



**IMPACTS OF CONCURRENT CIGARETTES AND E-CIGARETTES USE
ON UNIVERSITY STUDENTS' PSYCHOLOGICAL WELL-BEING,
HEALTH, AND SMOKING CESSATION**

By

WALI AFAT MASAUD ELSAIEH

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
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Smokers of e-cigarettes and traditional tobacco cigarettes are 2.6 times more likely to develop lung disease than non-smokers, with dual cigarette use rapidly increasing over the last decade. This rise in dual cigarette use has significantly raised the risk of lung disease among Malaysian adults. To address this public health concern, this study investigates the variables influencing dual cigarette use among adults, with a particular focus on higher education institutions. Specifically, it explores the relationship between socio-demographic factors and the smoking status of single and dual cigarette users. Additionally, the study examines potential differences in nicotine dependence, smoking habits, and willingness to quit smoking between these groups. The impact of demographic factors on the psychological well-being and smoking cessation efforts of Malaysia's younger population is also emphasized. Data were collected through a cross-sectional survey involving 386 students across four specified higher education institutions. The data were analyzed using SPSS version 25, employing statistical tests such as the Chi-square test of independence, Mann-Whitney U test, and Kruskal-

Wallis test. The results indicate that, except for gender ($\chi^2=6.036$, $p=0.049$), there is no significant relationship between five socio-demographic factors (gender, age, ethnicity, CGPA, and parents' income) and students' smoking status. Regarding nicotine dependency, single users exhibit a slightly higher mean score (9.27 ± 7.97) compared to dual users (8.24 ± 4.67), with a Mann-Whitney U test p-value of 0.045, indicating a statistically significant difference. However, there was no significant difference in smoking practices between single users (3.89 ± 0.89) and dual users (3.95 ± 0.82), with a p-value of 0.628. Similarly, perceptions of health risks and psychological well-being also show no significant differences ($p > 0.05$) between these groups (3.76 ± 0.90 for single users) and dual users (3.82 ± 0.95).

In assessing the willingness to quit smoking among three groups (single-cigarette users, single-vape users, and dual users), the study found no statistically significant differences in nicotine dependency, smoking practices, perceptions of health risks, or psychological well-being ($p > 0.05$). The study concludes by presenting a framework for addressing health risks associated with dual tobacco and e-cigarette use, focusing on smoking habits, nicotine dependency, and socio-demographic factors. This framework was evaluated by a panel of experts against criteria such as clarity, reliability, applicability, completeness, and sustainability. These findings can guide higher education authorities in developing effective smoking cessation programs tailored to the smoking status of students, with a particular emphasis on supporting single smokers who demonstrate a higher inclination to quit compared to dual smokers.

Keywords: dual cigarette use, nicotine dependency, students' smoking practices, students' perception, smoking cessation, psychological well-being

SDG: GOAL 3: Good Health and Well-Being



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**KESAN PENGGUNAAN ROKOK DAN ROKOK ELEKTRONIK SECARA
SERENTAK TERHADAP KESEJAHTERAAN PSIKOLOGI, KESIHATAN,
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Perokok rokok elektronik dan rokok tembakau tradisional adalah 2.6 kali ganda lebih berisiko mendapat penyakit paru-paru berbanding bukan perokok, dan tabiat dwi rokok telah meningkat dengan mendadak sejak sedekad yang lalu. Peningkatan ketara penggunaan dwi rokok dalam kalangan orang dewasa meningkatkan risiko penyakit paru-paru di Malaysia. Penyelidikan terhadap faktor-faktor yang mempengaruhi penggunaan dwi rokok dalam kalangan orang dewasa, khususnya di institusi pengajian tinggi, amat diperlukan. Kajian ini meneroka hubungan antara faktor sosio-demografi dan status merokok bagi pengguna tunggal dan pengguna dwi rokok. Selain itu, kajian ini bertujuan untuk mengenal pasti perbezaan dalam kebergantungan nikotin, tabiat merokok, dan kerelaan untuk berhenti merokok antara kedua-dua kumpulan ini. Kajian ini juga menekankan impak faktor demografi terhadap kesejahteraan psikologi dan usaha penghentian merokok dalam kalangan belia Malaysia.

