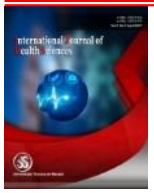

International Journal of Health Sciences
Available online at www.sciencescholar.us
Vol. 10 No. 2, August 2026, pages: 123-135
E-ISSN: 2550-696X
https://doi.org/10.53730/ijhs.v10n2.15945

Cross-Sector Perspectives on E-Cigarettes: A Comprehensive Study of Youth, Teachers, Healthcare Workers, And Government Workers

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Manuscript submitted: 09 March 2026, Manuscript revised: 27 April 2026, Accepted for publication: 14 May 2026

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Keywords

E-cigarettes;
government workers;
healthcare workers;
students;
teachers;

Abstract

This cross-sectional quantitative study examined the perceptions of youth, teachers, healthcare workers, and government workers regarding e-cigarette use in Iligan City. The study assessed levels of awareness, beliefs, and attitudes toward e-cigarettes across these sectors. Data were collected using standardized questionnaires distributed to selected respondents from public and private institutions. Statistical analyses, including correlation and regression, were conducted to determine relationships among variables and identify significant predictors of attitudes. Findings revealed that youth showed moderate awareness but generally demonstrated more favorable attitudes toward e-cigarette use, influenced by peer pressure, curiosity, and stress. However, teachers and healthcare workers exhibited higher awareness of health risks and held more negative attitudes, emphasizing the need for regulation and prevention. Government workers highlighted gaps in policy implementation and enforcement. The results further indicated that awareness, beliefs, and attitudes are significantly related, with beliefs as the strongest predictor of attitudes toward e-cigarette use. The study concludes that a collaborative, multi-sectoral approach involving education, healthcare, and policy is essential to address youth e-cigarette use. Interventions should focus on correcting misconceptions and addressing the social and psychological factors that drive vaping behavior. These findings provide a framework for developing targeted health programs and policies to reduce usage and promote healthier youth lifestyles.

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1 Introduction

E-cigarette use has become a growing global public health concern, particularly among adolescents and young adults (WHO, 2024). Recent reports indicate a rapid increase in vaping behavior worldwide, with millions of users across different age groups (Ciriaco, 2023). Studies show that a significant proportion of adolescents have experimented with or regularly use e-cigarettes, driven by factors such as curiosity, peer influence, and the perception that these products are safer alternatives to traditional cigarettes (O'Lawrence et al., 2020; Al-Sawalha et al., 2021). This rising trend is also evident in the Philippines, where a considerable number of youth are already engaged in e-cigarette use, highlighting the urgency of addressing this issue (Vincent, 2023).

E-cigarette use poses serious health risks that affect both physical and mental well-being. Exposure to nicotine and other harmful chemicals found in e-cigarette aerosols has been associated with addiction, respiratory diseases, cardiovascular complications, and impaired brain development among adolescents (WHO, 2024; Sahu et al., 2023). In addition, vaping has been linked to psychological concerns such as anxiety, depression, and behavioral problems (Salari, 2024). These health consequences emphasize the need for increased awareness and preventive measures to protect vulnerable populations, especially the youth.

Various interventions have been implemented to reduce e-cigarette use, including policy regulations, school-based education programs, and healthcare interventions (Uppal, 2019; Lyu et al., 2022). Public health campaigns aim to increase awareness of the harmful effects of vaping, while stricter regulations on advertising, accessibility, and age restrictions seek to limit youth exposure (WHO, 2021). Healthcare professionals also play a vital role in providing education and cessation support, while community-based programs and peer-led initiatives encourage healthier lifestyle choices (Levine et al., 2021; Hennrikus et al., 2023). Despite these efforts, challenges remain due to persistent misconceptions about e-cigarettes and the influence of social and environmental factors (Nature, 2022; Gardner et al., 2022).

