Sains Insani eISSN: [0127-7871]

A Comparative Analysis of Gender Discrepancies in Kratom Vein Knowledge Among Tertiary Students

Analisis Perbandingan Perbezaan Jantina dalam Pengetahuan Mengenai Urat Kratom dalam Kalangan Pelajar Institusi Pengajian Tinggi

Ameer Fuhaili Mohamad Hashim[1], Mohamad Hashim Othman[2]*

[1] *Faculty of Business and Communication, Universiti Malaysia Perlis, 01000 Kangar, Perlis, Malaysia;*
[2] *School of Educational Studies, Universiti Sains Malaysia, 11800 Penang, Malaysia;*

Article progress
Received: 3 February 2024
Accepted: 7 August 2024
Published: 30 November 2024

*Corresponding author:
Mohamad Hashim Othman,
School of Educational Studies,
Universiti Sains Malaysia,
11800 Penang, Malaysia;
Email: shim@usm.my

Abstract: Tertiary students' knowledge of kratom predominantly focuses on its effects and legal implications, overlooking the crucial understanding of different kratom leaf veins. Recognizing these vein types is essential for comprehending the potential consequences of kratom misuse. This study addresses concerns about the likelihood of tertiary students engaging in kratom abuse due to its easy accessibility and affordability. This study aims to evaluate the knowledge levels of three types of kratom veins inhalants—white, red, and green—among male and female tertiary students, utilizing a cross-sectional design with quantitative data collected from 296 students through Google Forms. The analysis reveals gender-based disparities in knowledge percentages for each vein type. The analysis presented in Figure 1 accentuates significant disparities in knowledge levels between male and female respondents regarding various colours of kratom veins. Notably, males consistently exhibit superior knowledge, with a substantial percentage of 19.9% for the white vein compared to their female counterparts. This trend persists with the red vein, where males outperform females, achieving a knowledge percentage of 15.9%, indicating a persistent gender-based difference in understanding kratom vein colours among tertiary students. The examination extends to the green vein, with males demonstrating a higher knowledge percentage of 10.1% compared to females. Despite the widespread use of kratom, particularly among adolescents in substance abuse, a substantial knowledge gap exists among tertiary students regarding various kratom vein types. Tailoring educational efforts to consider these multifaceted factors is crucial for promoting inclusivity, equitable knowledge distribution, and fostering a comprehensive understanding of kratom within diverse populations.

Keywords: knowledge, kratom, vein, tertiary, student

Abstrak: Pengetahuan pelajar-pelajar tertiari tentang kratom lebih cenderung kepada kesan dan implikasi undang-undang, dengan memahami pemahaman yang penting mengenai pelbagai jenis urat daun kratom. Pemahaman terhadap jenis-jenis urat ini adalah kunci untuk memahami kesan pengaruh kratom. Kajian ini menimbulkan kebimbangan mengenai kemungkinan pelajar tertiari terlibat dalam pengaruh dan harga yang mampu disebabkan kemudahan. Objektif kajian adalah menilai tahap pengetahuan terhadap tiga jenis urat kratom - putih, merah, dan hijau - di kalangan pelajar lelaki dan perempuan tertiari. Reka bentuk rentas-seksyen digunakan dengan mengumpulkan data kuantitatif daripada 296 pelajar melalui Google Forms. Analisis menunjukkan perbezaan berdasarkan jantina dalam peratusan pengetahuan bagi setiap jenis urat. Rajah 1 menunjukkan perbezaan yang ketara dalam tahap pengetahuan antara

PUSAT PENGAJIAN TERAS
Centre of Core Studies
USIM Universiti Sains Islam Malaysia

responden lelaki dan perempuan mengenai pelbagai warna urat kratom. Lelaki menunjukkan pengetahuan yang lebih tinggi secara konsisten, dengan peratusan ketara sebanyak 19.9% untuk urat putih berbanding perempuan. Trend ini berterusan dengan urat merah, di mana lelaki melebihi perempuan, mencapai peratusan pengetahuan sebanyak 15.9%, menunjukkan perbezaan yang berterusan berdasarkan jantina dalam pemahaman warna urat kratom di kalangan pelajar tertiari. Pemeriksaan melibatkan urat hijau, dengan lelaki menunjukkan peratusan pengetahuan yang lebih tinggi sebanyak 10.1% berbanding dengan perempuan. Walaupun penggunaan kratom yang meluas, terutamanya di kalangan remaja dalam pengaruh bahan, terdapat jurang pengetahuan yang besar di kalangan pelajar tertiari mengenai pelbagai jenis urat kratom. Penyesuaian usaha pendidikan untuk mengkaji faktor-faktor yang berbeza ini adalah penting untuk mempromosikan inklusiviti, pengagihan pengetahuan yang saksama, dan memahami pemahaman yang menyeluruh tentang kratom dalam kalangan populasi yang pelbagai.

Kata kunci: Pengetahuan, kratom, jenis urat, pelajar tertiary;

Introduction

Kratom, scientifically identified as Mitragyna speciosa, is native to Southeast Asia, encompassing countries such as Thailand, Malaysia, Indonesia, and Papua New Guinea (Khalid et al., 2023). In Malaysia, it is known by various names such as 'ketum,' 'air biak,' 'krypton' (Khalid et al., 2021; Ulbricht et al., 2013), or 'cakoroi,' particularly among the Malay population in northwest Malaysia, specifically in the states of Perlis, Kedah, and Penang. Recognized as Mitragyna speciosa, Kratom is a plant indigenous to Southeast Asia (Singh et al., 2017) and ranks among the three most frequently misused illicit drugs in the region, alongside cannabis and yaba (Angkurawaranon et al., 2018). It has a long history of traditional use with medicinal values (Swogger et al., 2015; Warner et al., 2016) despite its potential for addiction (Singh et al., 2015). Historically, it has been utilized in Asia to combat fatigue and address issues such as pain, diarrhea, cough, and opioid withdrawal. The dark green, oval leaves of the Kratom tree have been a staple in the traditional medicine of Southern Thailand and Northern Peninsular Malaysia for centuries, serving purposes like pain relief, energy enhancement, and treatment of medical conditions. Recent trends also show its recreational use (Hassan et al., 2013).