Data diperoleh melalui tinjauan keratan rentas melibatkan 386 pelajar dari empat institusi pengajian tinggi di Lembah Klang. Ujian Data yang dikumpul dianalisis menggunakan SPSS versi 25, dan ujian statistik, termasuk ujian Khi kuasa dua dan Ujian Kruskal-Wallis digunakan bagi mencapai objektif kajian ini. Data yang dikumpul dianalisis menggunakan SPSS versi 25, dan ujian statistik, termasuk ujian Khi kuasa dua, ujian Mann-Whitney U, dan ujian Kruskal-Wallis, telah digunakan. Dapatan kajian ini menunjukkan bahawa, kecuali jantina ($\chi^2 = 6.036$, $p = 0.049$), tiada hubungan yang signifikan antara lima faktor sosio-demografik (jantina, umur, etnik, CGPA dan pendapatan ibu bapa) dengan status merokok pelajar. Berkenaan kebergantungan terhadap nikotin, pengguna tunggal menunjukkan skor min yang sedikit tinggi (9.27 ± 7.97) berbanding pengguna dwi rokok (8.24 ± 4.67), dengan nilai p ujian Mann-Whitney U sebanyak 0.045, menunjukkan perbezaan yang signifikan secara statistik. Walau bagaimanapun, tiada perbezaan yang signifikan dalam tabiat merokok antara pengguna tunggal (3.89 ± 0.89) dan pengguna dwi rokok (3.95 ± 0.82), dengan nilai p sebanyak 0.628. Persepsi terhadap risiko kesihatan dan kesejahteraan psikologi juga tidak menunjukkan perbezaan yang signifikan ($p > 0.05$) antara pengguna tunggal (3.76 ± 0.90) dan pengguna dwi rokok (3.82 ± 0.95).

Berkenaan kesediaan untuk berhenti merokok dalam kalangan tiga kumpulan (pengguna tunggal rokok, pengguna tunggal rokok elektronik, dan pengguna dwi rokok), tiada perbezaan yang signifikan secara statistik dalam kebergantungan nikotin, tabiat merokok, persepsi risiko kesihatan, atau kesejahteraan psikologi dalam kalangan kumpulan ini ($p > 0.05$). Kajian ini disimpulkan dengan membentangkan rangka kerja untuk menangani risiko kesihatan yang berkaitan dengan penggunaan kedua-dua rokok tembakau dan elektronik, dengan tumpuan kepada tabiat merokok,

kebergantungan nikotin, dan faktor sosio-demografi. Rangka kerja ini telah dinilai oleh panel pakar berdasarkan kriteria seperti kejelasan, kebolehpercayaan, kebolegunaan, kesempurnaan dan kemampanan. Ini dapat membantu pihak institusi pengajian tinggi dalam membangunkan program berhenti merokok yang berkesan, disesuaikan dengan status merokok pelajar, dengan penekanan khusus kepada sokongan untuk perokok tunggal yang menunjukkan kecenderungan lebih tinggi untuk berhenti berbanding perokok dwi rokok.

Kata Kunci: kebergantungan nikotin, tabiat merokok pelajar, persepsi pelajar, berhenti merokok, kesejahteraan psikologi, Lembah Klang

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The availability of over 400 distinguishable e-cigarette brands (Villanti et al., 2017) and more than 7,500 different flavors (Zhu et al., 2014) is one of the primary explanations for e-cigarette use, particularly among teenagers. Additionally, among adolescents aged 15 to 19 who had ever used an e-cigarette, 38.2% of past 30-day users and 26.6% of current smokers were previous smokers as reported by University of Waterloo (2019). According to a growing body of research, dual cigarette and e-cigarette use is positively associated with truancy, poor academic performance, nicotine dependence, illicit drug use, and alcohol consumption, and is negatively associated with intentions to quit (Azagba, 2018; Azagba et al., 2019; Kristjansson et al., 2015; McCabe et al., 2018; Morean et al., 2016; Park et al., 2016).

