ORIGINAL ARTICLE

Perception of Vapor Products & Its Impact on General Health Among Healthcare and Non-Healthcare Students

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Abstract

Background: The use of vapor products such as vapes, e-cigarettes, and sheesha are gaining popularity and is of global concern owing to its possible health implications. Despite their marketing claiming otherwise, these products are linked with serious health problems like respiratory issues, cardiovascular diseases, and even several oral complications. This study aims to explore the perception of vapor products and their perceived health effects among health care and non-health care students.

Materials and Methods: To evaluate the attitudes of healthcare and non-healthcare students, a comparative cross-sectional survey was carried out with ethical approval and informed consent for the use of vapor products and their apparent negative effects on health. A convenience sample of 635 participants was enlisted. Data were gathered using a structured questionnaire with content reliability of 0.762 which included demographic information, vapor product usage, perceived health risks, and knowledge sources. The responses were analyzed using SPSS version 20.

Result: A total of 635 participants were included (195 males, 440 females), aged 18–35 years (mean = 21.48). Most were undergraduate students (91%), with only 9% pursuing postgraduate education. Vaping was far more prevalent among non-healthcare students (n = 119) than healthcare students (n = 69) ($p < 0.01$). Perceptions of harm varied: healthcare students predominantly viewed e-cigarettes as equally harmful to regular cigarettes, whereas non-healthcare students considered them more harmful. The difference in perceived addictiveness of e-cig over regular cigarettes was statistically significant ($p = 0.01$). Overall, 80% believed that accessing cigarettes or vapes was easy for youth. The most common reasons for initiating vape use were stress or depression (n = 213), smoking cessation (n = 194), and peer pressure (n = 106). Most users reported no change in physical health; however, sore or dry mouth/throat was the most frequent adverse effect ($p < 0.01$).

Conclusions: While familiarity with vapor products was widespread, a significant knowledge gap and negative perceptions prevailed among the study population. Comparing healthcare students to their non-healthcare peers, the former showed a greater awareness of the possible risks.

Keywords: *Vapor products, Vapes, e-cigarettes, Sheesha, Perception, General health, Healthcare students, Non-healthcare students, Gender.*

Introduction

The term Waterpipe Tobacco Product (WTPP) is commonly used by the World Health Organization and other health organizations to refer to both Sheesha (hookah) and e-cigarette products. Other terms used for these products include "Nicotine Delivery Systems", "Alternative Nicotine Products", "Tobacco Harm Reduction Products (THRP)" and "Vapor Products". The use of electronic nicotine delivery systems (ENDS), including e-cigarettes, vapes and sheesha has surged in recent years, especially in Pakistani society, where sheesha lounges and vaping culture have gained popularity among young adults.[1]

Although e-cigarettes are advertised as a safer alternative to traditional cigarettes, their popularity has risen significantly. [2] However, recent studies indicate that these products pose serious health risks including respiratory damage, cardiovascular complications and deterioration of oral health. [1,3,4] Nicotine is a highly addictive substance present in most vapor products and contributes to dependence symptoms, withdrawal symptoms and difficulty quitting. It can impair cognitive function, raise blood pressure, increase heart rate and raise the risk of ischemic heart attack and stroke. Additionally, studies suggest that early nicotine exposure may alter brain development, increasing susceptibility to addiction and behavioral changes.

In addition, the health implications of vapor products extend beyond nicotine addiction. Vapor product use -associated lung injury (VAPLI) is a severe condition

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characterized by lung inflammation and damage with symptoms such as coughing, chest pain and breathing difficulties. Additionally, vaping adversely affects oral health by inducing hyposalivation, leading to tissue dryness which foster conditions conducive for caries, periodontal disease, and other oral health complications. Long-term use has also been associated with gum inflammation, tooth discoloration and an increased risk of oral infections.

Despite increasing awareness of the harmful effects of vaping, misconceptions persist, and many users still view these products as less harmful than traditional cigarettes. [5] Healthcare students may have a better understanding of the health implications of vapour products compared to non-healthcare students due to their academic exposure. However, research comparing risk perception between these two groups remains limited. Knowing these differences can help develop targeted awareness campaigns and public health strategies to address vaping-related health risks.

This primary aim of this study is to investigate the perception of vapor products (vapes, sheesha, and e-cigarettes) and their perceived impact on general health among healthcare and non-healthcare students. By comparing these two groups, this research seeks to assess awareness, risk perception, and attitudes toward vapor product use. Findings from this study may contribute to public health efforts by identifying gaps in knowledge and promoting better education on the health risks associated with vaping.

