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AWARENESS, ATTITUDES, AND USAGE OF E-CIGARETTES (VAPING) AMONG STUDENTS AT NILE UNIVERSITY OF NIGERIA, ABUJA

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Abstract

The rising popularity of electronic cigarettes (e-cigarettes) among young adults has raised significant public health concerns due to potential health risks. This study assessed the knowledge, perceptions, and usage patterns of e-cigarettes among university students. A descriptive cross-sectional study was conducted among undergraduate students at Nile University of Nigeria, Abuja. A multi-stage sampling technique was used to recruit 427 participants, with data collected through an online questionnaire and analyzed using SPSS version 27. Descriptive statistics, chi-square tests, and multiple logistic regression analyses were performed. The response rate was 90% (384/427). Overall, 72.4% of respondents demonstrated good knowledge about e-cigarettes, though specific gaps were identified, particularly regarding the components of e-cigarette liquids. Most participants (93.9%) exhibited a good perception, recognizing the potential harms and risks associated with e-cigarette use. However, 43.5% also viewed e-cigarettes as stylish and socially appealing. The prevalence of current e-cigarette use was 6.5%. Factors significantly associated with e-cigarette use included enrollment in the Engineering faculty (OR = 4.54, 95% CI: 1.86–11.06) and poor perception of e-cigarettes (OR = 5.00, 95% CI: 1.59–15.72). While most students displayed a good understanding and perception of e-cigarettes, specific knowledge gaps and misconceptions persist. The prevalence of e-cigarette use was relatively low but varied significantly across faculties and levels. Targeted interventions, such as tailored educational campaigns and university-wide policies, are recommended to address knowledge deficiencies, rectify misconceptions, and discourage e-cigarette use among university students.

Keywords: Knowledge, Perception E-Cigarette, Students, Nigeria.

Introduction

The rapidly growing trend of e-cigarette (vaping) use among young adults has become a global public health concern, raising alarms about its potential long-term impacts on health. Research has shown that individuals aged 18 to 26 are particularly susceptible to experimenting with and adopting vaping practices, highlighting the need for targeted public health interventions (Centers for Disease Control and Prevention [CDC], 2023). Vaping has emerged as a significant public health issue, particularly in developed countries, where it has gained popularity among university students. In 2021, a study found that 4.5% of adults aged 18 years and above were current e-cigarette users, with the highest prevalence of 11% recorded among young adults aged 18 to 24 (CDC, 2023). This trend is not limited to older adolescents and young adults. Alarmingly, over 2.5 million middle and high school students in the United States were reported as current e-cigarette users, reflecting the early onset of vaping behavior (CDC, 2016). In Africa, the use of e-cigarettes is also increasing. A study by Naido (2021) reported significant levels of e-cigarette experimentation and usage among young adults, further illustrating the global reach of this trend. Despite being marketed as a safer alternative to traditional cigarettes, e-cigarettes pose potential risks, including nicotine addiction and the renormalization of smoking behaviors (Wang, 2016; Jones, 2020). These concerns underscore the importance of understanding vaping behaviors and perceptions, particularly among vulnerable populations such as university students.

Electronic cigarettes, commonly known as e-cigarettes, are battery-operated devices designed to mimic the experience of smoking traditional cigarettes. They work by vaporizing an e-liquid, which typically contains nicotine, propylene glycol, glycerol, and flavorings, without involving tobacco combustion (Erinoso et al., 2015). These devices consist of a cartridge for the e-liquid, a rechargeable battery, and an atomizer (heating element) that transforms the liquid into an aerosol inhaled by users through a mouthpiece. This process, often referred to as “vaping,” is

marketed as a less harmful alternative to smoking traditional cigarettes (Marques, 2021; National Institute on Drug Abuse, 2020). E-cigarettes have surged in popularity worldwide, particularly among young adults, for several reasons. These include their perceived lower risk compared to conventional cigarettes, the availability of appealing flavors, and their portrayal as modern and stylish (Jones, 2020). However, the use of e-cigarettes is not without consequences. Research indicates that vaping contributes to primary nicotine addiction and may serve as a gateway to traditional cigarette smoking. Moreover, the long-term health effects of e-cigarette use remain uncertain, further compounding concerns about their safety.