Recently, the misuse of kratom leaves has involved the preparation of kratom stew by mixing them with certain substances in water. The resulting boiled water can induce effects similar to those of drugs. Additionally, there is evidence suggesting that kratom products are used, including recreationally, in combination with other substances such as antidepressants, anti-psychotic agents, opiates/opioids, benzodiazepines, alcohol, and some NPS (e.g., designer opioids and synthetic cathinones) (Corkery et al., 2019). As a consequence, the Malaysian government has prohibited kratom use and classified it as a poison under the Poison Act, citing concerns about abuse susceptibility, associated health risks, and potential societal repercussions (Singh et al., 2014). Furthermore, the Poisons Act 1951 (1989) specifies that individuals engaged in activities such as importation, exportation, manufacturing, modification, mixing, supplying, selling, possessing, or using kratom can be prosecuted for their actions.

Despite the Poison Act, kratom abuse is still rampant. Various consumption methods include chewing fresh leaves, brewing tea, the "Toss and Wash" technique, encapsulation, and mixing with foods or beverages (DEA, 2023). Kratom is believed to exhibit stimulant-like effects at lower doses, providing increased energy and focus, with users reporting mood enhancement properties (Prozialeck et al., 2012). Higher doses may induce euphoria, contributing to recreational use, while excessive consumption can result in adverse effects such as nausea and vomiting (Singh et al., 2014). Prolonged use may lead to physical dependence, accompanied by withdrawal symptoms like irritability, insomnia, muscle aches, and mood swings (Leong Abdullah, 2020), as well as gastrointestinal issues, including constipation. Kratom misuse has been associated with changes in blood pressure and an increased risk of cardiovascular events (Davidson et al., 2021; Leong Abdullah & Singh, 2021). Long-term misuse may contribute to psychological symptoms such as anxiety and hallucinations. The rise of kratom (Mitragyna speciosa Korth.) as a novel and more affordable substance has

attracted individuals seeking an alternative to other prohibited narcotics (Leong Abdullah & Singh, 2021; Suhaimi et al., 2016). However, the growing trend of using kratom recreationally has extended to a younger demographic, raising significant concerns in society (Halim et al., 2021). The regular consumption of kratom during adolescence is especially troubling, given that adolescents are more susceptible to early substance abuse.

Research Background

Motivations for kratom use among tertiary students exhibit considerable diversity and are shaped by individual circumstances. Numerous studies and surveys have identified common motivations, such as self-medication practices to manage pain, alleviate stress, or cope with anxiety (Grundmann et al., 2022; Smith et al., 2022). The demanding nature of tertiary education, characterized by academic pressures, deadlines, and exams, often drives students to turn to kratom as a coping mechanism for stress and pressure (Tavolacci et al., 2013). Additionally, the historical use of kratom for pain relief has prompted some students to utilize it for alleviating physical discomfort or addressing chronic pain conditions (Vicknasingam et al., 2020). Significantly, individuals have reported using kratom as a substitute for opioids or to aid in managing opioid withdrawal symptoms, showcasing its potential role in harm reduction strategies (Stanciu et al., 2023). Recreational use of kratom is also noted, with some students seeking its psychoactive effects, including mood enhancement and relaxation (Ismail et al., 2022; Prevete et al., 2021). In certain cases, curiosity and experimentation contribute to kratom use, as students may try it out of interest or as part of exploring different substances (Veltri et al., 2019). Social and peer influence further plays a role in kratom use, as its prevalence within a specific social group may influence individuals to try it (Phoon et al., 2022). It is crucial to emphasize that, while some perceive benefits in kratom use, there are potential risks and adverse effects associated with its consumption.

Surveys and case studies reveal a growing trend of Americans using kratom for self-medication, addressing conditions such as pain and opioid withdrawal (Boyer et al., 2007; Coe et al., 2019; Grundmann, 2017; Henningfield et al., 2018; Smith and Lawson, 2017; Swogger et al., 2015). Despite this trend, the therapeutic benefits of such use lack robust empirical support. Kratom is recognized as a substitute for opioids and a remedy for opioid withdrawal in both Southeast Asia (SEA) and the US (Boyer et al., 2008; Coe et al., 2019; Grundmann, 2017; Vicknasingam et al., 2010;). Internet-based studies highlight prevalent usage patterns in the US, primarily among White, middle-aged, middle-income, and college-educated individuals. They commonly use kratom for pain treatment, opioid withdrawal, and mental health conditions, reporting minor, dose-dependent adverse effects like stomach upset (Grundmann, 2017; Henningfield et al., 2018; Swogger et al., 2015). Furthermore, US-based internet studies indicate that kratom use is notably prevalent among White, middle-aged, middle-income, and college-educated individuals, who often consume it for pain treatment, opioid withdrawal, and mental health conditions, experiencing minor, dose-dependent adverse effects such as stomach upset (Grundmann, 2017; Henningfield et al., 2018; Swogger et al., 2015). Another study by Vostrelová et al., (2021) sheds light on university students' kratom usage, revealing a lifetime prevalence of 21.8%, with 18.3% and 11.2% reporting use within the last year and last month, respectively. This study notes a higher prevalence among male students and those pursuing arts-related disciplines, with initial kratom use typically starting between ages 18 to 20, often characterized by sporadic or one-off experiences. Furthermore, the same study reports that 44.3% of respondents were aware of adverse effects, and 10% perceived the risk of addiction.