Material and Methods

We carried out an observational, cross-sectional study in June 2024 to see how healthcare and non-healthcare students viewed vapor products and their perceived health effects. To keep things practical (and within budget), we used a convenience sampling method. With this, we were able to reach a decent number of students across several universities in a short time. Of course, we know this method has its drawbacks—students who were easier to approach or more willing to join are more represented, which could skew the findings. Others, who might have different views but were harder to reach, may not be reflected here. We acknowledged these limitations while interpreting the results.

Altogether, 635 students aged 18 to 35 (average age around 21) from FUSH, FURC, NUST, Bahria University, and Comsats participated in the study. This gave us a reasonably diverse mix. Roughly 62% were healthcare students, and the rest (about 38%) were non-healthcare students. To be included, participants had to be enrolled in a university and willing to give consent. Anyone who refused or submitted incomplete answers was excluded.

Ethical approval was obtained from the Institutional Review Board (approval no. FF/FUMC/215-456-1 phy/24). Before joining, students were briefed that participation was voluntary, their answers would stay anonymous, and they could withdraw at any time with no consequences.

For data collection, we used a structured questionnaire adapted from earlier validated surveys on vaping behaviors and perceptions. [23] Experts in oral pathology and public health reviewed it to check if the content was relevant and locally appropriate. We made some small changes—like adding sheesha alongside e-cigs and vapes—so it felt more relatable. To test clarity, we ran a pilot study with a small student group. Their feedback helped us fix any confusing parts of the questionnaire. The final version showed good internal consistency, with a Cronbach's alpha reliability score of 0.762, indicating that the questionnaire items reliably measured the intended constructs.

The questionnaire had three parts:

1. **Demographics** – age, gender, educational background, and smoking/vaping history.

2. **Knowledge & Perceptions** – awareness, health risk perceptions, and views on addiction potential.

Usage Patterns & Accessibility – how often they used, how easy it was to access, and reasons for starting (stress relief, quitting cigarettes, peer pressure, etc.).

It was originally in English and translated into Urdu for accessibility.

Data were analyzed using SPSS version 20. We used descriptive stats (frequencies, percentages) for summaries, and the Chi-square test of independence (χ^2) to check associations between categorical variables. Results were reported with Chi-square statistic (χ^2), degrees of freedom (df), and *p*-value, with statistical significance set at $p < 0.05$. Where it was necessary, we used Supplementary analyses to strengthen interpretation.

Results

A total of 635 participants were included in the study. The gender distribution was 195 males (31%) and 440 females (69%). The participants' ages ranged from 18 to 35 years, with a mean age of 21 years. Among them, 91% (n=578) were undergraduate students, and 9% (n=57) were postgraduate students. Field of study distribution showed that 38% (n=242) were non-healthcare students, while 62% (n=393) were from healthcare backgrounds.

Almost 89% (n=566) of participants were aware of e-cigarettes, vapes, and sheesha. Awareness of the harmful ingredients in these products was reported by 67.2% (n=427), while 32.8% (n=208) were unaware. Regarding the perceived dangers of tobacco products, 90% (n=572) agreed that all tobacco products are dangerous. Social acceptability of vaping was noted by 40% (n=254), whereas 59.4% (n=377) did not consider vaping to enhance social status.

Among the participants, 29.4% (n=187) had used vape/e-cigarettes/sheesha, while 70.6% (n=448) had never used these products. Vaping was significantly

more common among non-healthcare students (49.1%, n=119) compared to healthcare students (17%, n=67).

Regarding product preference, 72.8% (n=462) reported no use of any tobacco products, 1.8% (n=11) used sheesha, 6.6% (n=42) were dual/multi-users, 7.4% (n=47) smoked regular cigarettes, and 11.8% (n=75) exclusively used vapes.

The primary reasons for initiation included quitting smoking, followed by stress (Figure 1). Accessibility to vaping products was not considered a barrier, as 80% (n=508) reported that it was easy to purchase these items.