E-cigarette use continues to be influenced by multiple factors, including social, environmental, and psychological determinants. Peer pressure, family influence, and social media exposure contribute to the normalization of vaping among adolescents (Fairman et al., 2023; Baker et al., 2019). Easy access to e-cigarettes and aggressive marketing strategies further increase their appeal (Desai et al., 2019; Stanton et al., 2022). Moreover, stress, anxiety, and the desire for social acceptance often drive youth to use e-cigarettes as a coping mechanism, reinforcing habitual use and increasing the risk of dependency (Osibugun et al., 2020; Cambron, 2022).

Despite the growing body of research, significant gaps remain in understanding how different sectors perceive e-cigarette use. Existing studies often focus primarily on youth, with limited attention given to the perspectives of teachers, healthcare workers, and government officials (Alluhibi, 2020; Baker et al., 2019).

There is also insufficient evidence on how awareness, beliefs, and attitudes interact across these groups and influence behaviors and policy responses (Camenga et al., 2018; Hong et al., 2022). Accordingly, this cross-sectional study aims to examine the perceptions of youth, teachers, healthcare workers, and

government workers regarding e-cigarette use in Iligan City, focusing on their levels of awareness, beliefs, and attitudes and determining the relationships among these variable.

This study aimed to explore the perceptions of youth, teachers, healthcare workers, and government workers regarding e-cigarette use in Iligan City. Specifically, it examined the level of awareness, beliefs, and attitudes toward e-cigarette use among the selected sectors. It also determined the significant relationships among awareness, beliefs, and attitudes. Furthermore, the study identified which factors best predict attitudes toward e-cigarette use across the different groups.

2 Materials and Methods

Research Design

This research employs a quantitative cross-sectional design to provide a comprehensive snapshot of awareness, attitudes, and beliefs regarding e-cigarette use among stakeholders in Iligan City (Miller et al. 2024). This approach is favored for its efficiency and cost-effectiveness compared to longitudinal studies, allowing researchers to gather substantial data from a large-scale survey at one specific moment. The design supports broad analyses of relationships between variables, such as how age, gender, and educational background influence perceptions, ensuring the findings are both credible and relevant to the local socioeconomic context (Brauer et al., 2022).

Participants

The respondents consist of a diverse group of 1,200 individuals, including 300 students, 300 teachers, 300 healthcare workers, and 300 government workers. To ensure a representative sample, the researchers combined purposive sampling to select participants with relevant professional or lived experiences and quota sampling to maintain proportional representation across all subgroups. Systematic measures, including the verification of enrollment records and the use of randomization tools within subgroups, were implemented to reduce bias and ensure the statistical validity of the conclusions.

Instruments

Data was gathered using validated self-report questionnaires designed to obtain comprehensive and consistent data on awareness, beliefs, and attitudes within a short timeframe. The instruments underwent an expert review by professionals in public health and education, followed by a pilot review from 100 participants to ensure the wording was clear and understandable. Construct validity was evaluated through factor analysis to ensure the tool accurately reflected the targeted aspects of e-cigarette use, while internal consistency was verified using Cronbach's alpha to measure the reliability of the awareness (0.917), attitude (0.811), and belief (0.841) scales.

Data Collection

The data gathering followed a structured five-step procedure that began with securing informed consent and was followed by the distribution of questionnaires in online, paper-based, and in-person formats. Researchers provided support during the completion process to ensure participants understood every question and individually collected the surveys to verify their completeness. This systematic administration, which utilized cluster sampling and maintained strict data privacy, was designed to provide valid and unbiased insights into the perceptions of the four targeted sectors.

Data Analysis

Quantitative data were analyzed using SPSS 25, starting with a cleaning process to identify missing values or outliers that could potentially skew the results. Because a normality test indicated that the data for awareness, attitudes, and beliefs significantly deviated from a normal distribution, the researchers utilized Kendall's Tau as a nonparametric test to evaluate the relationships between variables. Additionally, descriptive statistics, including mean and standard deviation, were employed to illustrate the levels of awareness and perceptions across the various sectors, providing a clear statistical basis for answering the research questions.

