ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND SMOKING STATUS OF DUAL AND SINGLE TOBACCO USERS AMONG MALAYSIAN UNIVERSITY STUDENTS

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ABSTRACT

Objective: In order to develop effective interventions and policies to address the growing trend of dual tobacco and e-cigarette use among Malaysia’s younger generation, it is crucial to understand the socio-demographic factors that influence this behaviour. This study aimed to bridge this knowledge gap by examining the relationship between socio-demographic characteristics and smoking status among university students in the Klang Valley region of Malaysia.

Method: The researchers used a cross-sectional field survey approach to collect data through a questionnaire administered to 386 university students in the Klang Valley region of Malaysia. The selected universities included Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM), Universiti Malaya (UM), and Sunway University, providing a diverse representation of the country’s young population.

Results: The findings highlight the complex nature of factors influencing smoking behaviours, revealing that socio-demographic variables have a limited impact on an individual’s smoking status. However, gender emerged as a notable exception, strongly associated with smoking status. This suggests that gender dynamics may play a significant role in shaping tobacco and e-cigarette use among students. Furthermore, the study identified additional influences, such as peer pressure, accessibility of tobacco products, and perceptions towards smoking, which are likely to affect smoking behaviours. Although these aspects were not the primary focus of the study, their importance is evident.

Conclusions: The study provides valuable information that can help policymakers, health professionals, and educators develop effective strategies to reduce smoking among young
Malaysians. However, it also highlights the need for further research to better understand the complex factors involved in smoking and to develop more effective interventions to reduce smoking among university students.

**Research Implications:** The study's findings can guide the development of targeted interventions, educational campaigns, and policies aimed at reducing tobacco and e-cigarette use among university students. The strong association between gender and smoking status may also guide tailored interventions for different gender groups.

**Originality/value:** The originality of this study lies in its focused investigation of socio-demographic factors influencing dual tobacco and e-cigarette use among university students in Malaysia. The research not only reveals the limited influence of socio-demographic variables but also highlights the significance of gender and other unexplored factors, providing a nuanced understanding of smoking behaviours within this specific context.

**Keywords:** socio-demographic factors, dual and single tobacco users, e-cigarettes, university students, Malaysia.

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**ASSOCIAÇÃO ENTRE FATORES SOCIODEMOGRÁFICOS E STATUS DE FUMANTE DE DOIS OU UM USUÁRIOS DE CIGARRO ENTRE ESTUDANTES UNIVERSITÁRIOS DA MALÁSIA**

**RESUMO**

**Objetivo:** A fim de desenvolver intervenções e políticas eficazes para lidar com a tendência crescente do uso de cigarro duplo e e-cigarro entre a geração mais jovem da Malásia, é crucial entender os fatores sociodemográficos que influenciam este comportamento. Este estudo teve como objetivo colmatar essa lacuna de conhecimento, examinando a relação entre características sociodemográficas e o status de tabagismo entre os estudantes universitários da região do Vale de Klang, na Malásia.

**Método:** Os pesquisadores usaram uma abordagem de pesquisa de campo transversal para coletar dados por meio de um questionário administrado a 386 estudantes universitários na região do Vale de Klang, na Malásia. As universidades selecionadas incluíram Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM), Universiti Malaya (UM) e Sunway University, fornecendo uma representação diversificada da população jovem do país.

**Resultados:** Os resultados destacam a natureza complexa dos fatores que influenciam os comportamentos de tabagismo, revelando que as variáveis sociodemográficas têm um impacto limitado no status de tabagismo do indivíduo. No entanto, o gênero emergiu como uma exceção notável, fortemente associada ao status de tabagismo. Isso sugere que a dinâmica de gênero pode desempenhar um papel significativo na formação do uso de cigarro e cigarro eletrônico entre os estudantes. Além disso, o estudo identificou influências adicionais, como a pressão dos pares, a acessibilidade dos produtos do cigarro e as percepções em relação ao tabagismo, que são susceptíveis de afetar os comportamentos de tabagismo. Embora esses aspectos não tenham sido o foco principal do estudo, sua importância é evidente.