The reasons why tertiary students might use kratom can vary widely and are influenced by individual circumstances. Common motivations, as reported in studies and surveys, encompass self-medication practices, where students employ kratom to manage pain, alleviate stress, or cope with anxiety (Grundmann, et al., 2022; Smith, et al., 2022). The challenging environment of tertiary education, marked by academic pressures, deadlines, and exams, often prompts students to turn to kratom as a coping mechanism for stress and pressure. Additionally, the traditional use of kratom for pain relief has led some students to utilize it to alleviate physical discomfort or address chronic pain conditions (Corkery, et al., 2019). Notably, individuals have reported using kratom as a substitute for opioids or to assist in managing opioid withdrawal symptoms, showcasing its potential role in harm reduction strategies (Stanciu, et al., 2023). Recreational use of kratom is also observed, with some students seeking its psychoactive effects, including mood enhancement and relaxation (Corkery, et al., 2019; Ismail, et al., 2022; Prevete, et al., 2021). In certain cases, curiosity and experimentation play a role, as students may try kratom out of interest or as part of exploring different substances (Veltri, et al., 2019). Social and peer influence further contributes to kratom use, as prevalence within a specific social group may influence individuals to try it (Phoon, et al., 2022). It is crucial to emphasize that, while some perceive benefits

in kratom use, there are potential risks and adverse effects associated with its consumption.

Kratom, like many substances, carries the risk of addiction and dependence. Educational campaigns are instrumental in preventing the development of problematic usage patterns that could lead to addiction. These campaigns serve as proactive and preventive measures, fostering public health, safety, and informed decision-making regarding kratom use. While campaigns addressing drug abuse often lack a specific focus on the type of kratom vein, their emphasis is guided by objectives, target audience, and prevailing issues related to kratom use. Some prioritize providing general awareness, concentrating on overall effects, risks, and legal status while avoiding specific details about vein types. Campaigns may also choose to highlight general effects to reach a broader audience, acknowledging individual variations in response. However, recognizing information about the types of kratom leaves is crucial for higher education students, aligning with their intellectual capacity. Discussing only general aspects of kratom effects may not fully engage individuals at the intellectual depth needed for more profound debate. It's noteworthy that most higher education students, belonging to Generation Z, display heightened curiosity and a desire for more detailed information. Therefore, this study aims to evaluate the knowledge levels of three types of kratom veins—white, red, and green—among male and female tertiary students. Examining the knowledge levels of kratom veins among male and female tertiary students is essential for customizing educational initiatives, fostering informed decision-making concerning kratom use, and formulating targeted strategies to rectify disparities and safeguard the well-being of the student population.

Ethical Consideration

In conducting this study with tertiary students, ethical considerations took precedence, emphasizing principles such as informed consent and participant protection. The study explicitly outlined its objectives, confidentiality protocols, and data-handling procedures, obtaining consent through a dedicated form. Participants were given the freedom to withdraw at any stage, signifying their understanding and agreement through the designated consent form. Furthermore, to ensure confidentiality during data collection through Google Forms, the researcher prioritized anonymity, implemented robust privacy controls, and communicated transparent privacy policies. This approach effectively safeguarded both data security and participant confidentiality.

Methodology

This research employed a cross-sectional design, adhering to methodologies outlined by Knottnerus and Muris (2003) and Setia (2016). Utilizing a quantitative approach, data were collected from 296 tertiary students enrolled in the Student Development program at a single time point. Participants were selected through simple random sampling following the procedure detailed by Noor et al., (2022). Students voluntarily participated in the study, completing a specially designed questionnaire to assess knowledge levels on three types of kratom veins across genders. The questionnaire utilized a dichotomous scale (1 = YES; 2 = NO; 3 = UNSURE), where "YES" indicated awareness, "NO" denoted a lack of knowledge, and "UNSURE" represented uncertainty. Responses marked as NO or UNSURE were scored as 0, while YES responses received a score of 1. Administered as part of the student development program, the questionnaire typically required approximately 15 minutes to complete. The questionnaire underwent content validity evaluation by a panel of two experts, assessing terminology, clarity, and representativeness. Data collection utilized Google Forms, a web-based platform ensuring versatility and accessibility across various devices (Kayode-Sanni, 2022). Google Forms prioritizes data security through encryption for both transmission and storage, ensuring a secure and cost-effective data collection method (Chernikov, 2023). Subsequently, descriptive analysis, incorporating percentages and frequencies, was conducted using SPSS version 26 to analyze demographic characteristics and assess knowledge related to inhalant drug category awareness among tertiary students.

Result

The analysis encompasses 296 participants, comprising 145 males and 151 females, with an average age of 21.7 years. Concerning family income, 7.09% (n=21) belonged to the Top 20% (T20) category, while 32.77% (n=97) were in the Middle 40% (M40), and the majority, comprising 60.13% (178), fell within the Bottom 40% (B40). The racial composition indicated 65.5% (n=194) Malay participants, 22.3% (n=66) Chinese participants, 6.8% (n=6.8) Indian participants, and 5.4% (n=16) categorized as other races. Regarding admission to higher institutions, 30.4% (n=90) gained entry through STPM, 56.1% (n=166) via matriculation, 8.4% (n=25) through diploma qualifications, and 5.6% (n=15) through other credentials. Subsequently, the analysis explores participants' knowledge about three types of kratom leaf veins—white, red, and green—

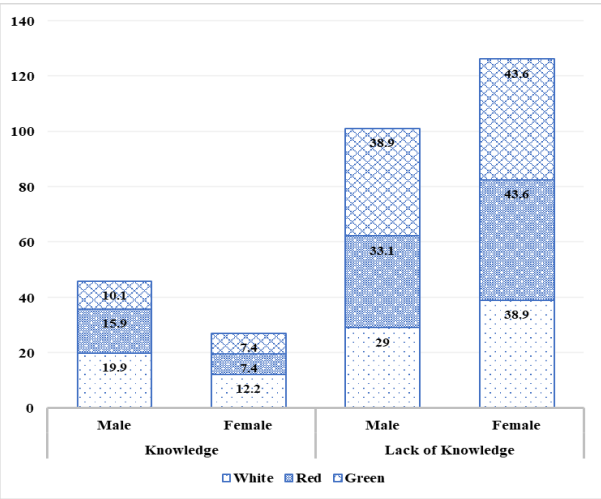
across genders among tertiary students, as depicted in Table 1.