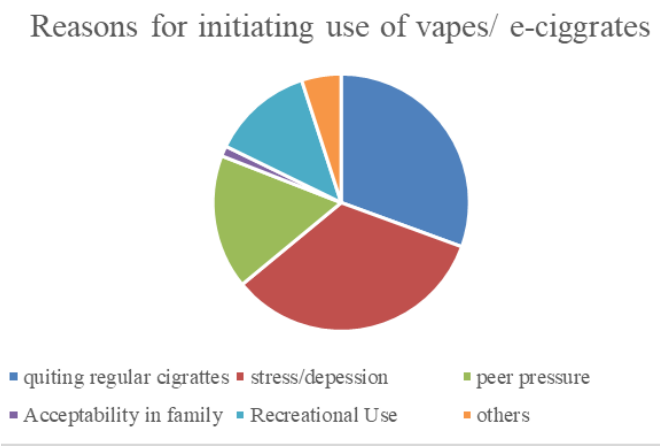

Figure 1: Reasons for initiation

Regarding the perceived harm of e-cigarettes compared to regular cigarettes, 35% (n=223) believed e-cigarettes were more harmful, 41% (n=263) thought they were equally harmful, and 23% (n=149) considered them less harmful. Additionally, 75% of healthcare and 80% of non-healthcare students perceived e-cigarettes to be equally harmful as regular cigarettes. The Chi-square test revealed no statistically significant difference ($p > 0.05$)

Participants' perceptions of the addictiveness of e-cigarettes compared to regular cigarettes was found significant between healthcare and non-healthcare students ($p = 0.01$). Detailed responses are presented in Table 1

Table 1: Addiction of e-cigarettes to regular cigarettes

		How addictive are e-cigarettes to regular cigarettes			Total	Chi-square P – value
		More	Equal	Less		
Category	Health care students	167	80	46	393	0.01
	Non-Health care students	115	84	43	242	
Total		282	264	89	635	

A sore or dry mouth or throat was the most often reported side effect (p-value < 0.01) Figure 2; however, most vapers reported no change in their physical condition. Moreover, physiological changes were also observed as worsened, improved or same and are shown in figure 3.

Discussion

This Knowledge, Attitudes, and Practices (KAP) survey provides constructive information about vaping patterns, beliefs, and related health risks among young adults between the ages of 18 and 35. The findings point to significant differences in vaping prevalence, risk evaluations, and e-cigarette accessibility between students majoring in healthcare profession and those not.