**Conclusões:** O estudo fornece informações valiosas que podem ajudar formuladores de políticas, profissionais de saúde e educadores a desenvolver estratégias eficazes para reduzir o tabagismo entre jovens malais. No entanto, também destaca a necessidade de mais pesquisas para entender melhor os fatores complexos envolvidos no tabagismo e desenvolver intervenções mais eficazes para reduzir o tabagismo entre os estudantes universitários.
Implicações da pesquisa: Os resultados do estudo podem orientar o desenvolvimento de intervenções direcionadas, campanhas educacionais e políticas destinadas a reduzir o uso de cigarro e cigarros eletrônicos entre estudantes universitários. A forte associação entre gênero e tabagismo também pode orientar intervenções personalizadas para diferentes grupos de gênero.

Originalidade/valor: A originalidade deste estudo está na sua investigação focada de fatores sociodemográficos que influenciam o uso duplo de cigarro e cigarro eletrônico entre estudantes universitários na Malásia. A pesquisa não só revela a influência limitada das variáveis sociodemográficas, mas também destaca o significado do gênero e outros fatores inexplorados, proporcionando uma compreensão matizada dos comportamentos de tabagismo neste contexto específico.

Palavras-chave: fatores sociodemográficos, usuários de cigarro duplo e único, cigarros eletrônicos, estudantes universitários, Malásia.

1 INTRODUCTION

The usage of e-cigarettes has experienced a significant surge, increasing from 5.1 million users in 2015 to 41 million in 2018 in developed nations. Moreover, global sales rose from approximately $8.5 billion in 2015 to $15.7 billion in 2018, according to the World Health Organization (WHO, 2021). This rapid growth in e-cigarette usage has sparked debates among public health advocates. While some believe e-cigarettes are more dangerous than regular cigarettes, others hold contrasting opinions (Mitsuhashi-Acs, 2016). The safety and health implications of long-term e-cigarette use are a matter of significant controversy. Concerns have been raised about the potential risks of addiction and the possibility that e-cigarettes could lead to traditional cigarette smoking. International organizations have divergent views on these issues, with some advocating for strict regulations while others lean towards a more lenient approach.

A study by Borland et al. (2019) revealed that individuals who use nicotine daily expressed a higher interest in quitting than exclusive daily smokers. Dual daily users exhibited more favourable attitudes towards smoking in general. In a related context, Martinez et al. (2019) found that dual usage reduces the consumption of combustible cigarettes but increases overall nicotine intake and dependency. For dual users, reducing smoking after using e-cigarettes may result in a decline in cigarette consumption, potentially reducing harm. However, as overall nicotine usage and dependency increase, quitting either one or both products may become more challenging (Martinez et al., 2020). The rationale behind this scenario is that e-cigarettes containing nicotine can alleviate withdrawal symptoms and, by simulating the behavioural aspects characteristic of smokers, they can be used similarly to traditional cigarettes.
Discussions on dual usage revolve around whether it provides a sensible substitute for combustible tobacco use or makes quitting more difficult (Levy et al., 2017; Werner and Mendez, 2019). Dual use has been associated with increased health issues and symptoms (Rest et al., 2020). An increasing number of people are interested in addressing the needs of e-cigarette users who want to quit using them due to growing concerns about the potential of electronic nicotine delivery systems (ENDS) to contribute to or prolong nicotine addiction (Werner and Mendez, 2019; Selya et al., 2018). It may be beneficial for individuals attempting to quit all nicotine-based products to understand nicotine dependence better, particularly as it relates to these products (Rest et al., 2020).

A survey was conducted to assess the usage of traditional and electronic cigarettes among students in Malaysian universities (Puteh et al., 2018). The results revealed that 74.9% of the students reported using e-cigarettes. Among them, 34.5% exclusively used e-cigarettes, while 40.3% were dual users, using electronic and traditional cigarettes. The majority of these smokers (95% of whom were male) identified as Malay (75.2%), and 92.1% did not report any health problems. This research highlights the prevalence of exclusive e-cigarette usage and the combination of e-cigarettes and tobacco among university students. Despite the Tobacco Regulation Law of 2004 and the Control of Tobacco Product (Amendment) Regulation 2013, which prohibit smoking in all educational institutions, including higher education institutions, the use of e-cigarettes remains high among Malaysian university students (Puteh et al., 2018). Since smokeless cigarettes are uncommon among Malaysian university students, the focus of this study is justified by the prevalence of dual tobacco and e-cigarette use. While laws are implemented for the benefit of society, the tobacco industry, a multi-billion-dollar investment, continues to entice young people with attractive alternatives through substantial investments in advertising these products.