Table 1. Knowledge Levels of Kratom Leaf Veins (White, Red, Green) Across Genders Among Tertiary Students

	YES				NO				UNSURE			
	Male		Female		Male		Female		Male		Female	
Kratom	%	n	%	n	%	n	%	n	%	n	%	n
White	19.9	59	12.2	36	9.1	27	8.8	26	19.9	59	30.1	89
Red	15.9	47	7.4	22	8.1	24	6.1	18	25	74	37.5	111
Green	10.1	30	7.4	22	10.1	30	5.7	17	28.7	85	37.8	112

The analysis presented in Table 1 highlights a notable gender-based knowledge gap among participants regarding these three kratom vein types. Male participants exhibit slightly higher knowledge percentages (white vein: 19.9%, red vein: 15.9%, green vein: 10.1%) across all three vein types compared to female participants (white vein: 12.2%, red vein: 7.4%, green vein: 7.4%). However, the overall knowledge level for all three vein types remains relatively low. In conclusion, the analysis underscores a significant gender-based disparity in knowledge concerning the primary vein colours of Kratom (white, red, and green) as illustrated in Figure 1.

Figure 1. Gender-Based Disparity in knowledge of Primary Vein Colours of Kratom



The analysis presented in Figure 1 accentuates significant disparities in knowledge levels between male and female respondents regarding various colours of kratom veins. Notably, males consistently exhibit superior knowledge, with a substantial percentage of 19.9% for the white vein compared to their female counterparts. This trend persists with the red vein, where males outperform females, achieving a knowledge percentage of 15.9%, indicating a persistent gender-based difference in understanding kratom vein colours among tertiary students. The examination extends to the green vein, with males demonstrating a higher knowledge percentage of 10.1% compared to females. Collectively, these patterns underscore substantial and consistent gender-based disparities in kratom knowledge among surveyed participants across white, red, and green veins. In summary, these findings emphasize a notable and enduring gender gap in knowledge related to kratom veins, underscoring the necessity for tailored educational interventions. Addressing and mitigating these disparities requires initiatives that consider the specific informational needs and learning preferences of both genders to effectively narrow the existing gaps in kratom-related knowledge among tertiary students.

Discussion

The analysis of knowledge levels concerning three types of kratom veins (white, red, and green) among male and female tertiary students has unveiled a nuanced pattern, with male students demonstrating slightly greater awareness. Although explicit reasons for this knowledge difference are not specified, various potential contributing factors come to light. Male and female students exhibit discernible disparities in their educational backgrounds and life experiences, and these distinctions hold the potential to shape their perceptions of various types of kratom veins (Khazaal et al., 2019). These differences arise from several factors, including variations in academic exposure and subject preferences, which influence their knowledge and attitudes towards substances like kratom. The diverse educational journeys undertaken by individuals contribute to distinct perspectives and levels of awareness concerning the intricacies associated with different kratom varieties. This diversity in educational backgrounds means that people have varying degrees of knowledge and understanding about the botanical, pharmacological, and cultural aspects of kratom. For instance, those with a background in pharmacology may have a deeper comprehension of kratom's chemical properties and

physiological effects, whereas individuals with education in social sciences might be more attuned to its social usage patterns and cultural significance. These varied perspectives can significantly influence how individuals perceive and evaluate the different strains and effects of kratom (Khazaal et al., 2019).

Moreover, differences in the curriculum, educational programs, and extracurricular activities across various educational settings act as influential factors, affecting individuals' opportunities to acquire information about kratom veins. Educational institutions vary widely in their approach to health education and substance awareness, which can shape students' exposure to information about kratom's varieties, effects, and risks. For example, schools with robust health education programs may provide more comprehensive information on substances like kratom, whereas institutions without such programs may leave students less informed. These disparities in educational settings contribute significantly to individuals' levels of awareness and understanding of kratom (Khazaal et al., 2019; Griffiths, & Cole, 2020). Disparities in the design, content, and availability of educational resources impact the exposure and accessibility of information related to kratom veins, thereby contributing to variations in comprehension or awareness among individuals. Educational resources vary widely in their coverage of substances like kratom, ranging from detailed pharmacological studies to general public health advisories. For instance, schools with comprehensive health education programs might provide specific information on kratom's botanical origins, chemical composition, and potential effects, enhancing students' understanding. In contrast, institutions lacking such resources may leave students with incomplete or inaccurate perceptions. These disparities not only influence individual awareness but also shape broader societal attitudes and responses towards kratom use (Cunningham, & Sen, 2008; Griffiths & Cole, 2020).

Social and cultural factors play a pivotal role in shaping knowledge dynamics, with gender-specific cultural practices influencing knowledge variations among male and female tertiary students. Cultural norms and practices can dictate what information is deemed appropriate or accessible for males versus females, influencing their knowledge and awareness levels regarding substances like kratom. For instance, societal expectations may encourage different behaviors and interests among genders, leading to varied levels of exposure and understanding of kratom's varieties and effects (Lai et al., 2015). These expectations shape socialization processes from childhood through adulthood, influencing the types of information individuals seek, receive, and internalize about substances like kratom. Gender-specific cultural practices and norms also play a role in determining which aspects of kratom use are highlighted or suppressed within different social contexts, contributing to disparities in knowledge and awareness among male and female tertiary students.

Furthermore, delving into the dynamics of knowledge acquisition involves considering individual interests and preferences that may differ between genders. These differences can influence what information individuals seek out and how they engage with it. For example, males and females may gravitate towards different types of educational materials or sources of information on substance abuse based on their personal interests and societal expectations due to several interconnected reasons. Societal norms often prescribe different roles and behaviours for males and females, influencing their preferences for how they engage with information. Historically, men have been encouraged to approach topics like substance abuse through a lens of problem-solving and technical understanding, which may lead them to favour scientific or policy-oriented sources. In contrast, societal expectations for women may emphasize emotional understanding and relational perspectives, potentially directing them towards narratives or community-focused educational materials on substance abuse. Personal interests and career aspirations also play a role, with individuals choosing educational resources that align with their professional goals or personal values. These factors collectively shape the diverse ways in which males and females seek out and engage with information about substance abuse, reflecting broader societal influences on learning styles and information-seeking behaviours. This diversity in interests can lead to variations in the depth and breadth of knowledge acquired about specific topics, including substances like kratom. Understanding these dynamics is crucial for developing tailored educational approaches that effectively reach and engage diverse groups (Miller, & Curtis, 2016).