Young adulthood is a critical period marked by exploration, identity formation, and the establishment of health behaviors. This stage often influences lifelong health practices, making it an important focus for studying substance use patterns, including vaping (Badrfam, 2020). Globally, e-cigarette use is on the rise. According to Tehrani et al. (2022), 23% of individuals worldwide have tried e-cigarettes, while 11% are current users. The U.S. Centers for Disease Control and Prevention (CDC) reported that in 2022, approximately 2.55 million middle and high school students in the United States had used e-cigarettes within the past 30 days. This figure includes 14.1% of high school students and 3.3% of middle school students (Cooper, 2022). These statistics highlight the alarming prevalence of vaping among adolescents and young adults, reflecting the need for early interventions to curb this trend.

In Nigeria, e-cigarette use is also gaining traction, particularly among young people. Studies by Erinoso et al. (2021) and Folayan et al. (2022) found that 7.9% of young adults had experimented with e-cigarettes, while 0.93% was current users. Among adolescents, 20% reported using e-cigarettes, indicating the growing popularity of vaping in a country already grappling with tobacco-related health challenges. Although e-cigarettes are often marketed as a safer alternative to traditional cigarettes, emerging evidence suggests that they pose

significant health risks. One of the primary concerns is nicotine addiction. Nicotine is a highly addictive substance that can have harmful effects on brain development, particularly in young adults and adolescents (Wang, 2016). Additionally, the renormalization of smoking behaviors through vaping undermines decades of public health efforts to reduce tobacco use.

The components of e-cigarette aerosol, including propylene glycol, glycerol, and flavoring agents, may also have adverse health effects. Inhalation of these substances has been associated with respiratory irritation and inflammation (Jones, 2020). Furthermore, the long-term health consequences of e-cigarette use remain poorly understood, raising questions about their overall safety. The increasing prevalence of e-cigarette use among young adults and adolescents underscores the need for research to understand the factors driving this trend. This study focuses on students at Nile University of Nigeria, Abuja, examining their knowledge, perceptions, and practices related to e-cigarette use. By exploring these dimensions, the research aims to provide insights into the vaping behaviors of university students in Nigeria's Federal Capital Territory. It also seeks to identify gaps in knowledge and address misconceptions, ultimately informing the design of targeted interventions to discourage e-cigarette use and promote healthier behaviors.

The global rise in e-cigarette use among young adults and adolescents represents a significant public health challenge. While marketed as a safer alternative to traditional cigarettes, e-cigarettes carry potential risks, including nicotine addiction and adverse respiratory effects. This study highlights the importance of understanding vaping behaviors, particularly among university students, who represent a vulnerable demographic. By addressing knowledge gaps and correcting misconceptions, public health practitioners can develop effective strategies to mitigate the impact of e-cigarette use on young people's health and well-being. Through its focus on Nile University students, this research aims to contribute to the growing body of

evidence on vaping behaviors, ultimately supporting efforts to reduce the prevalence of e-cigarette use and its associated health risks.

Method

Study design and Setting

The study was a descriptive cross-sectional study of knowledge, perception and practice of e-cigarettes use among young adults in Nile University of Nigeria, Abuja.

Study Population

The study population consisted of undergraduate students of Nile university of Nigeria who have stay up to one year in the University.

Sample Size Estimation

The sample size for the study was calculated using the formulae below.

$n = \frac{Z^2pq}{d^2}$, Where n = the desired sample size when population is more than 10,000, Z^2 = Standard normal deviate that correspond to the level of significance at 95%, d = the desired level of precision (maximum error of estimate), p = the estimated proportion of an attribute that is present in the population, and q = 1-p. At 95% confidence level, with d = 0.05, and p = 0.5 (maximum variability assumed), Z = 1.96, p = 0.5, q = 1 – 0.5= 0.5, d = 0.05

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2}$$

$$n = \frac{0.9604}{0.0025}$$

$$n = 384.16$$

The minimum sample size is 384. Giving room for 10% non-response:

$$n_f = \frac{n}{1-NR}$$

nf = final sample size, n = calculated sample size

NR = Non-response Rate

$$n_f = \frac{n}{1 - NR}$$

$$n_f = \frac{384}{1 - 0.1}$$

$$n_f = \frac{384}{0.9}$$

$n_f = 426.66$, The final sample size is 427. Nile university of Nigeria has 8 faculties. The undergraduate students were stratified by faculty and proportionate samples were determined for the faculties. A multistage sampling technique was employed.

