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Lived experiences and cardiovascular perceptions of E-Cigarette users in Peshawar, Pakistan: A Phenomenological Exploration.

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Abstract

Background: The rapid rise in electronic cigarette (e-cigarette) use in Pakistan, particularly in urban centers such as Peshawar, has generated increasing concern regarding potential cardiovascular risks. While e-cigarettes are promoted as a harm-reduction tool for smokers, their long-term cardioprotective or cardiotoxic effects remain unclear, especially within South Asian populations. Understanding how users interpret these risks is essential for guiding public health action. The aim was to explore the lived experiences, perceptions, and cardiovascular health concerns of adult e-cigarette users in Peshawar, Pakistan.

Methodology: A qualitative phenomenological design was employed. Twelve adult e-cigarette users were purposively selected and interviewed using semi-structured interviews conducted in the local language. Audio-recorded interviews were transcribed verbatim and analyzed using Braun and Clarke's six-phase thematic analysis framework.

Results: Five key themes emerged: (1) perceived harm-reduction and control, (2) awareness and experiential physical changes, (3) ambivalence toward cardiovascular symptoms, (4) social acceptance and normalization of vaping, and (5) uncertainty and the need for credible information. Although many participants reported improved breathing or stamina, several simultaneously described symptoms such as palpitations or chest discomfort. A statistically significant association was found between cardiovascular symptoms and perceived physical improvement, indicating that users without symptoms were more likely to feel physically better.

Conclusion: Participants generally viewed vaping as a safer alternative to smoking but remained uncertain about its long-term cardiovascular effects. The coexistence of perceived benefits and emerging symptoms highlights the need for clearer clinical guidance and locally relevant health education.

Keywords

E-Cigarettes, Cardiovascular Health, Harm Reduction, Public Health, Pakistan.

Introduction

Electronic cigarettes (e-cigarettes) have rapidly gained popularity in recent years, particularly among younger adults, and are widely promoted as a modern alternative to traditional tobacco smoking. Their appeal is often rooted in the perception that they are less harmful and more socially acceptable than combustible cigarettes. This rise in e-cigarette use has been strongly influenced by marketing narratives positioning vaping as a cleaner, lower-risk method of nicotine consumption and smoking cessation[1]. However, global public health experts have increasingly expressed concerns regarding the cardiovascular effects of long-term e-cigarette use. In Pakistan, clinicians at the Health Services Academy, Islamabad, have observed a growing influx of individuals who have transitioned from cigarettes to vaping, yet their cardiovascular outcomes remain unclear. Exploring the lived experiences of such users can provide crucial insight into how these risks are perceived within the local sociocultural context of Peshawar.

Cardiovascular diseases (CVDs) remain the leading cause of mortality globally, with tobacco smoking recognized as a major modifiable risk factor[2]. Well-established evidence links traditional cigarette smoking to coronary artery disease, myocardial infarction, and stroke[3]. Although e-cigarettes have been marketed as a safer alternative, research suggests that they still deliver nicotine and other potentially harmful constituents that may contribute to endothelial dysfunction, oxidative stress, inflammation, and other cardiovascular complications[4]. Despite this biological plausibility, many users continue to view e-cigarettes as significantly less harmful than conventional smoking, leading to misconceptions about their true cardiovascular impact[1]. This highlights the importance of investigating how users interpret and internalize these risks.

Emerging literature indicates that nicotine inhaled through e-cigarettes can elevate blood pressure, increase heart rate, and impair vascular elasticity factors known to elevate CVD risk[5]. Additional studies have associated e-cigarette use with oxidative imbalance and vascular inflammation, suggesting that vaping may contribute to hypertension, atherosclerosis, and other cardiovascular pathologies[2,6]. While international evidence continues to grow, Pakistan faces a scarcity of country-specific research exploring the cardiovascular implications of e-cigarettes, despite rising use among urban youth[7]. In Peshawar, the sharp increase in vaping practices necessitates examination of how these users understand, interpret, and respond to cardiovascular health signals.

Many e-cigarette users in Pakistan believe vaping to be a safer option than smoking, largely due to reduced odor, perceived cleaner vapor, and targeted online marketing[6]. However, recent evidence challenges this assumption, demonstrating that e-cigarettes can still release toxic compounds capable of affecting cardiac function[8]. These biological mechanisms raise questions about long-term safety. Moreover, although e-cigarettes are positioned as smoking cessation tools, evidence remains mixed regarding their sustained effectiveness, with many users employing them in dual-use patterns alongside cigarettes[10].

