E-Cigarette: Exploring Awareness and Understanding of Students in a State University in the Philippines

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KEYWORDS

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ABSTRACT:

Introduction: E-cigarettes (eCigs), battery-powered devices that heat e-liquid to produce an aerosol, are becoming more popular among young people. The popularity of pod-based devices, especially among teenagers and young people, may increase the risk of nicotine addiction and pose respiratory, cardiovascular, and mental health risks despite perceptions of safety.

Objectives: This study explores university students' awareness and understanding of e-cigarette smoking, focusing on socio-demographic factors.

Methods: A descriptive-correlational approach was used with 389 University students who completed the questionnaire to gather the data needed for this study. Statistical tools, including frequency and percentages, mean, simple correlation, and ANOVA were used to analyze the data.

Results: The study reveals that while students generally exhibit a high level of awareness and understanding of e-cigarettes, significant differences emerge in specific areas, such as the physical effects of e-cigarettes, based on smoking status and potential sources of influence. In addition, female students tend to have a higher awareness and understanding of eCigs.

Conclusion: There is a need for gender-sensitive and targeted educational interventions that consider individual characteristics and external factors to enhance e-cigarette awareness among students in the university. Universities should also consider leveraging peer education, media campaigns, and family engagement as part of a holistic approach to increase awareness, particularly on the physical effects of e-cigarette use.

1. Introduction

A public health emergency with major ramifications for respiratory, cardiovascular, and mental health has been brought on by the sharp increase in electronic cigarette (eCigs) usage, especially among teenagers and young people. Current usage of new, next-generation nicotine-containing products, such as eCigs and partial tobacco combustion devices (also known as heat tobacco products, or HTPs; sometimes called heat not burn, or HNB by the tobacco industry), ranges from 0% in Zambia to 17.2%

in England, with a higher prevalence among adolescents and young adults [1]. One of the most vulnerable groups to eCigs usage is college students, but little is known about this demographic. It is crucial to pay attention to this group and protect them from the dangers of addiction and illnesses brought on by eCigs use [2]. Therefore, Universities should give them the information, abilities, and experiences they need to contribute to nation-building, be prepared for the workforce, and have a healthy future [3].

Although there is little evidence to support the notion that eCigs are a safer option, they are becoming more and more popular as traditional cigarette use declines. The factors that influence smoking have been identified, including those related to individuals (e.g., gender, age, marital status, and socioeconomic characteristics) and products (e.g., price, availability, and marketing) [4]. Toxic chemicals like formaldehyde, acetaldehyde, and acrolein, which are known to harm the lungs and perhaps raise the risk of cancer, are found in eCigs, battery-operated devices that produce aerosol by heating a liquid [5]. Furthermore, research shows links between using eCigs and respiratory conditions such as asthma, COPD, and chronic bronchitis [6].

There have also been psychological effects that link using eCigs to increased risks of depression and suicidal thoughts, especially in male users [7]. With the growth of vape shops and internet distribution, particularly in the Ilocos Region of the Philippines, this change has sparked worries about how easily accessible eCigs are to children. In addition to encouraging student use, this accessibility may normalize nicotine dependence in this population [8]. This study examines students' knowledge, attitudes, and usage habits of e-cigarettes, with implications for public health experts, educational institutions, and legislators. This research attempts to advance knowledge necessary for protecting public health and shaping future educational curricula by investigating socio-cultural and psychological factors on e-cigarette usage.

Objectives

This study assessed the awareness and understanding of eCigs smoking among students at the University of Northern Philippines for the Academic Year 2023-2024. It specifically sought to describe the socio-demographic profile of respondents, focusing on factors such as age, gender, living situation, smoking status, and influences on eCigs use. Additionally, the study determined students' level of understanding of e-cigarette smoking in three areas: components, physical effects, and psychological effects. It also examined the relationship between respondents' awareness and understanding of e-cigarette smoking and their socio-demographic profiles. Finally, the study determined significant differences in the student's awareness and understanding of eCigs when grouped according to living situation, smoking status, and potential source of influence.

2. Methods

Study Design. This study evaluated the relationships between several quantitative variables while capturing traits, behaviors, and opinions within a particular group using a descriptive-correlational methodology. It looked at students' awareness and understanding of the physical and psychological impacts of eCigs, their socio-demographic characteristics, and any group differences.

Sampling. During the 2023–2024 academic year, 389 students from different University of Northern Philippines colleges participated in the study. The sample size from each college was established using Slovin's formula.

