	52 (59.1)	36 (40.9)	
Household income	Below RM2000.00	127 (64.8)	69 (35.2)	0.213
	Above RM2000.00	30 (75.0)	70 (25.0)	

Table 8. Association between duration e-cigarette usage and sociodemographic characteristics

Sociodemographic characteristics		Duration of e-cigarettes usage			p value
		< 1 year n (%)	1 year - 5 years n (%)	> 5 years n (%)	
Age	Under 21	54 (45.4)	61 (51.3)	4 (3.4)	<0.001
	Above 21	20 (17.1)	96 (82.1)	1 (0.9)	
Gender	Male	60 (27.5)	154 (70.6)	4 (1.8)	<0.001
	Female	14 (77.8)	3 (16.7)	1 (5.6)	
Race	Malay	65 (30.5)	145 (68.1)	3 (1.4)	0.039
	Non-Malay	9 (39.1)	12 (52.2)	2 (8.7)	
University of study	Public	41 (27.7)	103 (69.6)	4 (2.7)	0.236
	Private	33 (37.5)	54 (61.4)	1 (1.1)	
Household income	Below RM2000.00	61 (31.1)	134 (68.4)	1 (0.5)	<0.001
	Above RM2000.00	13 (32.5)	23 (57.5)	4 (10.0)	

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