Ethical Considerations

To maintain high integrity, the study obtained ethical approval from the Ethics Review Committee of Adventist Medical Center College before initiating data collection. All participants were provided with detailed information regarding the study's purpose, and informed consent was secured to ensure that participation was entirely voluntary and that individuals knew their right to withdraw at any time. Furthermore, strict confidentiality was maintained in compliance with RA 10173 (the Data Privacy Act), and the research instruments were designed to be culturally sensitive to the local customs and values of Iligan City.

3 Results and Discussions

3.1 Level of Awareness on E-Cigarettes by Students, Teachers, Health-care Workers, and Government Officials

Table 1 presents the results for the level of awareness, which is divided into 2 subscales. The first subscale describes youth, teachers, government officials, and healthcare workers' general awareness, focusing on e-cigarettes' features and components, with alternative usage serving its purpose for the target users. Based on the data, the results show students are "extremely aware" of e-cigarettes' components and description of e-cigarette indicating less offensive than traditional e-cigarette use. Students are also extremely aware of e-cigarette offers different flavors with different features, making them more customizable. On the other hand, teachers, healthcare workers, and government workers are "moderately aware" of the features, components, and their purpose or usage benefits of e-cigarettes, considering the generational gap, work, and practices.

The second subscale describes health risk awareness that focuses on health- related risk, hazards, and regulatory facts of e-cigarette use. The data shows that students are extremely aware of harmful substances, negative health impacts such as lung cancers, sleep deprivation, and behavioral changes. Additionally, students are more aware of the harmful effects on the users themselves and bystanders. Moreover, they are extremely aware of potential device malfunctions, knowing that it is regulated by the FDA authorities. Nevertheless, teachers, healthcare workers, and government officials are "moderately aware" of health-related awareness of e-cigarette use.

Table 1
Level of Awareness on E-Cigarettes by Students, Teachers, Health-care Workers, and Government Officials (n = 1200)

	N	General Awareness m± SD	Description	Health Risks Awareness m ± SD	Description
Student	300	3.35 ± .59	Extremely Aware	3.34 ± .58	Extremely Aware
Teachers	300	3.00 ± .64	Moderately Aware	3.04 ± .66	Moderately Aware
Healthcare Workers	300	2.71 ± .45	Moderately Aware	2.86 ± .45	Moderately Aware
Government Workers	300	2.56 ± .77	Moderately Aware	2.62 ± .81	Moderately Aware

Note: Scale: 1.0-1.74 (NA), 1.75 - 2.49 (SA), 2.50 - 3.24 (MA), 3.25 - 4.0 (EA)

3.2 Attitude Towards E-Cigarettes by Students, Teachers, Health-care Workers, and Government Officials

Table 2 presents the results for attitude towards e-cigarette use, which is divided into 2 subscales. The first subscale indicates a positive attitude of students, teachers, healthcare workers, and government workers in using e-cigarettes. It focuses on approving or accepting favorable views towards e-cigarettes. The data shows that students "agree" that e-cigarettes can relieve stress and are trendy, which is accepted in society. They moderately agree about reducing the risk of cancer, which makes them confident enough to use e-cigarettes

and recommend them to their peers. Nonetheless, teachers, healthcare workers, and government workers "disagree" that e-cigarettes are cool and trendy, and that they can relieve stress and its usage, considering their work and knowledge.

The second subscale describes negative attitudes, emphasizing critical and cautious views of e-cigarette use about marketing practices and the negative impact on influencing others. The data shows that students and teachers "strongly agree" on negative sentiments, such as potential health and social consequences, indicating a more cautious stance toward e-cigarette use. However, healthcare workers "disagree" that e-cigarettes are ineffective for quitting smoking and about the discomfort in public spaces of e-cigarette use. This possibly indicates professional objectivity or a firm rejection of the questions. Nevertheless, government workers "agree" to the negative statements, indicating concern but a slightly more neutral approach to the negative impact of e-cigarette marketing and influencing others.