Additionally, media plays a crucial role in elucidating observed variations in knowledge levels between male and female tertiary students, influencing public awareness and perception regarding kratom veins for several reasons. Media platforms mold the narrative and coverage of substances such as kratom, potentially highlighting different aspects based on gender demographics and societal norms. This differential exposure significantly impacts how individuals perceive and understand kratom's varieties and effects, contributing to disparities in knowledge acquisition and awareness between genders. Media portrayals can either reinforce or challenge existing stereotypes and biases related to substance use, thereby shaping societal

attitudes and influencing policy and public health interventions. Moreover, media's rapid and widespread dissemination of information makes it a potent tool for shaping public discourse on kratom and other substances, underscoring its critical role in shaping knowledge and perceptions among tertiary students and the broader public. Disparities in media exposure may lead to uneven information access, with males encountering relevant content more frequently and thus contributing to higher knowledge levels (Bergamini et al., 2017; Cranwell et al., 2015; Primack et al., 2016; Martins et al., 2016). Media platforms often tailor content based on demographic preferences and societal norms, potentially resulting in differential exposure to information about substances like kratom. For instance, males may be more likely to come across detailed discussions on kratom's effects and controversies through news articles, health reports, or online forums compared to females, thereby influencing their knowledge acquisition and awareness levels. Therefore, understanding the role of media influence is crucial for interpreting gender-based knowledge patterns, as it significantly shapes perceptions, disseminates information, and influences public discourse among male and female tertiary students regarding kratom veins. Furthermore, societal attitudes and priorities contribute significantly to the disparities in emphasis placed on different substances in educational and public health initiatives. Substances perceived to possess higher addiction potential, greater public health impact, or higher prevalence of use often receive more attention. For example, substances widely acknowledged as highly addictive or linked to significant public health concerns may garner more focus in educational and public health campaigns. These priorities stem from societal perceptions of severity and immediate health risks posed by certain substances. Public health efforts typically prioritize resources towards addressing substances with the most significant impact on individuals and communities, such as opioids or alcohol, due to their widespread addiction rates and adverse health outcomes. Additionally, societal norms and historical factors influence which substances are deemed worthy of greater educational focus and public health intervention, guiding policy decisions, funding allocations, and educational content development.

Drug education initiatives frequently face resource constraints that necessitate prioritization of core topics due to limited time and resources. This prioritization affects several aspects crucial to public health and education, including funding allocations, policy decisions, and the content of educational materials. As a result, emerging substances like kratom, which may not yet have a well-established body of research or regulatory framework, can receive less attention in educational curricula and public health campaigns. This disparity can impact public awareness, prevention efforts, and support systems for individuals using or affected by kratom, potentially hindering effective responses to its growing popularity and associated health risks (Cunningham & Sen, 2008).

Meanwhile, the limited focus on different types of kratom veins in drug education programs can be attributed to several factors. Firstly, the dynamic nature of substance use trends poses a significant challenge. As new substances like kratom gain popularity and recognition, educational materials often struggle to keep pace with evolving knowledge about their various forms and effects. This can result in educational programs providing outdated or insufficient information, potentially leaving students and educators ill-prepared to address emerging trends in substance use. Secondly, regulatory challenges and varying legal statuses across different regions further complicate the inclusion of kratom-related content in formal education curricula. Kratom's legal status varies widely, with some regions classifying it as a controlled substance while others permit its use or sale under certain conditions. These discrepancies create uncertainty and hesitation among educators and policymakers regarding the appropriate inclusion of kratom information in educational settings. As a result, the curriculum may not adequately cover the nuances of kratom varieties, potentially leaving gaps in students' understanding of its risks and effects.

Additionally, educators and program developers may have limited knowledge about the intricacies of kratom, including the significance of various vein types, leading to the oversight of these specific details in educational content (Singh, et al., 2014). This lack of expertise in understanding kratom can stem from several factors. Firstly, there is limited scientific research on kratom's effects and variations, especially concerning its different vein types and their specific impacts on users. This scarcity of empirical data hampers educators' ability to provide comprehensive and accurate information in educational settings. Secondly, the technical complexity of research articles on kratom may pose challenges for educators, making it difficult to grasp and effectively translate findings into accessible educational content. This complexity can diminish educators' interest and motivation to seek out and utilize updated information about kratom, further contributing to gaps in knowledge dissemination and understanding.

Ensuring that students receive accurate and up-to-date information about the various vein types of kratom (e.g., red, green, white) is crucial for several reasons. Firstly, accurate knowledge empowers students to make informed decisions about their health and well-being, including any potential use of kratom. Understanding the

differences between vein types allows students to anticipate and recognize the varying effects and risks associated with each type, thereby promoting safer and more responsible choices. Secondly, accurate information helps dispel misconceptions and myths that may surround kratom, reducing the likelihood of misinformation guiding students' perceptions and behaviours. This knowledge equips students with the necessary tools to engage in discussions about kratom use based on factual information, contributing to a more informed and educated community overall.

To enhance awareness of diverse kratom leaf veins among tertiary students, a comprehensive strategy is recommended because it addresses several critical aspects. Firstly, such a strategy ensures that students receive accurate and up-to-date information about the various vein types (e.g., red, green, white) and their distinct effects, promoting informed decision-making regarding kratom use. Secondly, a comprehensive approach helps counteract misinformation and myths that may surround kratom, fostering a more nuanced understanding among students. Additionally, by incorporating diverse educational methods and platforms, such as workshops, informational campaigns, and peer-led discussions, this strategy can effectively engage students with varying learning styles and preferences. Moreover, it supports the cultivation of critical thinking skills, encouraging students to evaluate information about kratom critically and responsibly. Overall, a comprehensive strategy not only enhances knowledge but also promotes safer use practices and contributes to overall public health literacy.