The relationship between dual cigarette use, e-cigarette use, and mental health issues has been the subject of only a limited number of studies. In the years 2011 to 2012, twenty percent of adolescents aged 12 to 17 reported that their mental health was not very good in their self-reports (Herman et al., 2015). Teenage smoking has been associated with a short attention span, hyperactivity disorder, sadness, anxiety, and mental comorbidities, as reported in recent research (Khouja et al., 2021).

While e-cigarette consumption is predominantly observed among younger individuals, often in combination with traditional tobacco cigarettes, the scientific understanding of how mental health correlates with either solitary or dual usage of e-cigarettes and

traditional cigarettes remains limited (Khouja et al., 2021). Symptoms were a significant predictor of e-cigarette use at the 6-month follow-up in a long-term study of college students in Texas. Regarding smoking cessation, studies have yielded mixed findings on students using e-cigarettes as a smoking cessation aid with the hope of quitting or reducing their cigarette use. However, there is still insufficient data to support the use of e-cigarettes for smoking cessation. It is important to emphasize that regulatory agencies such as the FDA do not currently recognize e-cigarettes as an effective tool for quitting smoking. Therefore, it is crucial to review the results of this study in the specific context to gain a comprehensive understanding of the unique effects of dual cigarette usage among the selected university students.

1.2 Background of the Study

Understanding the effects of conventional cigarettes and e-cigarettes is essential for comprehending their impact on health, mental well-being, and smoking cessation among urban youth. Both types of cigarettes are derived from processed tobacco leaves, which contain high levels of nicotine, leading to euphoria and addiction. However, burning tobacco in conventional cigarettes releases harmful chemicals such as tar and carbon monoxide, which are associated with various health risks (U.S. Department of Health and Human Services, 2014).

E-cigarettes, also known as electronic cigarettes or vaporizers, have a battery-powered element that heats liquid into an aerosol. This aerosol typically contains nicotine and flavorings, as well as other substances such as heavy metals like acrylamide. E-cigarettes have been found to contain harmful compounds such as formaldehyde and

acrolein, posing risks beyond respiratory and cardiovascular issues, potentially triggering allergies and other health conditions (Matsumoto et al., 2019).

Both conventional and e-cigarettes contain nicotine, which is the primary cause of addiction. Nicotine stimulates parts of the brain associated with pleasure, leading to reduced dopamine levels and, in some cases, depression (Matsumoto et al., 2019). Traditional cigarettes also contain numerous carcinogenic substances, while e-cigarettes have been shown to contain many harmful compounds (Goniewicz et al., 2014).

In many countries, traditional cigarette advertising and sales are heavily regulated, with measures such as bans on television and radio commercials, plain packaging requirements, and high taxes contributing to reduced consumption. In contrast, e-cigarettes have faced relatively little regulatory scrutiny, allowing manufacturers to market their products with unverified health claims (Grana et al., 2014). This regulatory gap has enabled e-cigarette companies to target young people with appealing flavors and high-tech imagery, significantly expanding the global market from \$685 million in 2009 to \$8.4 billion in 2015.

The rise of e-cigarettes has sparked controversy among public health advocates, with debates over whether they are a viable alternative to traditional tobacco or merely another harmful substance (Ganasegeran & Rashid, 2016). Traditional cigarette companies have significant investments in many e-cigarette brands, allowing them to maintain market share despite shifting public opinion (McNeill et al., 2015).

E-cigarettes are particularly popular among young people and college students, who are influenced by peer pressure and attracted to high-tech products. Companies market e-cigarettes as leisure products that provide relaxation, stress relief, and social acceptance, appealing directly to the youth demographic (Romijnders et al., 2018). Despite the perceived minimal public health risks associated with e-cigarettes compared to traditional cigarettes, this perception could change as more research emerges (Romijnders et al., 2018).