Study Instrument

The tool used for the data collection was a self-administered questionnaire adapted from previous studies. Pretesting of the questionnaire was carried out by administering the questions to 10% of the 427-sample size in another Tertiary institution in Abuja and changes were made based on feedback before final use in this study to improve clarity and reliability. The questionnaire took into consideration the study objectives, with items adapted from previous studies on e-cigarette/vaping knowledge and usage. During data collection, the purpose and nature of the study was explained to the respondents and confidentiality was guaranteed and consent was sought before administering data to respondents.

Data collection and Analysis

This study was conducted over a two-month period using an online questionnaire distributed via Google Forms. To ensure participant confidentiality, the forms were completed anonymously. Data collected were entered and analyzed using SPSS version 27, with results

presented through tables and charts. Numerical data were summarized using mean and standard deviation, while categorical data were summarized as frequencies and percentages. Each of the six perception-related questions was scored as follows: 1 point for a correct answer and 0 points for an incorrect answer. The total score for each respondent was calculated as a percentage of the maximum score of six. A percentage score of ≥50% was categorized as "good perception," whiles a score of <50% was categorized as "poor perception."

Similarly, knowledge was assessed through five questions, with each correct answer awarded 1 point and incorrect answers given 0 points. The total knowledge score for each respondent was expressed as a percentage of the maximum score of five. Chi-square tests were employed to examine associations between categorical variables, while multiple logistic regression analysis was conducted to identify predictors of perception and e-cigarette use. A significance level of 0.05 was set for all statistical tests. This rigorous methodological approach ensured robust and reliable findings.

Ethical Consideration

Ethical approval was obtained from FCT Health Research Ethics Committee and Nile University of Nigeria Health Research Ethics Committee. A written informed consent to participate in the study was obtained from participants. The participants were provided with information about the objectives of the study, its methodology and potential risk and benefits. Participants were informed that the participation was voluntary and confidential, and that they could withdraw from the study at any point.

Results

Out of 427 participants, 384 completed responses were received. This corresponds to a response rate of approximately 90%. The age ranges of respondents were 16 years to 21 years with mean age of 19.3 ± 2.8 years. Almost more than half of the respondents were females, 21.6% are from law and management sciences, 30.7% in 400 level of study with close to half of the students stays with the parents from where they go to school (Table 1).

Table 1: Socio-demographic characteristics of Respondents

Variable	Frequency (n = 384)	Percent
Age (year)		
16-17	97	25.3
18-19	128	33.3
20-21	111	28.9
≥22	48	12.5
Mean	19.3 ± 2.8	
Sex		
Female	194	50.5
Male	190	49.5
Faculty		
College of Health Sciences	42	10.9
Sciences and Environment	40	10.4
Engineering	72	18.8
Computing	80	20.8
Law and Management Sciences	83	21.6
Arts and Social Sciences	67	17.4
Level in school		
100	97	25.3

200	70	18.2
300	99	25.8
400	118	30.7
Place of residence		
Off campus housing	77	20.1
On campus hostel	116	30.2
With parents/family	191	49.7

Knowledge and Perception e-cigarette among Respondents

While 72.4% of students had good knowledge of e-cigarette, there were knowledge gaps in specific areas regarding e-cigarette. A quarter of the students did not know what "e-cigarette" is and the components of e-cigarette liquids. Majority (67.2%) knew that "e-cigarette" stands for "electronic cigarettes," a significant proportion (32.7%) did not know. Most participants (84.9%) were aware that e-cigarettes contain substances harmful to health, 72.7% knew that e-cigarettes contain nicotine, tobacco, glycol, and flavors. However, 15.1% do not know that e-cigarettes contain harmful substances while 64.0% of the participants were aware that e-cigarettes can lead to long-term nicotine addiction. However, a significant portion (43.5%) perceived e-cigarettes as stylish and cool to use. While a quarter of the participants (30.7%) believed that e-cigarettes are safer than regular cigarettes with 12.8% believed that e-cigarettes can help people quit smoking. (Table 2a/b)