Table 2
Attitude Towards E-Cigarettes by Students, Teachers, Health-care Workers, and Government Officials (n = 1200)

	N	Positive Attitude m ± SD	Description	Negative Attitude m ± SD	Description
Student	300	2.65 ± .63	Agree	3.28 ± .42	Strongly Agree
Teachers	300	2.22 ± .67	Disagree	3.27 ± .47	Strongly Agree
Healthcare Workers	300	2.08 ± .75	Disagree	2.02 ± .32	Disagree
Government Workers	300	2.01 ± .70	Disagree	2.86 ± .77	Agree

Note: Scale: 1.0-1.74 (SD), 1.75 - 2.49 (D), 2.50 - 3.24 (A), 3.25 - 4.0 (SA)

3.3 Beliefs about E-Cigarettes by Students, Teachers, Health-care Workers, and Government Officials

Table 3 presents the results for belief on e-cigarette use, which is divided into 2 subscales. The first subscale describes the regulation and education of students, teachers, healthcare workers, and government workers in using e-cigarettes. It focuses on belief in institutional and societal control of e-cigarette use. Base from the data results, it shows that students, teachers, and government workers "strongly believe" in the need for regulation and public awareness. On the other hand, healthcare workers "believe" moderately in agreeing to regulatory and educational beliefs in e- cigarette use.

The second subscale describes health beliefs focusing on the health impact of e-cigarette usage. The data shows that students and healthcare workers "strongly believe" that e-cigarettes can harm users and others, recognizing health risks, which indicates concern and advocacy for preventive measures. Nonetheless, teachers and government workers "believe" moderately in how e-cigarettes can affect the users' and other bystanders' health, which puts them at risk for respiratory health risks.

Table 3
Belief in E-Cigarettes by Students, Teachers, Health-care Workers, and Government Officials (n = 1200)

	N	Regulation and Education m ± SD	Description	Health Belief m ± SD	Description
Student	300	3.69 ± .33	Strongly Believe	3.32 ± .43	Strongly Believe
Teachers	300	3.31 ± .48	Strongly Believe	2.79 ± .33	Believe
Healthcare Workers	300	2.59 ± .43	Believe	3.33 ± .62	Strongly Believe

	N	Regulation and Education m ± SD	Description	Health Belief m ± SD	Description
Government Workers	300	3.49 ± .94	Strongly Believe	2.86 ± .81	Believe

Note: Scale: 1.0-1.74 (SD), 1.75 - 2.49 (D), 2.50 - 3.24 (B), 3.25 - 4.0 (SB)

3.4 Relationship between awareness, attitude, and belief on e-cigarettes

Table 4 presents the correlation between awareness, belief, and attitude, including subscales. The results show that general awareness and positive attitude have a strong positive significant relationship. This means that the more people are informed about what e-cigarettes are, the more likely they are to view them favorably, which increases the positive attitude towards e-cigarettes. Yet, the correlation between general awareness and negative attitude shows a direct but moderately significant positive relationship. It means that when general awareness increases, the negative attitude also increases.

The correlation between health risk awareness and positive attitude has a direct but moderately significant positive relationship. If the awareness of the health risk increases, the positive attitude of e-cigarette uses such as viewing it as cool and trendy, will slightly increase. On the other hand, health risk awareness and negative attitude have direct but moderately significant positive relationships. As health risk awareness increases, the negative attitude towards e-cigarettes, such as the negative impact of marketing and influencing others to use e-cigarettes, also increases. This means that the more they are aware of health risk, the more they will agree to the negative impact that the e-cigarette has brought in holistic health of individuals.

In the belief section, the results show that regulation and education, and positive attitude have a direct but weak, significantly positive relationship. As belief in regulation and education (believing in establishing the need for regulation and public awareness) increases, the positive attitude viewing e-cigarette as cool and trendy will slightly increase. However, regulation, education, and negative attitude have strong, significant positive relationships. As regulation and education increase, the negative attitude towards e-cigarettes, such as the negative impact of marketing and influencing others, also increases. This means that the more they believe about regulating e-cigarette policies in schools and public places, the more they agree to the negative impact that the e-cigarette has brought in holistic health of individuals.