Nicotine addiction significantly affects psychological well-being, causing mood disorders and mental health issues (Matsumoto et al., 2019). The dual use of conventional and e-cigarettes can exacerbate these problems, highlighting the need for awareness of the potential health hazards (Bilgiç & Günay, 2018). There is an urgent need to address smoking habits among young people, as their current behaviors will have long-term consequences. Peer influence plays a crucial role in smoking initiation, and social interventions can help reduce nicotine dependency (Bilgiç & Günay, 2018; Nasser et al., 2020).

Understanding the diversity in smoking practices, from vaping to using pipes and cigars, is crucial for developing tailored intervention strategies. Educating students about the health hazards of smoking and promoting a healthy lifestyle can enhance psychological well-being and reduce participation in hazardous activities (Hanawi et al., 2020; Matsumoto et al., 2019). Cultural and societal factors also influence smoking behaviors, and addressing these factors is essential for effective prevention and cessation programs (Hairston et al., 2018).

1.2.1 Nicotine Dependency of Students

Exploring nicotine dependency is crucial, particularly among students who are at a vulnerable developmental stage where addictive behaviors can have long-lasting consequences. Bilgiç and Günay (2018) demonstrated that peer education significantly influences smoking behavior among high school students, highlighting the social component that can either drive or mitigate nicotine dependency. Additionally, Nasser et al. (2020) conducted a systematic review on the prevalence of smoking among university students in several Arab countries and found a substantial rate of cigarette and waterpipe smoking. This underscores the need for age-specific approaches targeting both high school and university students to effectively combat nicotine dependency.

1.2.2 Smoking Practices among Students

Smoking behaviors among students are influenced by numerous factors. Wang et al. (2019) highlighted that various forms of tobacco use, including conventional cigarettes, e-cigarettes, cigars, and waterpipes, are common among middle and high school students. Understanding this diversity in smoking practices is essential for developing tailored intervention strategies. Additionally, these behaviors are shaped by external social and environmental factors, such as peer pressure and the availability of tobacco products, which must be incorporated into any comprehensive assessment.

1.2.3 Students' Perception of Health Effects

Students' perceptions of the health implications of smoking significantly influence their smoking behaviors. Hanawi et al. (2020) demonstrated that a healthy lifestyle positively impacts the psychological well-being of university students, suggesting that those better informed about early health risks are less likely to engage in harmful behaviors, including smoking. Similarly, Matsumoto et al. (2019) identified a relationship between symptoms, subjective perception of health, and stress among college students, indicating that perception can strongly influence behavior. Hairston et al. (2018) explored students' perceptions and the effects of colorism on the mental well-being of African American men, highlighting that wellness perceptions are intertwined with cultural and social contexts.

Nicotine dependency, smoking practices, and perceptions of health effects each provide unique insights into the complex landscape of students' smoking behavior. Nicotine dependency is not an isolated psychological phenomenon; it is influenced by peer dynamics and age-specific factors. Smoking practices are diverse and shaped by multiple external variables, necessitating varied interventions. Students' perceptions of health effects play a significant role in determining behavior and are influenced by psychological, social, and cultural factors. Therefore, a multifaceted, tailored approach is essential for understanding and addressing smoking behavior among students.

In this context, it is crucial to define psychological well-being as a multidimensional construct encompassing emotional, cognitive, and social health. Psychological well-being is not merely the absence of mental disorders but a state in which individuals

realize their potential, cope with life's normal stresses, work productively, and contribute to their community (World Health Organization, 2021). Recent research by Smith and Jones (2018) has highlighted the complex relationship between smoking practices and emotional well-being in university students. Their findings suggest that students with good mental health are more likely to understand the health risks of smoking and vaping, and consequently, are more motivated to quit. Conversely, individuals with poor mental health may use smoking or vaping to manage stress or emotional distress, perpetuating a harmful cycle for their physical health. This interaction underscores the importance of addressing mental health to understand and reduce smoking behavior.

Therefore, university health programs aimed at decreasing smoking rates among college students must include educational components that inform students about the physical health hazards of smoking and e-cigarette use. Additionally, these programs should provide tools for psychological health, including anti-nicotine coping mechanisms and stress-reduction methods.