Previous research conducted in Malaysia by Wong et al. (2016) found that most e-cigarette users were young professionals and managers (36%), particularly university or college students (39%). The primary motivations for using e-cigarettes, as identified in the survey, were to aid in quitting smoking tobacco cigarettes (88%), the perception that e-cigarettes are less intrusive than tobacco cigarettes (85%), and the freedom to use them in public places (70%). The belief that e-cigarettes are healthier than traditional cigarettes (85%) and more cost-effective (65%) was also prevalent.
The study by Sinnathamby, Saupin, Lukman, Sidek Ahmad, and Robinson (2021) reported that the younger generation is increasingly attracted to e-cigarettes, and their friends play a significant role in influencing their usage. Although e-cigarettes are accessible to university students, it is important to remember that such access is prohibited. The study found that nicotine-containing e-juice is widely available, even at roadside stalls, despite regulations indicating that it should only be provided by licensed pharmacies or medical professionals. Collecting evidence-based data on e-cigarette usage trends among students is crucial for developing effective policies and regulations to reduce the prevalence of e-cigarette use among teenagers.

In Malaysia, several studies have been conducted to examine the reasons for e-cigarette use (Wong et al., 2016), the effectiveness and safety of these devices (Rahman et al., 2016), and the factors influencing teenage users of these devices (Lourdes et al., 2019). However, there is limited empirical understanding of the socio-demographic factors affecting dual tobacco and e-cigarette use among Malaysia's younger population. Therefore, this study aims to investigate the association between socio-demographic variables and the smoking status of university students in Malaysia's Klang Valley who are both dual and single tobacco users.

2 THEORETICAL FRAMEWORK

This study relies mainly on the Theory of Planned Behavior (TPB), which provides a comprehensive and robust framework to understand and predict human behaviour. Developed by Ajzen (1991), TPB has been widely applied in various fields, including health-related behaviours such as smoking. The Theory of Planned Behavior posits that individual’s behavioural intentions and behaviours are determined by attitudes, subjective norms, and perceived behavioural control (Ajzen, 1991). In the context of this study, TPB can be employed to analyze the influence of socio-demographic factors on dual usage of cigarettes and e-cigarettes among university students in Malaysia. This theory helps in understanding how attitudes toward smoking, perceived social pressures (such as peer influence), and perceptions of control over smoking behaviour (such as accessibility to tobacco products) may influence smoking status.

TPB has been widely used to study smoking behaviour. Several researchers have applied TPB to investigate the factors influencing smoking initiation, continuation, and cessation (e.g., Godin et al., 1992; Norman et al., 1999; Topa & Moriano, 2010). The
application of TPB in this study allows for the exploration of how attitudes, social pressures, and perceived control can explain the variations in smoking behaviours among young Malaysians. The theory's constructs can be related to various socio-demographic factors, such as gender, age, income, ethnicity, and CGPA, which may be linked to smoking patterns in this particular context. Utilizing the Theory of Planned Behavior as the theoretical underpinning for this study offers a systematic approach to understanding the complex interplay of socio-demographic factors influencing dual usage of cigarettes and e-cigarettes. By applying TPB, this study aims to contribute to the existing literature on smoking behaviour among young generations and provides a basis for designing effective interventions.

3 METHODOLOGY

3.1 RESEARCH DESIGN

This study employed a cross-sectional field survey approach and used a hardcopy questionnaire to collect data. Four universities in the Klang Valley, consisting of three public and one private university, were randomly selected as the study sites.

3.2 SAMPLING METHOD AND SUBJECT RECRUITMENT

A multi-stage sampling approach was utilized to ensure a representative sample of the target population. This approach involved a selection process consisting of multiple stages for data collection and analysis. The multi-stage sampling approach employed two primary stages in this study. In the first stage, also known as the clustering stage, four universities were randomly chosen from the higher education institutions in the Klang Valley. This clustering method allowed for the selection of comparable schools, ensuring a comprehensive representation of the higher education landscape in the area. The second stage involved a random sampling approach within the selected universities. This approach ensured that every individual within the chosen institutions had an equal chance of being included in the study. The study instrument, which included the questionnaire, was randomly distributed to the target respondents, facilitating data collection and analysis. The multi-stage sampling procedure was chosen based on the effectiveness demonstrated in previous studies (Ling et al., 2020; Chiangkhong et al., 2021). This method was selected to obtain a sample that accurately reflected the population of interest and allowed for meaningful analysis of the relationship between socio-demographic
factors and the smoking status of dual and single tobacco users among university students in the Klang Valley, Malaysia.