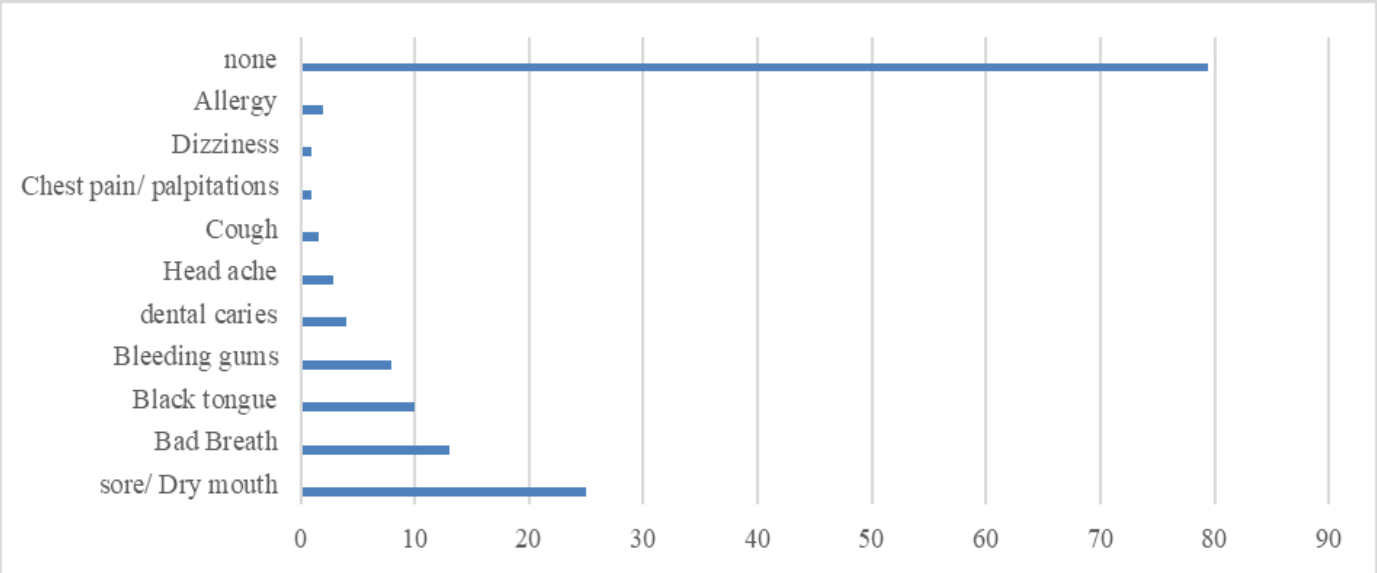

Figure 2: Reported Side Effects

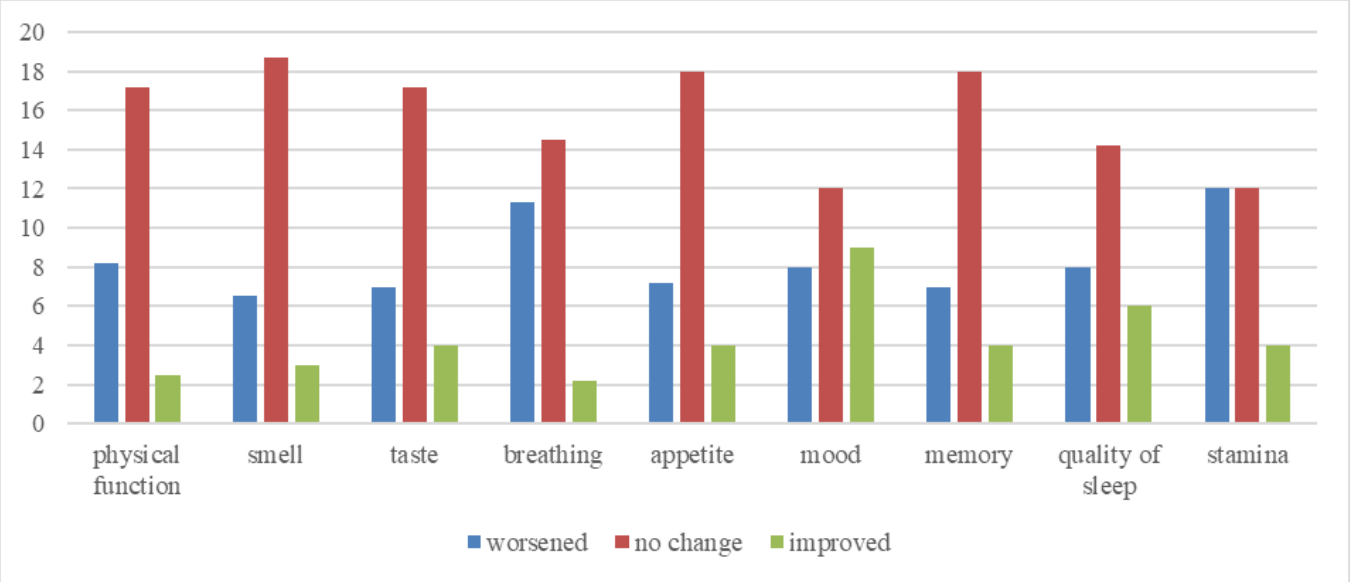

Figure 2: Reported Side Effects

Knowledge of Vaping (WTPP) and Associated Risks: The study shows that healthcare and non-healthcare students had different levels of awareness about the dangers of vaping. Of the students, 29% have used or are currently using vape, sheesha, or e-cigarettes (WTPP), and 87% were aware of what it is. 67.2% knew what the compounds and components in WTPP were. Students studying medicine showed a more thorough comprehension of the possible risks, including addiction and long-term health effects. This is consistent with earlier research indicating that formal health sciences education raises knowledge of the adverse effects of tobacco use. [6] Nonetheless, the mistaken belief of many participants that e-cigarettes are more unsafe in comparison to conventional cigarettes points out the need for a balanced and effective public health messaging. [7]

Attitudes toward Vaping and Harm Perceptions:

According to the study's findings, most participants thought e-cigarettes were just as addictive as regular cigarettes ($p < 0.05$) which is in line with research showing that nicotine addiction from vaping is like that from traditional cigarettes. [8] 90% of the student's perception aligns to the statement that "All Tobacco Products Are Dangerous", while 91% agreed to the question that people harm themselves by using WTPP. Furthermore, according to 80% of non-healthcare students and 75% of healthcare students, e-cigarettes are more dangerous than traditional cigarettes. This exaggerated assessment of damage runs counter to data showing that, although e-cigarettes are not innocuous, they often expose users to fewer harmful substances than traditional cigarettes. [9] The attitude gap between students studying healthcare and those who are not lends more credence to the idea that educational background influences how people perceive danger.