Table 2a: Knowledge of E-cigarettes of Respondents

Knowledge	Frequency (n = 384)	Percent
The term “e-cigarette” stands for		
Electronic cigarettes	258	67.2
Electric cigarettes	47	12.2
Enhanced cigarettes	9	2.3
I don't know	70	18.2
E-cigarettes contain substances harmful to health		
Yes	326	84.9
No	5	1.3
I don’t know	53	13.8
E-cigarettes contain nicotine, tobacco, glycol & flavors		
Yes	279	72.7

No	8	2.1
I don't know	97	25.3
The liquid in e-cigarettes is called		
E-juice	66	17.2
Vapor Fluid	57	14.8
Nicotine extract	53	13.8
Tar	5	1.3
I don't know	203	52.9
E-cigarettes can lead to long-term nicotine addiction		
Yes	246	64.0
No	21	5.5
I don't know	117	30.5
Knowledge score (%)		
Good	278	72.4
Poor	106	27.6
Mean	61.2 ± 27.0	

Table 2b: Awareness and perception about e-cigarette

Variable	Frequency (n = 384)	Percent
Heard of e-cigarette		
Yes	359	93.5
No	25	6.5
Perception about e-cigarette		
Smoking e-cigarettes is harmful to health	353	91.9
Flavored e-cigarettes target youth non-smokers	333	86.7
E-cigarettes are addictive	317	82.6
E-cigarettes are stylish and cool to use	167	43.5
E-cigarettes are safer than regular cigarettes	118	30.7
E-cigarettes can help people quit smoking	49	12.8
Perception score (%)		
Good	359	93.9
Poor	25	6.5
Mean	79.0 ± 20.4	

Use of E-cigarettes among Respondents

Among the respondents 6.5% use e-cigarette while 2.3% take other forms of cigarette. Respondents who currently use e-cigarette, majority (72%) reported using e-cigarettes daily whole smaller proportion of the respondent used e-cigarettes 2-3 times a week (16%) and once a week (8%) (Table, 3)

Table 3: Use of E-cigarettes among Respondents

Variable	Frequency (n = 384)	Percent
Smoke cigarette		
Yes	9	2.3
No	375	97.7
Ever tried e-cigarette		
Yes	112	29.2
No	272	70.8
Current user of e-cigarette		
Yes	25	6.5
No	359	93.5
How often use e-cigarette	**n = 25**	
Daily	18	72
2-3 times a week	4	16.0
Once a week	2	8.0
Tried it once or twice	1	4.0

Factors affecting perception and Use of E- Cigarette among Respondents

Age was not a predictor of current e-cigarette use (p = 0.079). However, respondents aged 22 years or older were 2.52 times more likely to be current e-cigarette users compared to those younger. Being in the Engineering faculty was a statistically significant predictor of current e-cigarette use (p = 0.001). Respondents in the Engineering faculty were 4.54 times more likely to be current e-cigarette users compared to those in other faculties in the institution (AOR = 4.54; 95% CI = 1.86 to 11.06, P=0.001). Poor perception was a statistically significant predictor of current e-cigarette use (AOR=5.00, CI= 1.59-15.72, P = 0.006). Respondents with poor perception of e-cigarette were 5 times more likely to be current e-cigarette users compared to those with good perception (Table 4).

Table 4: Multiple Logistic Regression of E-cigarette Use among Respondents

Predictor variable	β	SE	Wald	p-value	Adj. OR	95% CI Lower	Upper
Constant	*-3.961*	*0.448*	*78.059*	*<0.001**			
Age (≥22 years/<22 years)	0.922	0.525	3.084	0.079	2.52	0.90	7.04

Sex (Male/Female)	0.381	0.479	0.632	0.426	1.46	0.57	3.75
Engineering faculty (Yes/No)	1.513	0.454	11.084	0.001*	4.54	1.86	11.06
Off campus residence (Yes/No)	0.617	0.506	1.488	0.223	1.85	0.69	5.00
Perception (Poor/Good)	1.609	0.585	7.574	0.006*	5.00	1.59	15.72

* Statistically significant β = Regression coefficient; SE = Standard error; Adj. = Adjusted; OR = Odds ratio