On the other hand, the result shows that health beliefs and positive attitude have a strong, significant, positive relationship. As health beliefs increase, a positive attitude will also increase. This means that the more they believe in the negative impact of e-cigarettes on the health and wellness of individuals, the more they are likely to be more knowledgeable about how e-cigarettes can contribute to behavioral and psychological changes. Yet, health beliefs and negative attitudes have a direct but moderately significant positive relationship. As health beliefs increase, the negative attitude towards e-cigarettes, such as the negative impact of marketing and influencing e-cigarettes, also increases. This means that the more they firmly believe that e-cigarettes pose health risks, the more they are concerned about public health and safety.

Table 4
Relationship between awareness, attitude, and belief on e-cigarette (n = 1200)

	Attitude 1 (Positive) r (p)	Attitude 2 (Negative) r (p)
Awareness 1 (General Awareness)	.38 (.00)	.20 (.00)
Awareness 2 (Health Risk Awareness)	.15 (.00)	.26 (.00)
Beliefs 1 (Regulation and Education)	.10 (.00)	.46 (.00)
Beliefs 2 (Health Belief)	.49 (.00)	.37 (.00)

The research findings indicate that students possess the highest level of awareness regarding both the general features and the specific health risks of e-cigarettes, while educators, healthcare professionals, and

government workers demonstrate a more moderate level of awareness. While students exhibit ambivalent attitudes—recognizing both the social appeal and the dangers of vaping—professional sectors generally hold more negative, risk-averse views (Ambrose et al., 2019; Camenga et al., 2018). Notably, the study found that beliefs regarding health risks and regulation are much stronger predictors of a person's attitude than general awareness alone (Levy et al., 2023). While students and healthcare workers strongly believe in the physiological health risks, teachers and government officials place a higher emphasis on the need for institutional regulation and education.

These results align with existing literature suggesting that youth are more informed about e-cigarettes due to high exposure to digital media and targeted marketing (Qutob et al., 2022; Jaswal et al., 2023). The observed student ambivalence mirrors (Smith & Kott, 2021), where curiosity and the desire for social acceptance often compete with a growing awareness of health risks (Ambrose et al., 2019; Camenga et al., 2018). Furthermore, the strong support for regulation among the various sectors is consistent with World Health Organization findings regarding rising public advocacy for tobacco control (Melin et al., 2018; Ghanim et al., 2024). The significant correlation between beliefs and attitudes found in this study is theoretically grounded in the Theory of Planned Behavior, which posits that underlying convictions are the primary drivers of behavioral intentions (Levy et al., 2023).

The study implies that simply spreading factual information is insufficient to prevent e-cigarette use among youth (Ambrose et al. 2019; Goldenson et al., 2019). Instead, schools and communities must engage students as active partners in anti-vaping advocacy, utilizing their influence on peers to lead discussions and digital campaigns (Alpert et al., 2019; CDC, 2023). For professional sectors, the moderate awareness (Schillo et al., 2020; Ghanim et al., 2024) levels highlight a need for enhanced training programs to bridge knowledge gaps and improve the enforcement of tobacco control measures (Anderson et al., 2024). Public health campaigns should shift from posters filled with facts to emotional, values-driven messaging that connects to real-life experiences, as building strong health-protective beliefs is more effective than increasing knowledge alone (Camenga et al., 2018).

A primary strength of this research is its comprehensive, cross-sectoral quantitative approach, which systematically captured the diverse perspectives of four distinct stakeholder groups. The use of validated and reliable instruments, combined with rigorous statistical analyses such as Kendall's Tau and regression, enhances the credibility and generalizability of the results. Furthermore, the study maintained high ethical standards, prioritizing participant confidentiality and informed consent, which reinforced the trustworthiness of the findings.

The research was limited by its cross-sectional design, which provides a snapshot in time but cannot determine cause-and-effect relationships or track changes over longer periods. The scope was restricted to Iligan City and did not include parents or other community members, potentially missing wider social influences. Additionally, the reliance on self-reported data introduces the possibility of response bias, and the lack of qualitative data means the study could not deeply explore the personal motivations behind participants' views.