Practices and Prevalence of Vaping: In line with earlier studies suggesting that students without formal health education may be more vulnerable to e-cigarette use, vaping was shown to be substantially more prevalent among non-healthcare students. [10] The mean age of 21 years indicates that the majority of vaping starts in early adulthood, a phase characterized by experimentation with substances, including nicotine. [11],[12] 40% of students agreed when asked if vaping or e-cigarettes make young people feel "fit in", "cool "and become socially more acceptable.47% of the students claimed that they are surrounded by those who advocate vaping. Furthermore, according to 80% of participants, buying cigarettes or vapes was not difficult, highlighting the items' broad accessibility despite legal prohibitions. [13] The ease of access[14] [15]could encourage long-term use and help explain why it's becoming more common among young adults. [11]

Reasons for Vaping Initiation and Sustained Use:

Stress, despair, and attempts to stop smoking were the most common reasons for starting to vape (30%). Recreational usage (12.8%) and peer pressure (16.9%) are additional causes. This is in line with studies that indicate people view e-cigarettes as a smoking cessation aid as well as a coping strategy for psychological distress. [16,18] Dual usage and relapses into traditional smoking are still problems, despite some evidence supporting the effectiveness of e-cigarettes as a harm reduction method. [19] The necessity for integrated mental health interventions to address the psychological aspects influencing e-cigarette use is highlighted by the substantial correlation found between stress and the commencement of vaping.

Health Effects and Reported Symptoms: The most often reported side effect was a sore or dry mouth or throat ($p < 0.01$), despite the fact that the majority of vape users in the study did not report any significant changes in their physical health. These results are consistent with earlier studies showing that e-cigarette users have comparable short-term respiratory and mouth health effects. [5]35% of students believed that e-cigarettes were more toxic than tradi-

tional cigarettes, while 41% of students believed that both were equally harmful. The underestimate of long-term hazards may be a result of young individuals' lack of severe reported health difficulties. But new research indicates that long-term e-cigarette usage may increase the risk of heart disease and lung problems [5,20], calling for constant observations and longitudinal studies. [4,21,22]

Public Health and Policy Implications: The findings of this KAP study have a number of ramifications for education and public health policy. First, more stringent enforcement of age restrictions and retail compliance procedures is necessary due to the broad accessibility of vaping goods despite current rules. Second, focused educational initiatives should be created to dispel myths regarding the relative risks of smoking and vaping, making sure that both medical and non-medical students are given fact-based information. Third, it's critical to incorporate mental health assistance into preventative initiatives because of the substantial correlation between stress and the commencement of vaping. Lastly, to evaluate the success of programs meant to lower the prevalence of vaping among young adults, more study and policy monitoring are required.

Comparable findings have been reported in the South Asian region and beyond. A Pakistani survey among medical undergraduates highlighted limited awareness of the long-term health consequences of e-cigarettes, aligning with our observation of knowledge gaps despite high usage trends. [23]Similarly, an Indian study demonstrated that although students recognized potential risks, misconceptions regarding reduced harm compared to conventional smoking were widespread. [24]Research from Bangladesh echoed these concerns, noting that while awareness of harmful effects existed, social influences and peer acceptance played a significant role in sustaining use. [25] In contrast, a European study reported higher levels of awareness regarding the addictive potential of vaping, yet even there, a substantial proportion of university students perceived it as a “safer” alternative. [26] Together, these findings emphasize that despite geographical and cultural differences, misconceptions about the safety of vapor products are consistently observed across regions.

Limitations and Future Research Directions

There are several restraints on this study. The cross-sectional design prevents causal conclusions about vaping behaviors and perceptions. Furthermore, the use of self-reported data raises the risk of social desirability and recall bias. Longitudinal approaches should be used in future studies to investigate how vaping practices, attitudes, and knowledge evolve over time. The effect of focused educational initiatives on lowering the prevalence of vaping should also be assessed in future research, especially with regard to non-healthcare students who might not be as familiar with the hazards associated with vaping. The use of convenience sampling may introduce selection bias, potentially limiting the generalizability of the findings. Additionally, the self-reported nature of the questionnaire may lead to recall bias or social desirability bias, where participants may underreport or over report certain behaviors based on perceived societal expectations.

Conclusion

This study, which is a KAP, identifies significant disparities between healthcare and non-healthcare students' vaping practices, attitudes, and knowledge. The general prevalence of e-cigarette usage is still a public health problem, even though healthcare students showed a higher awareness of the risks associated with vaping. Enhancing accurate understanding, addressing stress-related vaping behaviors, and strengthening regulatory enforcement to restrict accessibility should be the main goals of interventions. Future studies should examine the long-term health effects of vaping as well as the efficacy of policy-driven and educational initiatives in reducing young adults' use of e-cigarettes.

CONFLICT OF INTEREST: **None**

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Author Contributions

1. **Maham Azeem:** Conception and design of study, data collection.
2. **Mahnoor Dawood:** Data analysis and interpretation, drafting of manuscript.
3. **Nadia Zaib:** Literature review and data acquisition.
4. **Muhammad Wajahat Ghafoor:** Critical revision and supervision.
5. **Fakeha Meraj Ansari:** Data entry and statistical analysis.
6. **Sidra Ghayas:** Proofreading and final approval of the manuscript.