1.3 Problem Statement

The dual use of conventional cigarettes and e-cigarettes among university students raises significant concerns for their health, psychological well-being, and smoking cessation efforts. However, there is limited knowledge about the effects of dual use in this group. Investigating the impact of dual use of cigarettes and e-cigarettes on the psychological well-being, physical health, and smoking cessation outcomes among university students is essential. The growing popularity of e-cigarettes among college students, despite the acknowledged dangers of dual smoking, exacerbates these

concerns (Hanawi et al., 2020). Nicotine addiction significantly influences psychological well-being, causing mood disorders and negatively impacting mental health (Matsumoto et al., 2019). Dual usage as a stress-reduction technique further complicates wellness issues (Nasser et al., 2020).

Although the health risks associated with conventional cigarettes are widely known, the belief that e-cigarettes are a safer option may lead to dual usage without adequate knowledge of their potential health effects (Bilgiç and Günay, 2018). Understanding the impact of dual usage on the overall health and long-term wellness of university students is crucial for developing focused treatments and health policies. While some students might consider e-cigarettes as a tool to reduce or quit smoking, the effectiveness of this approach remains debatable. Investigating the effects of dual usage on smoking cessation outcomes and understanding the challenges faced by university students in quitting smoking will facilitate the development of evidence-based cessation strategies tailored to their specific needs.

Several studies in Malaysia have investigated the reasons for e-cigarette use (Wong et al., 2016), their efficacy (Rahman et al., 2016), and the factors contributing to dual usage among Malaysian teenagers (Lourdes et al., 2019). However, there is a lack of empirical data on the health dangers and effects of using both cigarettes and e-cigarettes on the psychological well-being and smoking cessation efforts of Malaysians. Therefore, this study aims to develop a framework to assess the health hazards and evaluate the effects of using both traditional cigarettes and e-cigarettes on the mental well-being and smoking cessation efforts of university students in the Klang Valley, Malaysia.

The choice of Klang Valley as the research focus is due to its distinct demographic and cultural characteristics that may impact the dual use of cigarettes and e-cigarettes among university students. Klang Valley, encompassing Malaysia's capital Kuala Lumpur and its adjacent urban districts, features a diverse and densely urbanized population, along with numerous higher education institutions. This urban environment presents unique social and environmental factors that may contribute to higher or different patterns of dual usage compared to other regions. Azizan et al. (2021) emphasize the importance of geographical and cultural context in understanding health behaviors, suggesting that the urban environment of Klang Valley could significantly shape the smoking habits of its university student population.

Given the intricate relationship between psychological well-being and smoking practices, this study addresses the core research question: "What is the correlation between the concurrent use of cigarettes and e-cigarettes and the psychological well-being of university students? How does this affect smoking cessation outcomes?" This inquiry seeks to explore beyond the immediate health ramifications of smoking, focusing on the interaction between these behaviors and the psychological states of students. The emphasis on psychological well-being reflects a commitment to understanding the complex effects of dual smoking. This investigation aims to uncover insights that could lead to the development of more effective strategies to enhance psychological well-being and increase the success of smoking cessation programs for university students.

Recent research from Thompson et al. (2023) highlights the critical importance of psychological well-being in smoking and vaping behaviors among young adults. This study underscores the need for a holistic approach that addresses the complex relationship between psychological well-being and smoking habits. This integrated approach aims to provide comprehensive support for individuals in their cessation efforts, addressing both the physical and psychological dimensions of smoking behavior.

1.4 Research Questions

This research aims to answer the following questions:

RQ (1): How do socio-demographic factors correlate with the smoking practices of dual and single tobacco users?

RQ (2): What are the differences in nicotine dependency and smoking practices between single-cigarette users, single-vape users, and dual users?

RQ (3): How does psychological well-being influence the willingness to quit smoking among single and dual smokers?

RQ (4): What is the impact of dual usage of cigarettes and e-cigarettes on smoking cessation efforts among university students in the Klang Valley, Malaysia?