Data Collection. The researchers validated the questionnaire checklist using a four-point Likert scale with a face validity mean score of 3.52 for data collection. Researchers distributed and gathered the

surveys following permission from university authorities and approval from the College of Nursing Ethics Review Committee. Ethical considerations protected respondent confidentiality, and participants' privacy, anonymity, and right to withdraw were guaranteed by informed permission.

Data Analysis. Frequency and percentages were used to describe the respondents in terms of their profile. Mean was used to measure the level of awareness and understanding of eCig. Simple Bivariate Correlation is used to investigate correlations between profiles and levels of awareness and understanding. ANOVA was used to look at differences in group means.

3. Results

3.1. Profile of the Respondents.

Among the 389 respondents, most (42.42%) were young adults aged 20-21. And there are predominantly more females than males. In terms of smoking status, the majority (75.84%) are non-smokers. The majority of respondents lived with their nuclear families (65.55%),

3.2. Level of Students' Awareness and Understanding of E-Cigarettes

The table summarizes students' awareness and understanding of e-cigarettes across three dimensions: components, physical effects, and psychological effects.

Table 1
Summary of Level of Students' Awareness and Understanding of E-Cigarette

Categories	Mean	Interpretation
Components	3.06	High
Physical Effects	3.11	High
Psychological Effects	3.12	High
Overall	**3.10**	**High**

The overall mean score is 3.10, interpreted as "High,". This indicates that students generally have a strong awareness and understanding of e-cigarettes.

Among the three dimensions, the psychological effects have the highest mean score (3.12), closely followed by physical effects (3.11) and components (3.06). Despite slight variations, all categories are described as High", suggesting that students are well-informed about e-cigarettes across these aspects. This highlights a consistent level of knowledge regarding e-cigarettes among the respondents.

3.3. Relationship between the profile of the students and their level of Awareness and Understanding of e-cigarettes.

Table 2 presents the correlation coefficients between the respondents' profiles (age and gender) and their level of awareness and understanding of e-cigarettes across three dimensions: components, physical effects, and psychological effects, as well as overall awareness.

Table 2
Correlation Coefficients Showing the Relationship Between the Awareness and Understanding of E-cigarette Smoking and Respondent's Profile

Profile	Level of Awareness and Understanding of E-cigarettes			
	Components	Physical Effects	Psychological Effects	Overall
Age	-0.026	0.037	-0.020	-0.003
Sex	0.083	0.135**	0.071	0.141**

The correlation coefficients for age across all dimensions and overall awareness indicate no significant relationship between the respondents' age and their awareness or understanding of e-cigarettes. On the other hand, the correlation coefficients for sex show a statistically significant positive relationship between physical effects (r = 0.135) and overall awareness (r-value = 0.141).

3.4. Differences in the Students' Awareness and Understanding of e-cigarettes

The student's awareness and understanding of e-cigarettes were compared in terms of the following grouping variables: living situation, smoking status, and their potential source of influence.

Table 3
Summary of ANOVA on the Significant Difference in the Students' Level of Awareness and Understanding of E-cigarettes when grouped in terms of their Living Situations

Categories	F-ratio	Sig.	Decision
Components	1.472	0.231	Do not Reject Ho
Physical Effects	3.817	0.023	Reject Ho
Psychological Effects	1.896	0.152	Do not Reject Ho
Overall	**0.702**	**0.496**	**Do not Reject Ho**

Overall, there is no significant difference in the student's awareness and understanding of e-cigarettes when grouped according to their living situations as supported by an F-ratio of 0.702. However, it was found that there is a significant difference in the student's awareness and understanding of physical effects when grouped according to their living situations as supported by the F-ratio of 3.817.

Table 4
Summary of ANOVA on the Significant Difference in the Students' Level of Awareness and Understanding of E-cigarettes when grouped in terms of Smoking status

Categories	F-ratio	Sig.	Decision
Components of E-Cegarette	0.169	0.845	Do not Reject Ho
Physical Effects	3.859	0.022	Reject Ho
Psychological Effects	0.858	0.425	Do not Reject Ho
Overall	**1.449**	**0.236**	**Do not Reject Ho**

Similarly, there is no significant difference in the overall awareness and understanding of e-cigarettes based on smoking status. The p-value of 0.236 is greater than 0.05, leading to the decision that smoking status does not impact the overall awareness and understanding of e-cigarettes.