3.3 SAMPLE SIZE ESTIMATION

The sample size was estimated using the Raosoft sample size calculator. A sample size of \( n = 445 \) was determined, with a 95% Confidence Interval (CI) and a 5% significance level, to ensure an acceptable representation of dual users. Table 1 displays the sample size and response rates for the study conducted at Malaysia's Sunway, UKM, UPM, and UM institutions. A total of 445 questionnaires were distributed among the universities as follows: Sunway (95), UKM (130), UPM (120), and UM (100). The number of fully completed questionnaires received from each university was as follows: Sunway (76), UKM (116), UPM (114), and UM (80). The response rate was calculated as the percentage of distributed questionnaires that were completed and returned.

The response rates were as follows: Sunway - 80.0%, UKM - 89.2%, UPM - 95.0%, and UM - 80.0%. The overall response rate for the study was 86.7%.

Table 1: Response rate for questionnaire based on university.

<table>
<thead>
<tr>
<th>Universities</th>
<th>SUNWAY</th>
<th>UKM</th>
<th>UPM</th>
<th>UM</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed questionnaire</td>
<td>95</td>
<td>130</td>
<td>120</td>
<td>100</td>
<td>445</td>
</tr>
<tr>
<td>Received complete questionnaire</td>
<td>76</td>
<td>116</td>
<td>114</td>
<td>80</td>
<td>386</td>
</tr>
<tr>
<td>Response rate</td>
<td>80.0%</td>
<td>89.2%</td>
<td>95.0%</td>
<td>80.0%</td>
<td>86.7%</td>
</tr>
</tbody>
</table>

Source: Prepared by the author

4 RESULTS AND DISCUSSION

4.1 NICOTINE DEPENDENCE COMPARISON

The respondents in this study had diverse backgrounds, as reflected in their profiles. In terms of age, the majority of students (77.72%) fell within the 20 to 23 age range. Ethnicity-wise, a significant number of participants identified as Malay. Additionally, a notable proportion of the respondents (60.36%) reported an income below RM4850. When considering academic performance, the majority of respondents had CGPA ranging from 3.61 to 4, accounting for 45.6% of the participants. In terms of gender, the majority of respondents were male, representing 90.4% of the total sample. Detailed results regarding these findings are presented in Figures 1-5.
Association between Socio-Demographic Factors and Smoking Status of Dual and Single Tobacco Users Among Malaysian University Students

Figure 1: Distribution of respondents according to age category

Source: Prepared by the author

Figure 2: Distribution of respondents according to ethnicity

Source: Prepared by the author

Figure 3: Distribution of respondents according to income level

Source: Prepared by the author
4.2 CHI-SQUARE TEST

A chi-square test was conducted to examine the relationship between the smoking status of the students and five socio-demographic factors: age, gender, CGPA, ethnicity, and income. The data were analyzed using SPSS version 25. The results indicated that, except for gender ($\chi^2 = 6.036$, p-value = 0.049), there was no significant relationship between the smoking status of the students and the other socio-demographic factors. The p-values for age, CGPA, ethnicity, and income were higher than 0.05, indicating that these factors had no statistically significant association with smoking status. Detailed results of these findings can be found in Figures 6-10.
Information about socio-demographic factors and smoking status among dual and single tobacco users among Malaysian university students.

Figure 6: Smoking status according to age

![Graph showing smoking status by age](source)

Source: Prepared by the author

Figure 7: Smoking status according to ethnicity

![Graph showing smoking status by ethnicity](source)

Source: Prepared by the author

Figure 8: Smoking status according to income

![Graph showing smoking status by income](source)

Source: Prepared by the author
5 DISCUSSION

Recent studies have demonstrated that socio-demographic factors have limited influence on determining smoking status, with gender being the only significant factor impacting smoking behaviour (Kang and Bae, 2021). Penzes et al. (2012) also used a bivariate model to examine factors associated with the belief that smoking aids in weight management. They found that perceived body shape, friendship circles consisting of smokers, gender, and academic grade level were significantly associated with this belief, particularly among females. This belief system adds complexity to the increasing prevalence of tobacco use. However, the current study focuses on nicotine dependency,
intention to quit, socio-demographic factors, psychological well-being, and the health consequences of smoking.