1.5 Research Objectives

The objectives of this study are:

RO (1): To analyze the correlation between socio-demographic factors and smoking practices among single and dual users of tobacco products.

RO (2): To evaluate differences in nicotine dependency and smoking practices among single-cigarette users, single-vape users, and dual users.

RO (3): To assess the influence of psychological well-being on the willingness to quit smoking among single and dual smokers.

RO (4): To develop and propose a comprehensive framework that assesses the health risks associated with dual tobacco and e-cigarette use, focusing on smoking practices, nicotine dependency, smoking cessation, and socio-demographic variables of the respondents.

1.6 Research Significance

The current study is significant for several reasons. Conducting this research in the Klang Valley, Malaysia, provides insights into the local population's experiences and challenges related to dual usage of conventional cigarettes and e-cigarettes. As Malaysia's most populated region and home to numerous institutions and colleges, understanding the effects of dual usage on university students in this area is crucial. This knowledge will facilitate the development of tailored treatments and policies that meet the specific needs of this demographic.

The influence of both conventional cigarettes and e-cigarettes on public health is well-documented (Ramachandran et al., 2018). This study can inform public health initiatives aimed at reducing dual usage and enhancing the general well-being of university students in the Klang Valley. By examining the psychological well-being, health, and smoking cessation outcomes of students involved in dual usage, the research offers valuable insights for policymakers to implement targeted interventions, such as awareness campaigns, educational programs, and tobacco control policies.

Understanding the specific challenges faced by university students who engage in dual usage can help design effective and relevant intervention strategies. This research can establish evidence-based treatments, such as support networks, counseling services, and smoking cessation programs tailored to the needs of college students. By providing detailed insights into the effects of dual use on psychological well-being, health, and smoking cessation outcomes, this study contributes to the existing body of knowledge (Hair et al., 2018). It addresses knowledge gaps and lays the groundwork for further research on dual usage among Malaysian youth.

Malaysian officials have not given sufficient attention to the potential health risks linked to combining conventional tobacco smoking and e-cigarette usage, despite the possibility of increased harm (Lee et al., 2017). This study will contribute to understanding the consequences of dual usage on the psychological health of university students who use these substances simultaneously. The results will highlight specific consequences and act as a catalyst for more research on dual usage of tobacco products and e-cigarettes among Malaysian youth.

This investigation extends beyond academic exploration, carrying significant implications for the formulation and implementation of smoking cessation strategies and policies. By focusing on the psychological aspects of smoking and vaping behaviors among university students, it aims to elucidate the complex relationship between mental health and substance use. Recognizing the critical role of psychological well-being in cessation success, insights gained could drive the development of more customized and effective interventions. These interventions aim

to address both the mental and physical dimensions of addiction, enhancing the likelihood of successful cessation.

Recent studies, including those by Anderson et al. (2023) and Shah, Singh & Gupta (2024), emphasize the importance of integrating psychological support into cessation programs. These studies show that focusing on psychological well-being significantly increases the likelihood of successful quitting. Additionally, this study contributes to a comprehensive public health approach by acknowledging that improving mental health not only boosts cessation rates but also enhances overall quality of life.

Recognizing the dual influence of psychological well-being on both mental and physical health outcomes enhances our understanding of the complexities and potential strategies in smoking cessation initiatives targeted at university students. This perspective positions the research at the forefront of an innovative public health paradigm that endorses a holistic approach to smoking cessation. It acknowledges the significant connection between psychological well-being and the success of behavioral health interventions, promoting integrated strategies that address the complex aspects of smoking behavior. This methodology emphasizes the necessity of addressing both psychological and physical dimensions in the design and implementation of cessation programs, aiming to develop more comprehensive and impactful public health initiatives.

1.7 Scope of the Study

This study focuses on university students who smoke, spanning four universities in the Klang Valley area in Malaysia: Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM), Universiti Malaya (UM), and Sunway University. The target population includes both single and dual users of conventional cigarettes and e-cigarettes. The study aims to understand the relationship between socio-demographic factors, nicotine dependency, smoking practices, and students' perceptions of health effects on their smoking cessation and psychological well-being.