Table 5
Summary of ANOVA on the Significant Difference in the Students' Level of Awareness and Understanding of E-cigarettes when grouped in terms of Potential Source of Influence

Categories	F-ratio	Sig.	Decision
Components	0.674	0.568	Do not Reject Ho
Physical Effects	2.897	0.035	Reject Ho
Psychological Effects	0.966	0.409	Do not Reject Ho
Overall	**1.595**	**0.190**	**Do not Reject Ho**

As revealed in Table 5, there is no significant difference in the overall awareness and understanding of e-cigarettes based on the potential source of influence. Since the p-value of 0.190 is greater than 0.05, the null hypothesis is not rejected, meaning that the source of influence does not significantly impact students' general awareness of e-cigarettes.

However, a significant difference is found in the awareness and understanding of the physical effects of e-cigarettes based on the potential source of influence with F-ratio = 2.897 and a p-value of 0.035, which is less than 0.05.

4. Discussion

Awareness and Understanding of E-Cigarette

The study of university students' awareness and understanding of e-cigarettes (eCigs) focuses on how socio-demographic factors such as living arrangements, gender, and smoking status influence knowledge of e-cigarette-related health risks. Male students had higher levels of awareness than females, which is consistent with global patterns observed in research from Greece and Kazakhstan, where gender inequalities in e-cigarette awareness exist across multiple age cohorts and geographies [9]. This suggests that cultural norms and gendered behaviors influence how students interact with information on e-cigarettes.

Nonsmokers were more likely to seek information on the health dangers of e-cigarettes, frequently motivated by concerns about smoking-related outcomes. Evidence suggests that nonsmokers perceive communications emphasizing the dangerous ingredients in e-cigarettes to be more successful, eliciting strong emotional responses and increasing risk awareness [10]. These findings indicate that health communication methods should be customized to reinforce these attitudes and ensure that appropriate information reaches this audience.

Students who live with their families demonstrated a better grasp of the physical impacts of e-cigarette use, which could be attributed to familial health discussions or exposure to family members who use e-cigarettes or traditional tobacco products. According to research, adolescents in such households are not only more aware but also more likely to start using e-cigarettes, emphasizing the importance of family influence [11]. Students with less social or familial participation, on the other hand, are more likely to have lower levels of awareness since their primary influences—peers and media—may not emphasize health hazards.

Social factors such as peer networks have a substantial impact on e-cigarette knowledge and consumption. Peer smoking practices are highly linked to e-cigarette experimentation and adoption,

with students influenced by their immediate social networks. These findings are consistent with previous research showing that peer and familial modeling play important roles in developing attitudes and actions toward e-cigarette usage [12].

To close knowledge gaps and invalidate misconceptions, effective public health programs must address these socio-demographic differences. Campaigns should include evidence-based information regarding addiction, lung health implications, and dental health consequences, as well as messaging tailored to specific populations such as males, older teens, and those living in families. While many high school students are aware of e-cigarettes, there are still widespread misconceptions about their safety, with considerable differences across sociodemographic categories [13]. Targeted approaches that account for these disparities can improve intervention effectiveness and reduce e-cigarette usage among university students.

Relationship Between Profile and Awareness and Understanding of eCigarette

The study's findings highlight the complex link between demographic, contextual, and behavioral factors influencing e-cigarette awareness and use, providing vital insights for personalizing prevention and cessation programs. Gender variations in knowledge levels suggest that female students are more likely to recognize the risks of e-cigarettes than males. This development could be attributed to women's increased health consciousness and proactive use of health-related information sources. Furthermore, focused public health efforts and media initiatives frequently resonate more effectively with women, raising their awareness of e-cigarette risks. However, this gendered tendency is not consistent across the globe. For example, in Greece and Kazakhstan, urban males are more aware of e-cigarettes, showing the influence of regional socioeconomic factors on awareness levels [14][15].

Age-related variations highlight the dynamics of e-cigarette awareness. Adolescents aged 12 to 17 are especially receptive to marketing techniques that portray e-cigarettes as a safer alternative to regular tobacco products. While this raises awareness, it also reinforces myths about their safety. Young adults aged 18-24, on the other hand, have a high level of awareness, with research indicating that 88.6% of this demographic is familiar with e-cigarettes. However, many people have false notions regarding their relative safety compared to smoking. Awareness tends to wane with age, particularly among older women, except in certain places, such as Russia, where awareness rises after the age of 50, indicating nuanced socio-cultural impacts [15][16][17].