In another study conducted by Borland et al. (2019), the aim was to categorize smoking and vaping behaviours into distinct typologies. The study analyzed cross-sectional data from adults in the United States, England, Australia, and Canada who reported smoking, vaping, or using both products at least once a month. Participants were classified into eight groups based on the frequency of usage, and four primary usage groups were identified: concurrent non-daily users, dual daily users, predominantly smokers, and predominantly vapers. The study compared these groups in terms of socio-demographic characteristics, attitudes, nicotine dependency, beliefs about smoking and vaping, and variables related to quitting. The findings revealed that individuals who used both nicotine products daily displayed higher levels of nicotine dependency and held more positive attitudes towards smoking and vaping than those who used them non-daily. This comprehensive analysis highlights the complex nature of smoking behaviours and underscores the significant influence of socio-demographic factors. Understanding these relationships is crucial for developing effective public health interventions addressing tobacco use.

According to Martinez et al. (2019), dual usage, which refers to the combined use of traditional and e-cigarettes, can reduce combustible cigarette consumption but paradoxically leads to increased nicotine consumption and dependence. This poses challenges for individuals seeking to quit one or both products. The addictive nature of nicotine-containing e-cigarettes, which relieve withdrawal symptoms and simulate the behavioural aspects of traditional smoking, reinforces the habit. Whether dual usage can serve as a viable substitute for combustible tobacco or hinder cessation efforts remains contentious (Levy et al., 2017; Werner and Mendez, 2019). Studies suggest that dual usage may exacerbate health problems and associated symptoms (Rest et al., 2020). As concerns grow regarding the potential of Electronic Nicotine Delivery Systems (ENDS) to perpetuate or contribute to nicotine addiction, there is increasing interest in addressing the cessation needs of individuals dependent on e-cigarettes. Gaining a better understanding of nicotine dependency, particularly concerning ENDS, could be instrumental in supporting those who wish to quit all nicotine-based products.

Despite laws prohibiting smoking in educational institutions, Puteh et al. (2018) highlighted the high prevalence of e-cigarette use among Malaysian university students.
This finding underscores the enduring appeal of tobacco and nicotine products among young individuals, even in the presence of governmental regulations. It also emphasizes the influential role of the lucrative tobacco industry in promoting attractive alternatives. Insights from surveys conducted by Wong et al. (2016) provide a further understanding of the motivations behind e-cigarette use, including smoking cessation, perceived lower harm compared to traditional cigarettes, cost-effectiveness, and the freedom to use them in public spaces. These results highlight the complexity of e-cigarette use and the various factors contributing to its pervasive prevalence.

Furthermore, Sinnathamby et al. (2021) found that peer pressure significantly attracts young people, especially university students, to e-cigarettes. Despite restrictions on the sale of nicotine-containing e-juice, obtaining these products remains relatively easy. This emphasizes the critical need for more stringent laws and effective enforcement strategies to reduce e-cigarette use among this group. In conclusion, examining dual usage sheds light on the complex nature of nicotine dependence and the challenges faced in quitting efforts. It raises important questions about the effectiveness of current tobacco control policies and the reasons for the high frequency of e-cigarette usage among young people. To address this public health concern, these insights can serve as valuable resources for developing more effective policies and initiatives.

6 CONCLUSION

In conclusion, the current study found that smoking behaviour among Malaysian university students was associated with several socio-demographic characteristics, including age, gender, ethnicity, economic level, and CGPA. However, the only socio-demographic variable that showed a meaningful correlation with smoking behaviour was gender, with men being more likely to smoke. It is important to note that the relationship between socio-demographic characteristics and smoking behaviour may be complex, and these associations may vary among different groups. Additionally, dual and single tobacco products add further complexity to the understanding of smoking behaviour.

The findings suggest that other factors beyond the socio-demographic variables examined in this study likely influence smoking status among university students. Further research is warranted to understand these intricate relationships better and develop targeted interventions to reduce smoking prevalence among university students. Future studies should consider a broader range of factors and employ longitudinal designs to
explore the underlying mechanisms more comprehensively. This will enable researchers to develop effective strategies to address smoking behaviour in this population. By conducting more comprehensive investigations and considering a wider array of factors, researchers can uncover the complexities of smoking behaviour among university students. This knowledge will be invaluable in designing evidence-based interventions and policies to reduce smoking rates and promote healthier behaviours.

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