



A COMPREHENSIVE ANALYSIS OF THE IMPACT OF VAPING (ELECTRONIC CIGARETTE USE) ON THE EDUCATIONAL PROCESS, COGNITIVE FUNCTIONS, AND ACADEMIC PERFORMANCE OF UNIVERSITY STUDENTS

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Abstract

This article presents a comprehensive analysis of the impact of electronic cigarette use (vaping) among students on the educational process, cognitive functions, and academic performance. The aim of the study is to identify the relationship between vaping and students' attention, memory, academic motivation, psycho-emotional state, and learning outcomes. The research methodology is based on the analysis of scientific literature, sociological surveys, comparative methods, and analytical approaches. The results indicate that regular vaping is associated with decreased concentration, increased fatigue, heightened anxiety levels, and impaired cognitive performance. Students who use electronic cigarettes demonstrate lower academic motivation, higher absenteeism rates, and reduced academic achievement compared to non-vaping peers. The findings are consistent with the author's previous research, which identified a relationship between students' health indicators and behavioral risk factors. The study emphasizes the importance of implementing comprehensive preventive strategies in higher education institutions, including health education programs, psychological support, and digital health interventions aimed at reducing vaping prevalence and promoting healthy lifestyle behaviors. The conclusions of the study may be used to improve student health protection policies and enhance the effectiveness of the educational process.



Keywords: Vaping, electronic cigarettes, students, educational process, cognitive functions, academic performance, prevention.

Introduction

The study was conducted using a comprehensive methodological approach aimed at assessing the impact of vaping on the educational process among university students. The research design included an analytical review of international and regional scientific literature, a sociological survey, and comparative analysis of educational and psycho-functional indicators.

The literature review covered publications indexed in international databases, including reports by the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), and the U.S. Surgeon General, as well as peer-reviewed articles addressing the effects of vaping on cognitive functions, mental health, and learning outcomes. Particular attention was given to studies focusing on young adults and student populations.

A sociological survey was conducted among university students aged 18–25 years. The survey questionnaire included items related to vaping behavior (frequency and duration of use), self-assessment of academic performance, concentration, fatigue, sleep quality, and psycho-emotional state. Participation in the survey was voluntary and anonymous, ensuring ethical compliance and reliability of responses.

Students were divided into two groups: those who reported regular use of electronic cigarettes and those who did not use vaping products. Comparative analysis was applied to identify differences in academic motivation, attendance, cognitive performance, and emotional well-being between the two groups. Descriptive statistics and analytical methods were used to interpret the collected data and evaluate trends.

The methodological approach of the present study is consistent with previous research conducted by the author, which examined health indicators and behavioral risk factors among students during medical examinations [Temirova D.U., 2024]. This continuity ensures methodological reliability and supports the validity of the findings.

RESULTS AND DISCUSSION

Prevalence of Vaping Among University Students

The results of the survey indicate that vaping is relatively widespread among university students. Approximately one-third of respondents reported having tried electronic cigarettes at least once, while a significant proportion indicated regular or occasional use. The highest prevalence was observed among first- and second-year students, which may be associated with academic adaptation stress and social influence.

Students identified several factors contributing to vaping initiation, including peer pressure, perceived stress reduction, curiosity, and the belief that vaping is less harmful than traditional smoking. These findings are consistent with international studies highlighting similar trends among young adults [CDC, 2022].

Impact of Vaping on Cognitive Functions

Analysis of survey responses revealed that students who regularly use electronic cigarettes reported more frequent difficulties with concentration and memory compared to non-vaping peers. Many vaping students described reduced attention span during lectures, difficulty processing complex information, and faster mental fatigue.

Nicotine exposure is known to affect neurotransmitter activity, which may explain the observed cognitive impairments. While short-term stimulation may occur, long-term use contributes to decreased cognitive efficiency. These results align with previous studies demonstrating negative effects of nicotine-containing products on learning-related cognitive functions [U.S. Surgeon General, 2020].

Psycho-Emotional Effects of Vaping

Students who reported regular vaping also demonstrated higher levels of anxiety, irritability, and emotional instability. A significant number of respondents indicated that they used vaping as a coping mechanism for academic stress and emotional tension. However, reliance on vaping for stress management appears to exacerbate emotional vulnerability rather than improve psychological resilience.

These findings support earlier research suggesting that vaping may worsen psycho-emotional well-being and increase dependence-related stress [Smith et

al., 2021]. Emotional instability, in turn, negatively affects motivation, self-regulation, and academic engagement.

Academic Motivation and Performance

Comparative analysis showed that students who vape reported lower levels of academic academic motivation and engagement in the learning process. They were more likely to miss classes, arrive late, and demonstrate reduced participation in academic activities. Self-reported academic performance indicators were also lower among vaping students.

The results of the present study are consistent with the author's previous research, which identified a relationship between behavioral risk factors and increased fatigue, reduced functional reserves, and impaired adaptation to academic workload [Temirova D.U., 2024]. These findings suggest that vaping may act as an additional risk factor that negatively influences academic outcomes.

Preventive Strategies in Higher Education Institutions

The findings highlight the urgent need for preventive strategies aimed at reducing vaping prevalence among students. Educational institutions play a key role in promoting healthy behaviors and shaping students' attitudes toward harmful habits. Effective preventive measures include health education campaigns, smoke-free campus policies, psychological counseling services, and student-centered wellness programs.

Integrating preventive education into academic curricula and providing access to mental health support may enhance students' awareness of vaping-related risks and encourage healthier coping mechanisms for stress management.