Given the rapid uptake of vaping in Pakistan and the limited understanding of its cardiovascular risks, there is a critical need for local evidence to inform clinical and public health practice. Lack of awareness, inconsistent clinical guidance, and misinformation serve as barriers to effective cardiovascular risk reduction among e-cigarette users[11]. Understanding users' lived experiences especially their interpretations of cardiovascular symptoms and perceived health changes can provide valuable insights for targeted health education and culturally adapted interventions.

This study therefore aims to explore the lived experiences and perceptions of e-cigarette users in Peshawar regarding their cardiovascular health. By capturing users' personal narratives, the research seeks to illuminate how individuals interpret harms, benefits, uncertainties, and social influences surrounding vaping. These findings can contribute

to the development of tailored health communication strategies and guide policy efforts aimed at reducing vaping-related cardiovascular risks in Pakistan.

Methodology

Study Design

This study utilized a qualitative phenomenological design to explore the lived experiences, perceptions, and cardiovascular health concerns of adult e-cigarette users. A phenomenological approach allowed researchers to capture in-depth personal narratives and subjective interpretations of vaping-related health changes.

Through semi-structured, one-to-one interviews, the study emphasized depth rather than breadth, ensuring a rich understanding of the emotional, physiological, and behavioral meanings that participants attached to their vaping experiences.

Ethics

Ethical approval was granted by the Ethical Research Committee of the Health Services Academy, Islamabad (Ref# RO-346/2025/HAS-PGDHPE-II dated 27th October 2025). All procedures followed the ethical principles of the Declaration of Helsinki, including respect for persons, beneficence, confidentiality, and voluntary participation.

Written informed consent was obtained prior to interviews, and participants were informed of their right to withdraw at any point without consequences. Data confidentiality was ensured through anonymization of transcripts and secure storage of audio recordings.

Setting

The study was conducted at the Health Services Academy (HSA), Islamabad, which was selected due to its increasing number of adult e-cigarette users seeking health guidance, particularly regarding cardiovascular symptoms. Interviews were conducted in a private setting to ensure comfort, confidentiality, and free expression. Data collection took place between September 1, 2025, and October 20, 2025.

Participants

A total of twelve adult e-cigarette users were recruited using purposive sampling. Eligible participants were between 18 and 40 years old, regular e-cigarette users for at least six months, and willing to articulate their vaping - related perceptions and cardiovascular concerns. Individuals with a history of major cardiovascular disease prior to initiating e-cigarette use or those who had exclusively smoked cigarettes without vaping experience were excluded. This selection ensured that participants could meaningfully reflect on vaping-specific experiences without confounding health histories.

Variables

The primary variables of interest were subjective perceptions and lived experiences related to e-cigarette use and cardiovascular health. These included:

- Perceived physical changes (e.g., stamina, breathing, chest discomfort, palpitations)
- Perceived harm-reduction beliefs
- Social and familial influences on vaping
- Awareness of cardiovascular risks
- Perceived safety compared to traditional cigarettes

These variables emerged through participant narratives and were analyzed using thematic coding. For triangulation, simple quantitative variables such as age, duration of vaping, and presence/absence of cardiovascular symptoms were also noted.

Data Sources/Measurement

Data were collected through semi-structured, in-depth interviews conducted in the participants' native language to maximize clarity and emotional expression. Interviews lasted 30–60 minutes and were audio-recorded with consent. Verbatim transcription was carried out, followed by manual verification using audio playback. A structured interview guide captured motivations for vaping, perceived physiological changes, awareness of cardiovascular effects, and social influences. Measurement of variables relied on thematic

coding of the narratives using Braun & Clarke's six-phase analysis framework. Additionally, simple descriptive demographic data were recorded.

Bias

Several strategies were implemented to minimize bias. Purposive sampling ensured inclusion of participants with relevant vaping experience, but researchers also maintained reflexivity through analytic memos and audit trails to reduce interpretive bias. Conducting interviews in the native language minimized interviewer–participant communication bias. Triangulation across transcripts, consistent coding procedures, and independent code checking strengthened analytic credibility. Researcher reflexivity was maintained throughout to avoid imposing preconceived interpretations on participant narratives.

Study Size

A sample size of twelve participants was deemed adequate based on phenomenological research standards, which emphasize data saturation rather than statistical power. Saturation was achieved when no new themes emerged across interviews, confirming that the sample size was sufficient to capture diverse perspectives of local vaping experiences and cardiovascular concerns.