Discussion

The findings of this study reveal that a significant number of respondents (93.5%) demonstrated good knowledge of e-cigarettes, while 93.9% exhibited a good perception of e-cigarettes as harmful to health. These results align with a study conducted by Jiang et al. (2019), which reported that 90% of university students in Hong Kong possessed good knowledge of e-cigarettes. The prevalence of negative perceptions among the respondents suggests that ongoing public health campaigns emphasizing the risks of e-cigarettes, particularly for non-smokers and young people, are critical within academic environments where habits and behaviors are often shaped. Similarly, a study by Vichayanrat et al. (2024) among Thai university students highlighted a strong negative perception of e-cigarettes, consistent with the current findings. Participants acknowledged the potential harms associated with vaping, including health hazards (91.9%) and addiction (82.6%). Chen et al. (2023) further reported that 88% of college students in Alaska were aware of the health risks of e-cigarettes, with 80% recognizing their addictive potential. However, despite these insights, 43.5% of respondents in this study perceived e-cigarettes as stylish and cool to use, while 30.7% believed they were safer than traditional cigarettes.

The glamorization of e-cigarettes as trendy can be attributed to social influences and aggressive marketing strategies. Alduraywish et al. (2023) found that 40% of young adults considered e-cigarettes fashionable, and 35% believed they were a safer alternative to conventional cigarettes. This trend reflects a significant challenge for public health initiatives, as misconceptions about e-cigarettes continue to persist among youth. Social media and peer networks amplify these beliefs, creating a fertile ground for myths that minimize the risks of vaping.

The study also found that 2.3% of respondents smoked traditional cigarettes, while 29.2% had tried e-cigarettes, and 6.5% were current users. These figures underscore a shift in tobacco product preferences among students, with e-cigarettes becoming a more attractive option than traditional cigarettes. Factors such as perceived safety, ease of use, and social trends may explain this preference. Similar findings were reported by Khanal (2023) in Nepal, where the prevalence of ever-use and current use of e-cigarettes was 21.2% and 5.9%, respectively. Studies by Patanavanich et al. (2021) and Wamamili et al. (2020) also reported comparable prevalence rates of 5.9% and 6.1%, respectively. However, contrasting data from France showed higher prevalence rates, with e-cigarette use recorded at 26.9%, 70.3%, and 40.5% in different cohorts (Aljandaleh, 2020; Peckham et al., 2020; Wamamili, 2020). Such variations in prevalence may be influenced by survey timing, geographical location, marketing trends, cost differences, and levels of awareness. The appeal of e-cigarettes, particularly fruity and menthol flavors, continues to attract young users, fostering nicotine dependence. Curiosity (71.4%) and peer influence (50.0%) emerged as primary motivators for vaping in this study. This is consistent with findings from New Zealand, where curiosity (67.4%) was cited as a common reason for vaping among university students (Wamamili, 2020).

The study identified demographic factors associated with higher e-cigarette use, including being male, aged 22 or older, and enrolled in the Engineering faculty. Older students may have greater autonomy, disposable income, or prolonged exposure to peer influences, which normalize vaping behaviors. Gender-specific marketing strategies and societal norms also contribute to higher usage rates among males. Nazzal et al. (2024) found that male university students in Palestine were 2.1 times more likely to use e-cigarettes than females. Similarly, Ghanim et al. (2024) observed higher e-cigarette usage rates among male students aged 25 and above, particularly in STEM faculties such as Engineering.

Interestingly, this study revealed that knowledge of e-cigarettes does not necessarily influence perception or usage patterns. Palmes et al. (2021) found no significant correlation between knowledge and perception, which aligns with this study's findings. Participants with poor perceptions were more likely to use e-cigarettes, suggesting that behaviors may be shaped more by personal experiences, such as health effects or societal disapproval, than by pre-existing knowledge. The study has several strengths, including its focus on young adults in an academic setting and its comprehensive assessment of knowledge, perception, and usage patterns. However, it is not without limitations. Self-reported data may be subject to recall bias and misreporting. Additionally, as a cross-sectional study, it cannot establish causality between the variables examined.

Conclusion

This study highlights the complex dynamics of e-cigarette knowledge, perception, and usage among students at Nile University of Nigeria. Despite widespread awareness of the health risks, a significant number of students perceive e-cigarettes as stylish and socially acceptable. The findings underscore the influence of socio-demographic factors, curiosity, and peer networks in shaping vaping behaviors. Addressing these challenges requires multifaceted public health

strategies, including targeted educational campaigns to dispel misconceptions about e-cigarettes and stricter regulations on their marketing and accessibility. By fostering a more informed student population, such interventions can help mitigate the growing public health risks associated with vaping among young adults.

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