Limitation of Study

The study encounters challenges in generalizing its findings due to various factors. Firstly, the limitations in sample size may constrain the extent to which the results can be applied to larger populations. Furthermore, a constrained research design that concentrates solely on specific aspects, without accounting for broader variables, may limit the universal relevance of the findings. Lastly, the utilization of online surveys introduces the risk of hurried or incomplete responses, potentially leading to lower-quality data that may not fully capture participants' perspectives or behaviours. Despite these challenges, the study's results can serve as a basis for future research expansion.

Summary

The nuanced pattern in knowledge levels among male and female tertiary students concerning three types of kratom veins suggests that males have slightly greater awareness. Contributing factors, such as educational backgrounds, life experiences, and cultural practices, shape this nuanced pattern. Distinctions in educational journeys, curriculum design, and resource availability further shape distinct perspectives. Social and cultural influences, along with media impact, contribute to the observed knowledge dynamics. In contrast, the lack of emphasis on kratom vein types in drug education programs is attributed to resource constraints, leading to the prioritization of fundamental topics and potential oversight by educators. Ongoing research on kratom's effects may not have established vein-type information during the initial program development. To bridge this knowledge gap, a comprehensive strategy is recommended, focusing on enhancing existing drug education initiatives, engaging students through interactive workshops and online resources, involving experts, implementing peer-led programs, integrating real-life case studies, providing regular updates, and encouraging open dialogues. The ultimate goal is to equip tertiary students with a nuanced understanding of kratom vein types to elevate their knowledge in alignment with their intellectual capacity.

Acknowledgment

A heartfelt appreciation is extended to the participants who generously volunteered as respondents for this study. Additionally, sincere thanks are offered to the committed staff of the Student Development Unit for their invaluable support in coordinating the student development course and facilitating the seamless data collection process.

References

Andrade, M. (2015). Alcohol and tobacco content in UK video games and their association with alcohol and tobacco use among young people. *Public Health, 129*(9), 790-792. https://doi.org/10.1016/j.puhe.2015.05.012

Angkurawaranon, C., Jiraporncharoen, W., Likhitsathian, S., Thaikla, K., Kanato, M., Perngparn, U., Assanangkornchai, S., & Aramrattana, A. (2018). Trends in the use of illicit substances in Thailand: Results from national household surveys. *Drug and Alcohol Review, 37*(5), 658–663. https://doi.org/10.1111/dar.12689

Bergamini, E., Demidenko, E., & Sargent, J. D. (2017). Trends in tobacco and alcohol brand placements in popular US movies, 1996 through 2009. *JAMA Pediatrics, 171*(1), 19-27. https://doi.org/10.1001/jamapediatrics.2016.3347

Boyer, E. W., Babu, K. M., & Macalino, G. E. (2007). Self-treatment of opioid withdrawal with a dietary supplement, Kratom. *The American Journal on Addictions*, *16*(5), 352–356. https://doi.org/10.1080/10550490701525368

Boyer, E. W., Babu, K. M., Adkins, J. E., McCurdy, C. R., & Halpern, J. H. (2008). Self-treatment of opioid withdrawal using kratom (Mitragynia speciosa korth). *Addiction (Abingdon, England)*, *103*(6), 1048–1050. https://doi.org/10.1111/j.1360-0443.2008.02209.x

Chernikov, A. (2023, March 10). *14 advantages and disadvantages of Google Forms*. https://nerdy-form.com/blog/google-form-maker

Coe, M. A., Pillitteri, J. L., Sembower, M. A., Gerlach, K. K., & Henningfield, J. E. (2019). Kratom as a substitute for opioids: Results from an online survey. *Drug and Alcohol Dependence, 202,* 24–32. https://doi.org/10.1016/j.drugalcdep.2019.05.005

Corkery, J. M., Streete, P., Claridge, H., Goodair, C., Papanti, D., Orsolini, L., Schifano, F., Sikka, K., Körber, S., & Hendricks, A. (2019). Characteristics of deaths associated with kratom use. *Journal of Psychopharmacology (Oxford, England)*, *33*(9), 1102–1123. https://doi.org/10.1177/0269881119862530

Cunningham, J. K., & Sen, S. (2008). Correlates of frequent and infrequent kratom use among illicit drug users in Malaysia. *Journal of Psychoactive Drugs, 40*(3), 497-508. https://doi.org/10.1080/02791072.2008.10400618

Davidson, C., Cao, D., King, T., Weiss, S. T., Wongvisavakorn, S., Ratprasert, N., Trakulsrichai, S., & Srisuma, S. (2021). A comparative analysis of kratom exposure cases in Thailand and the United States from 2010-2017. *The American Journal of Drug and Alcohol Abuse*, *47*(1), 74–83. https://doi.org/10.1080/00952990.2020.1836185

DEA (2020). Kratom. https://www.dea.gov/sites/default/files/2020-06/Kratom-2020_0.pdf

Escobedo, P., Allem, J. P., Baezconde-Garbanati, L., & Unger, J. B. (2018). Cultural values associated with substance use among Hispanic emerging adults in Southern California. *Addictive Behaviors*, *77*, 267–271. https://doi.org/10.1016/j.addbeh.2017.07.018

Fergusson, D. M., & Boden, J. M. (2008). Cannabis use and later life outcomes. *Addiction, 103*(6), 969-976. https://doi.org/10.1111/j.1360-0443.2008.02221.x

Griffiths, M., & Cole, T. (2020). The role of educational settings in shaping perceptions and knowledge about substances: A review of current literature. *Journal of Education and Health Promotion, 9*, 276. https://doi.org/10.4103/jehp.jehp_371_20

Grundmann O. (2017). Patterns of Kratom use and health impact in the US-Results from an online survey. *Drug and Alcohol Dependence*, *176*, 63–70. https://doi.org/10.1016/j.drugalcdep.2017.03.007