Future researchers should adopt a longitudinal design to observe how perceptions and behaviors regarding e-cigarettes evolve. It is recommended to broaden participant demographics to include more diverse geographic locations and socioeconomic statuses to improve generalizability. Integrating qualitative methods, such as interviews or focus groups, would provide a more nuanced understanding of individual motivations. Finally, refining survey instruments and extending data collection periods could help account for fluctuations caused by policy changes or media exposure, leading to even more impactful studies.

4 Conclusion

Youth are uniquely positioned as both the most informed group and the most vulnerable to targeted marketing and misinformation due to their digital connectivity. Because beliefs about health risks and regulation shape attitudes more powerfully than simple knowledge, future interventions must prioritize correcting misconceptions and building strong, evidence-based convictions. There is a noted need for targeted training for educators and government workers to bridge knowledge gaps and strengthen their roles in health

promotion. Ultimately, a collaborative, multi-sectoral approach involving education, healthcare, and policy is essential to protect the well-being of youth and address the complex challenges posed by e-cigarette use.

Acknowledgments
The authors would like to express their sincere gratitude to all individuals who contributed to the completion of this study. Special thanks are extended to the respondents from the youth, teachers, healthcare workers, and government sectors in Iligan City for their time, participation, and valuable insights. The authors also extend their appreciation to their research adviser for the guidance, support, and expertise provided throughout the research process. Gratitude is likewise given to the faculty members and administrators of Adventist Medical Center College for their encouragement and assistance. Finally, the authors are deeply thankful to their families for their unwavering support and motivation, and above all, to God for providing wisdom, strength, and guidance in completing this study.

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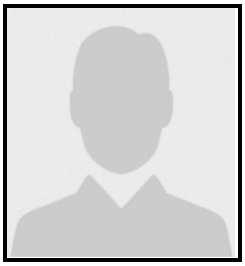
Biography of Authors



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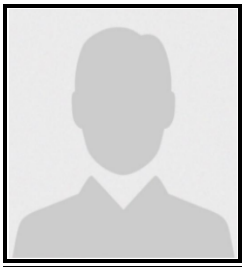

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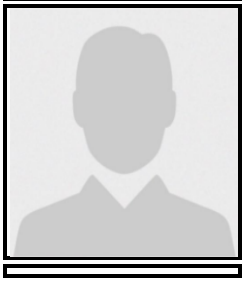

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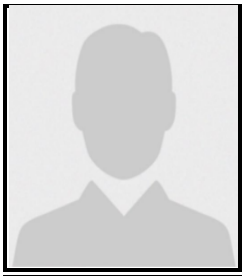

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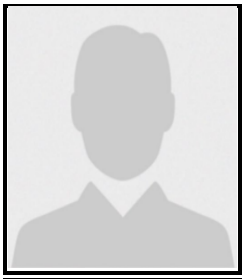

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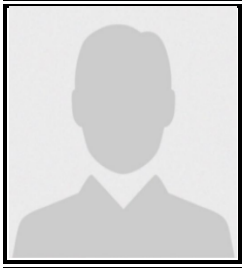

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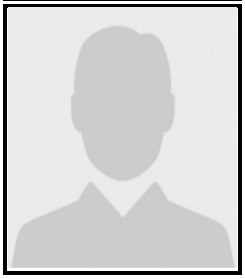

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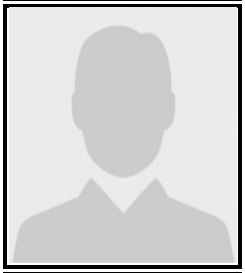

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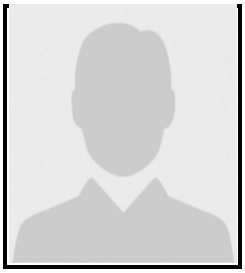

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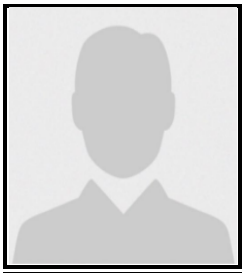

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