DISCUSSION

The findings of this study confirm that vaping among university students represents a significant risk factor not only for physical and mental health but also for the effectiveness of the educational process. The obtained results demonstrate a clear association between electronic cigarette use and decreased cognitive performance, including reduced attention span, impaired memory, and increased mental fatigue. These factors are critically important for academic success, particularly in higher education settings characterized by intensive intellectual workload. The psycho-emotional effects observed among vaping students



deserve particular attention. Increased anxiety, emotional instability, and reliance on vaping as a stress-coping mechanism indicate maladaptive behavioral patterns. Instead of reducing stress, regular nicotine consumption appears to exacerbate emotional vulnerability, which negatively affects academic motivation and self-regulation. This finding is consistent with international research highlighting the relationship between nicotine dependence and reduced psychological resilience among young adults. A notable aspect of this study is the integration of the author's previous research on student health indicators. Earlier findings demonstrated that behavioral risk factors are closely associated with increased fatigue and reduced functional reserves among students [Temirova D.U., 2024]. The present study expands this perspective by identifying vaping as an additional behavioral factor that may intensify existing health and academic challenges. The results also underline the importance of considering vaping within a broader socio-educational context. Peer influence, misconceptions regarding the safety of electronic cigarettes, and insufficient awareness of long-term consequences contribute to the persistence of vaping habits among students. Therefore, addressing vaping requires not only individual-level interventions but also institutional and policy-level strategies. Universities are uniquely positioned to influence student behavior through structured preventive programs. Creating smoke-free campuses, integrating health education into curricula, and strengthening psychological support services may significantly reduce vaping prevalence. Moreover, the use of digital health tools and peer-led interventions could enhance engagement and effectiveness of preventive measures.

CONCLUSION

The comprehensive analysis presented in this study demonstrates that vaping among university students has a negative impact on the educational process, cognitive functions, academic motivation, and overall learning outcomes. Regular use of electronic cigarettes is associated with decreased concentration, increased fatigue, heightened anxiety, and lower academic performance. These effects undermine students' ability to fully engage in educational activities and achieve academic success.

The study confirms that vaping should be regarded not only as a public health issue but also as an educational challenge requiring systematic attention. Preventive strategies must be comprehensive and interdisciplinary, combining

medical, psychological, and educational approaches. Higher education institutions should prioritize health promotion initiatives, develop effective anti-vaping policies, and provide accessible psychological support to students.

The findings of this research may serve as a scientific basis for the development of targeted preventive programs aimed at reducing vaping prevalence and improving academic performance. Promoting healthy lifestyle behaviors among students is essential for safeguarding their well-being and enhancing the quality and effectiveness of the educational process.

REFERENCES

1. World Health Organization. WHO report on the global tobacco epidemic. Geneva, 2021.
2. Centers for Disease Control and Prevention. E-cigarette use among young adults. Atlanta, 2022.
3. U.S. Surgeon General. E-cigarette use among youth and young adults. Washington, 2020.
4. Marmot M. The Health Gap: The Challenge of an Unequal World. London: Bloomsbury, 2015.
5. Smith L., Jackson S., Brown K. Vaping and mental health among university students. *Journal of Public Health*. 2021; 43(2): 234–241.
6. Chadi N., Schroeder R., Jensen J. Association between vaping and cognitive performance in young adults. *Addictive Behaviors*. 2020; 102: 106–112.
7. Lee Y., Park S. Electronic cigarette use and academic engagement among college students. *BMC Public Health*. 2022; 22: 845.
8. Goniewicz M., Smith D. Nicotine exposure and neurocognitive effects. *Tobacco Control*. 2019; 28(5): 562–567.
9. WHO Regional Office for Europe. Health behavior among young people. Copenhagen, 2020.
10. Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance System. Atlanta, 2021.
11. Dawkins L., Turner J. Electronic cigarettes and stress regulation. *Psychopharmacology*. 2021; 238(8): 2141–2150.
12. Farsalinos K. Electronic cigarettes: health effects and regulation. *Therapeutic Advances in Drug Safety*. 2018; 9(6): 319–329.



13. Grana R., Benowitz N. E-cigarettes: scientific review. *Circulation*. 2019; 129(19): 1972–1986.
14. Patel D., Tinggen M. Smoking behaviors among university students. *Journal of Adolescent Health*. 2020; 67(1): 112–118.
15. European Commission. Attitudes of Europeans towards tobacco and e-cigarettes. Brussels, 2020.
16. WHO. Global strategy on health promotion for young people. Geneva, 2021.
17. Kandel D., Kandel E. A molecular basis for nicotine as a gateway drug. *New England Journal of Medicine*. 2014; 371: 932–943.
18. Viner R., Ozer E. Adolescence and health behavior. *The Lancet*. 2018; 379: 1641–1652.
19. Currie C., Morgan A. Social determinants of health in youth. *Health Policy*. 2020; 124(5): 497–504.
20. Bonell C., Fletcher A. School-based health interventions. *BMJ*. 2019; 365: 1192.
21. Ministry of Health of Uzbekistan. National program on healthy lifestyle promotion. Tashkent, 2020.
22. Youth Agency of Uzbekistan. Analytical report on youth health behavior. Tashkent, 2023.
23. Andijan State Medical Institute. Student health monitoring report. Andijan, 2024.
24. Temirova D.U., Chiftchi Z.A. Determining morbidity indicators in female students of fertile age during a medical examination at primary care. *International Multidisciplinary Journal for Research & Development*. 2024; 11(11): 37–43.
25. Temirova D.U. Behavioral risk factors and functional health indicators among students. *Regional Medical Journal*. 2023; 4(2): 56–62.