Grundmann, O., Veltri, C. A., Morcos, D., Knights, D., 3rd, Smith, K. E., Singh, D., Corazza, O., Cinosi, E., Martinotti, G., Walsh, Z., & Swogger, M. T. (2022). Exploring the self-reported motivations of kratom (*Mitragyna speciosa* Korth.) use a cross-sectional investigation. *The American Journal of Drug and Alcohol Abuse*, *48*(4), 433–444. https://doi.org/10.1080/00952990.2022.2041026

Halim, S. A., Low, J. H., Chee, Y. C., & Alias, M. R. (2021). Seizures among young adults consuming kratom beverages in Malaysia: A case series. *Epilepsy & Behaviour: E&B*, *121*(Pt A), 108057. https://doi.org/10.1016/j.yebeh.2021.108057

Hassan, Z., Muzaimi, M., Navaratnam, V., Yusoff, N. H., Suhaimi, F. W., Vadivelu, R., Vicknasingam, B. K., Amato, D., von Hörsten, S., Ismail, N. I., Jayabalan, N., Hazim, A. I., Mansor, S. M., & Müller, C. P. (2013). From Kratom to Mitragynine and its derivatives: physiological and behavioral effects related to use, abuse, and addiction. *Neuroscience and Biobehavioral Reviews, 37*(2), 138–151. https://doi.org/10.1016/j.neubiorev.2012.11.012

Henningfield, J. E., Fant, R. V., & Wang, D. W. (2018). The abuse potential of kratom according to the 8 factors of the controlled substances act: implications for Regulation and Research. *Psychopharmacology*, *235*(2), 573–589. https://doi.org/10.1007/s00213-017-4813-4

Hussin, K., et al. (2014). *Drug Abuse in Malaysian Institute of Higher Education* (*Penyalahgunaan dadah: Institut Pengajian Tinggi Malaysia*). Universiti Malaysia Perlis Publication

Ismail, R., Abdul Manaf, M. R., Hassan, M. R., Mohammed Nawi, A., Ibrahim, N., Lyndon, N., Amit, N., Zakaria, E., Abd Razak, M. A., Zaiedy Nor, N. I., Shukor, M. S., & Kamarubahrin, A. F. (2022). Prevalence of drug and substance use among Malaysian Youth: A nationwide survey. *International Journal of Environmental Research and Public Health*, *19*(8), 4684. https://doi.org/10.3390/ijerph19084684

Kayode-Sanni, A., (Nov 22, 2022). *Google forms: advantages & disadvantages in 2022*. https://www.formpl.us/blog/google-forms-advantages-disadvantages-in-2022

Khalid, K., Ku Md Saad, S., Soelar, S. A., Mohamed Yusof, Z., & Warijo, O. (2021). Exploring adolescents' practice and perspective on the use and misuse of kratom in northwest Malaysia. Journal of Ethnicity in Substance Abuse. doi:10.1080/15332640.2021.1906816

Khazaal, Y., Chatton, A., Cochand, S., Zullino, D., & Khan, R. (2019). Gender differences in the perceived effects of kratom (Mitragyna speciosa) among regular users. *Journal of Psychoactive Drugs, 51*(2), 162-169. https://doi.org/10.1080/02791072.2019.1573289

Knottnerus, J. A., & Muris, J. W. (2003). Assessment of the accuracy of diagnostic tests: the cross-sectional study. *Journal of Clinical Epidemiology*, *56*(11), 1118–1128. https://doi.org/10.1016/s0895-4356(03)00206-3

Lai, H. M., Cleary, M., Sitharthan, T., & Hunt, G. E. (2015). Prevalence of comorbid substance use, anxiety and mood disorders in epidemiological surveys, 1990–2014: A systematic review and meta-analysis. *Drug and Alcohol Review, 35*(3), 317-325. https://doi.org/10.1111/dar.12304

Laws Of Malaysia Act. (1989). *Poisons Act 1952* (Revised - 1989). https://pharmacy.moh.gov.my/sites/default/files/document-upload/poisons-act-1952-act-366-edit-a1666-clean_0.pdf

Leong Abdullah, M. F. I., & Singh, D. (2021). The Adverse Cardiovascular Effects and Cardiotoxicity of Kratom (Mitragyna speciosa Korth): *A Comprehensive Review. Frontiers in Pharmacology, 12*. https://doi.org/10.3389/fphar.2021.726003

Leong Abdullah, M. F. I., (2020). Kratom Dependence and Treatment Options: A Comprehensive Review of the Literature. *Current Drug Targets*, *21*(15), 1566–1579. https://doi.org/10.2174/1389450121666200719011653

Martins, N., Morris, R. G., & Tiggemann, M. (2016). A systematic review of the effects of exposure to pro-eating disorder websites, apps, and social media. *Eating Disorders, 24*(3), 206-224. https://doi.org/10.1080/10640266.2016.1146145

Mayo Clinic. (2022, June 03). *Kratom: Unsafe and ineffective*. https://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/kratom/art-20402171

Miller, P. G., & Curtis, A. (2016). Drug and alcohol dependence prevention: A public health perspective. *Health Education Journal, 75*(1), 3-13. https://doi.org/10.1177/0017896915595241

Noor, S., Tajik, O., & Golzar, J. (2022). Simple random sampling. *International Journal of Education & Language Studies, 1*(2), 78-82. https://doi.10.22034/ijels.2022.162982

Phoong, S. W., Phoong, S. Y., & Yeoh, Y. J. (2022). Kratom: A bibliometric analysis of scientific publications. *Journal of Psychoactive Drugs*, 1–9. Advanced online publication. https://doi.org/10.1080/02791072.2022.2159591

Prevete, E., Hupli, A., Marrinan, S., Singh, D., D' Udine, B., Bersani, G., Kuypers, K. P. C., Ramaekers, J. G., & Corazza, O. (2021). Exploring the use of kratom (Mitragyna speciosa) via the YouTube data tool: A novel ethnographic analysis. *Emerging Trends in Drugs, Addictions, and Health.* https://doi.org/10.1016/j.etdah.2021.100007