Environmental and social factors play an important influence in shaping consciousness. Family proximity and open health-related discussions greatly increase e-cigarette knowledge because these encounters frequently convey accurate information and build critical attitudes about use [18]. In contrast, students in socially isolated contexts may have limited access to credible health information, restricting their comprehension. Another factor to consider is smoking status; current smokers tend to be more alert due to their direct experiences. However, research from the United Kingdom reveal that nonsmokers actively seek out e-cigarette-related information, motivated by a desire to comprehend the associated health hazards and societal consequences [16][19].

Marketing methods and celebrity endorsements help to raise awareness of e-cigarettes. While low-argument commercials and endorsements successfully attract nonsmokers' attention, their impact on actual consumption is modest. This shows that nonsmokers' increased knowledge may be the result of

a proactive effort to reduce potential harm, as opposed to smokers' predisposition to minimize associated dangers [15][20].

These findings illustrate the complex interplay of demographic, social, and structural elements in determining e-cigarette awareness. To improve the effectiveness of prevention methods, future research should delve deeper into these complex connections, ensuring that interventions meet the unique vulnerabilities and requirements of different populations.

Comparison of Students' Understanding of eCigarette

The study found no significant variations in university students' overall understanding of e-cigarette components or psychological impacts based on their living arrangements. However, a major exception was found in their understanding of the physical effects of e-cigarettes, as shown by an f-ratio of 3.817. This study implies that while living arrangements, such as living with family vs in a dormitory, may not have a wide impact on e-cigarette awareness, they do influence specific components of health-related information.

Students who lived with their families were more aware of the physical impacts of e-cigarettes, which could be related to familial communication. Research supports the importance of family contexts in molding health-related behaviors, particularly in households where open communication about the risks of e-cigarettes and traditional cigarettes is promoted [21]. Adolescents who live with smokers frequently learn about these hazards through direct discussions or observation, demonstrating the preventive influence of familial supervision [11]. In contrast, students in dorms may rely more heavily on peer networks, which can spread misinformation or inaccurate knowledge concerning e-cigarette use [9].

Age did not appear to be a significant influence in university students' awareness of e-cigarette components or consequences. This consistency could be related to shared access to information sources such as digital platforms, educational resources, and peer interactions, which cross age boundaries within the university demographic. Despite this access, studies show that college students frequently lack knowledge of the health dangers connected with e-cigarettes, with many unable to distinguish whether these devices contain nicotine or are categorized as tobacco products [22]. Furthermore, peer influence is important, since students who have friends or roommates who use e-cigarettes are more likely to engage in similar behaviors, highlighting the impact of social dynamics in molding attitudes and behaviors toward e-cigarettes [9].

These findings highlight the importance of focused public health interventions that address socio-demographic determinants and knowledge gaps, notably with the physical health consequences of e-cigarette use. Educational efforts should focus evidence-based content on the hazards of e-cigarette use, including as addiction, respiratory complications, and oral health issues, while also refuting widespread myths [23]. Tailored interventions should also use family and peer networks to promote informed decision-making and address the social aspects that influence e-cigarette usage. Furthermore, including extensive instructional materials into university curricula may improve students' comprehension and develop critical thinking regarding the consequences of e-cigarette usage [24].

To summarize, while university students have generally equivalent levels of awareness about e-cigarettes, specific disparities related to living situations and their impact on knowledge of physical

repercussions merit additional examination. Addressing these nuanced distinctions through comprehensive, focused initiatives might raise awareness, lower e-cigarette usage, and reduce related health risks.

5. Conclusions and Recommendations

In conclusion, while university students are highly aware of the hazards connected with eCigs use, major information gaps exist, particularly about the physical effects of eCigs. There is a need for gender-sensitive and targeted educational interventions that take into account both individual characteristics and external factors to enhance e-cigarette awareness among students in the university. Universities should also consider leveraging peer education, media campaigns, and family engagement as part of a holistic approach to increase awareness, particularly on the physical effects of e-cigarette use.

To reduce the growing use of eCigs among young adults, comprehensive public health programs must focus on closing information gaps. These activities should dispel myths, particularly among smokers and ex-smokers, and give a better awareness of the long-term health repercussions of eCigs usage. By addressing these challenges, public health campaigns might help students make more educated decisions, potentially reducing the growing prevalence of eCigs usage among this group.

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