This study integrates the Theory of Planned Behavior (TPB) and the Health Belief Model (HBM) to examine the research variables: nicotine dependence, smoking practices, health risks, socio-demographic factors, and smoking cessation. By mapping these theoretical frameworks against the research variables, the study aims to provide a comprehensive understanding of smoking cessation among university students.

Recent advancements in TPB, highlighted by Smith and McSweeney (2021), support the relevance of determinants such as attitudes, subjective norms, and perceived behavioral control in understanding the motivation to quit smoking among young adult smokers. These factors illustrate the interplay between individual psychological attributes and the sociocultural environment, offering insights into how individual and social factors influence university students' perceptions and decisions to quit smoking.

Johnson et al. (2022) underscore the relevance of the HBM in current health behavior research, focusing on young adults' perceptions of smoking risks and benefits. Their

findings emphasize the role of perceived susceptibility, severity, benefits, and barriers in the decision-making process for smoking cessation. The HBM provides a systematic approach to studying the health behavior of college students, particularly in relation to smoking and cessation, enhancing the understanding and design of interventions.

This research will evaluate how social and demographic factors influence students' attitudes toward cessation, perceived behavioral control, and normative influence on their intentions to quit. Additionally, it will investigate the impact of nicotine addiction and habitual smoking on students' health beliefs, specifically their perceptions of the risks and benefits of smoking cessation. This comprehensive evaluation aims to inform the design of interventions that address both internal and external factors, thereby supporting effective smoking cessation strategies.

Aligned with the Theory of Planned Behavior (TPB), this research examines the intention to quit smoking among university students by considering attitudes, subjective norms, and perceived behavioral control. This focus is significant, as the intention to quit is a strong predictor of actual cessation attempts. The study employs a cross-sectional design, using survey data collected at a single point in time, offering a snapshot of smoking habits and associated characteristics within the student population.

The study does not evaluate changes over time, and the results may not be generalizable to all university students in Malaysia or globally, as the data were collected from students at only four universities in the Klang Valley region. Despite

this limitation, the findings provide valuable insights for health educators, college administrators, and policymakers aiming to reduce smoking and promote health and well-being among college students.

By integrating the TPB and the Health Belief Model (HBM), this research offers a comprehensive understanding of smoking habits and their associated characteristics. The insights gained can inform the development of effective interventions and policies to curtail smoking and improve overall well-being among university students.

1.8 Hypotheses Summary

This study examines the intricate relationships between smoking habits, sociodemographic characteristics, and university students' psychological health. It formulates several hypotheses to investigate the subtle differences between single and dual tobacco use, which are essential to the research's analytical framework.

Hypothesis 1: Among university students, smoking status (single or dual tobacco use) is significantly correlated with sociodemographic characteristics (age, gender, socioeconomic level, ethnicity, and educational attainment). This hypothesis aims to clarify how different demographic backgrounds affect smoking behaviors within this population.

Hypothesis 2: There are significant differences in nicotine dependence and smoking behaviors among single-cigarette users, single-vape users, and dual users (those who use both cigarettes and e-cigarettes). This hypothesis evaluates the differences in nicotine addiction and frequency of smoking among these various user profiles.

Hypothesis 3: There is a significant difference in readiness to quit smoking between those who smoke alone and those who smoke with a partner, potentially influenced by their psychological health. This hypothesis aims to investigate the motivations for quitting among these cohorts to provide insight into the psychological processes driving cessation efforts.

Hypothesis 4: A comprehensive framework can assess the health risks associated with the concurrent use of tobacco and e-cigarettes. This model would incorporate smoking habits, nicotine dependency, and sociodemographic parameters to predict the effects of smoking cessation among university students. The goal is to create a model that guides tailored cessation therapies, particularly considering the unique needs of single and dual users.

These hypotheses collectively contribute to understanding the complex interplay between smoking behaviors, demographic factors, and psychological health, providing a foundation for developing targeted smoking cessation interventions.

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