Primack, B. A., Colditz, J. B., Pang, K. C., Jackson, K., & Porticella, N. (2016). Media use and marijuana use among adolescents and emerging adults in the United States. *Journal of Studies on Alcohol and Drugs, 77*(2), 342-350. https://doi.org/10.15288/jsad.2016.77.342

Prozialeck, W. C., Jivan, J. K., & Andurkar, S. V. (2012). Pharmacology of kratom: an emerging botanical agent with stimulant, analgesic, and opioid-like effects. *The Journal of the American Osteopathic Association*, *112*(12), 792–799

Setia M. S. (2016). Methodology Series Module 3: Cross-sectional studies. *Indian Journal of Dermatology, 61*(3), 261–264. https://doi.org/10.4103/0019-5154.182410

Singh, D., Müller, C. P., & Vicknasingam, B. K. (2014). Kratom (Mitragyna speciosa) dependence, withdrawal symptoms, and craving in regular users. *Drug and Alcohol Dependence*, *139*, 132–137. https://doi.org/10.1016/j.drugalcdep.2014.03.017

Singh, D., Muller, C. P., Vicknasingam, B. K., Mansor, M., & Mansor, S. M. (2015). Social € functioning of kratom (mitragyna speciosa) users in Malaysia. *Journal of Psychoactive Drugs, 47*(2), 125–131. https://doi.org/10.1080/02791072.2015.1012610

Singh, D., Narayanan, S., Vicknasingam, B., Corazza, O., Santacroce, R., & Roman-Urrestarazu, A. (2017). Changing trends in the use of kratom (Mitragyna speciosa) in Southeast Asia. *Human Psychopharmacology, 32*(3), e2582. https://doi.org/10.1002/hup.v32.3.10.1002/hup.2582

Smith, K. E., & Lawson, T. (2017). Prevalence and motivations for kratom use in a sample of substance users enrolled in a residential treatment program. *Drug and Alcohol Dependence*, *180*, 340–348. https://doi.org/10.1016/j.drugalcdep.2017.08.034

Smith, K. E., Dunn, K. E., Rogers, J. M., Grundmann, O., McCurdy, C. R., Garcia-Romeu, A., Schriefer, D., Swogger, M. T., & Epstein, D. H. (2022). Kratom use as more than a "self-treatment". *The American Journal of Drug and Alcohol Abuse*, *48*(6), 684–694. https://doi.org/10.1080/00952990.2022.2083967

Stanciu, C. N., Ahmed, S., Sarfraz, Z., Nimavat, N., Healey, C. J., Grundmann, O., Ballard, J. R., & Henningfield, J. (2023). prevalence, characteristics, and reasons for kratom use among psychiatrically III. Inpatients who use substances. *Journal of Dual Diagnosis*, 1–11. Advanced online publication. https://doi.org/10.1080/15504263.2023.2289456

Suhaimi, F. W., Yusoff, N. H., Hassan, R., Mansor, S. M., Navaratnam, V., Müller, C. P., & Hassan, Z. (2016). Neurobiology of Kratom and its main alkaloid mitragynine. *Brain Research Bulletin*, *126*(Pt 1), 29–40. https://doi.org/10.1016/j.brainresbull.2016.03.015

Swogger, M. T., Hart, E., Erowid, F., Erowid, E., Trabold, N., Yee, K., Parkhurst, K. A., Priddy, B. M., & Walsh, Z. (2015). Experiences of kratom users: A qualitative analysis. *Journal of Psychoactive Drugs, 47*(5), 360–367. https://doi.org/10.1080/02791072.2015.1096434

Tavolacci, M. P., Ladner, J., Grigioni, S., Richard, L., Villet, H., & Dechelotte, P. (2013). Prevalence and association of perceived stress, substance use, and behavioral addictions: a cross-sectional study among university students in France, 2009-2011. *BMC Public Health*, *13*, 724. https://doi.org/10.1186/1471-2458-13-724

Ulbricht, C., Costa, D., Dao, J., Isaac, R., Leblanc, Y. C., Rhoades, J., & Windsor, R. C. (2013). An evidence-based systematic review of kratom (mitragyna speciosa) by the natural standard research collaboration. *Journal of Dietary Supplements, 10*(2), 152–170. https://doi.org/10.3109/19390211.2013.793541

Unger, J. B., Baezconde-Garbanati, L., Shakib, S., Palmer, P. H., Nezami, E., & Mora, J. (2004). A cultural psychology approach to "drug abuse" prevention. *Substance Use & Misuse, 39*(10-12), 1779–1820. https://doi.org/10.1081/JA-200033224

Veltri, C., & Grundmann, O. (2019). Current perspectives on the impact of Kratom use. *Substance Abuse and Rehabilitation*, *10*, 23–31. https://doi.org/10.2147/SAR.S164261

Vicknasingam, B., Chooi, W. T., Rahim, A. A., Ramachandram, D., Singh, D., Ramanathan, S., Yusof, N. S. M., Zainal, H., Murugaiyah, V., Gueorguieva, R., Mansor, S. M., & Chawarski, M. C. (2020). Kratom and Pain Tolerance: A Randomized, Placebo-Controlled, Double-Blind Study. *The Yale Journal of Biology and Medicine*, *93*(2), 229–238.

Vicknasingam, B., Narayanan, S., Beng, G. T., & Mansor, S. M. (2010). The informal use of ketum (Mitragyna speciosa) for opioid withdrawal in the northern states of peninsular Malaysia and implications for drug substitution therapy. *The International Journal on Drug Policy*, *21*(4), 283–288. https://doi.org/10.1016/j.drugpo.2009.12.003

Vostrelová, Z., Vajdlová, D., Vacek, J., & Mravčík, V. (2021). *Use and awareness of kratom among university students: Questionnaire surveys.* https://www.aplp.cz/wp-content/uploads/2021/10/01vostrelova.pd

Warner, M. L., Kaufman, N. C., & Grundmann, O. (2016). The pharmacology and toxicology of kratom: from traditional herb to drug of abuse. *International Journal of Legal Medicine, 130*(1), 127–138. https://doi.org/10.1007/s00414-015-1279-y