Quantitative Variables

Although the study was primarily qualitative, basic quantitative variables were also recorded, including participant age, years of e-cigarette use, and presence of cardiovascular symptoms (e.g., palpitations, chest discomfort). These variables supported descriptive profiling and facilitated an exploratory Chi-square analysis examining associations between cardiovascular symptoms and perceived physical improvements.

Statistical Methods

Descriptive statistics (mean and standard deviation) were used to summarize demographic variables. Thematic analysis followed Braun and Clarke's six-phase process, combining inductive and deductive coding. To complement the qualitative findings, an exploratory Chi-square test assessed the relationship between self-reported cardiovascular symptoms and perceived physical improvements after switching to e-cigarettes. A statistically significant p-value (0.020928) indicated a meaningful association. All analyses were performed to enhance triangulation and strengthen interpretive rigor, despite the study's qualitative foundation.

Results

Participants

A total of twelve adult e-cigarette users participated in this study. All participants were purposively selected based on their regular use of e-cigarettes for at least six months and their ability to reflect on their vaping-related cardiovascular experiences. Interviews took place between September 1 and October 20, 2025, at the Health Services Academy, Islamabad. All participants completed the interview process without withdrawal. Their narratives provided rich and detailed insights into the physiological, emotional, and social dimensions of vaping, particularly regarding cardiovascular health.

Descriptive Data

The demographic profile of participants showed a mean age of 28.5 years (SD = 4.13), reflecting a predominantly younger adult user base. The average duration of e-cigarette use was 2.4 years (SD = 1.14), indicating sustained engagement with vaping. Participants represented a diverse range of vaping patterns, nicotine strengths, and exposure histories. Many had transitioned from conventional cigarettes to e-cigarettes, while others began vaping as their first nicotine-related behavior. Basic descriptive variables revealed a mixture of perceived physical improvements such as easier breathing or improved stamina and recurring symptoms including occasional palpitations or mild chest discomfort.

Outcome Data

Qualitative thematic analysis produced five major themes that captured how individuals made sense of vaping in relation to cardiovascular health: (1) perceived harm reduction and control, (2) awareness and experiential physical changes, (3) ambivalence toward cardiovascular symptoms, (4)

social acceptance and normalization of vaping, and (5) uncertainty and need for credible health information. Alongside these qualitative outcomes, an exploratory Chi-square test was conducted to examine the association between cardiovascular symptoms and participants' self-reported physical improvements after switching to e-cigarettes. The analysis showed a statistically significant association ($p = 0.020$), suggesting that individuals without cardiovascular symptoms were more likely to perceive physical improvements, while those experiencing palpitations or chest discomfort tended to report less improvement.

Main Results

The findings revealed a complex interplay between perceived benefits and emerging health concerns. Most participants believed e-cigarettes to be a harm-reduction tool and described noticeable improvements in breathing, stamina, and overall physical comfort after switching from traditional cigarettes.

However, the presence of cardiovascular symptoms particularly palpitations created uncertainty and ambivalence among users, prompting many to question the long-term safety of vaping. Social factors also played a strong role, as users reported that vaping was more socially accepted, less stigmatized, and increasingly normalized in their peer circles. Despite this normalization, participants expressed frustration over inconsistent or unclear guidance from healthcare providers, emphasizing a strong need for credible and standardized information regarding cardiovascular risks. The combination of thematic findings and statistical analysis highlights that while perceived short-term benefits exist, cardiovascular concerns remain a significant and unresolved issue among e-cigarette users.

Table 1: Baseline demographic characteristics.

Variables	Mean ± SD
Age (Years)	28.50 ± 4.13
Duration of E-Cigarette Use (Years)	2.40 ± 1.14

Table 2: Cardiovascular risk factors and comorbidities.

Cardiovascular Symptom Category	No Physical Improvement (n)	Reported Improvement (n)	p-value
Chest Discomfort	2	0	<0.05*
No Symptoms	0	5	<0.05*
Palpitations	1	4	<0.05*

*p<0.05 is considered statistically significant.

Table 3: Summary of Major Themes Identified in Thematic Analysis.

Theme	Description
Perceived Harm Reduction & Control	Users believe e-cigarettes reduce harm and offer greater control over nicotine intake.
Awareness and Experiential Physical Change	Participants report improved breathing and stamina but remain uncertain about long-term cardiovascular effects.
Ambivalence Toward Cardiovascular Symptoms	Users notice palpitations or chest discomfort but often normalize these symptoms.
Social Acceptance and Normalization	Vaping is perceived as socially acceptable and less stigmatizing than smoking.

Uncertainty and Need for Credible Information	Users report conflicting medical advice and desire clearer guidance.

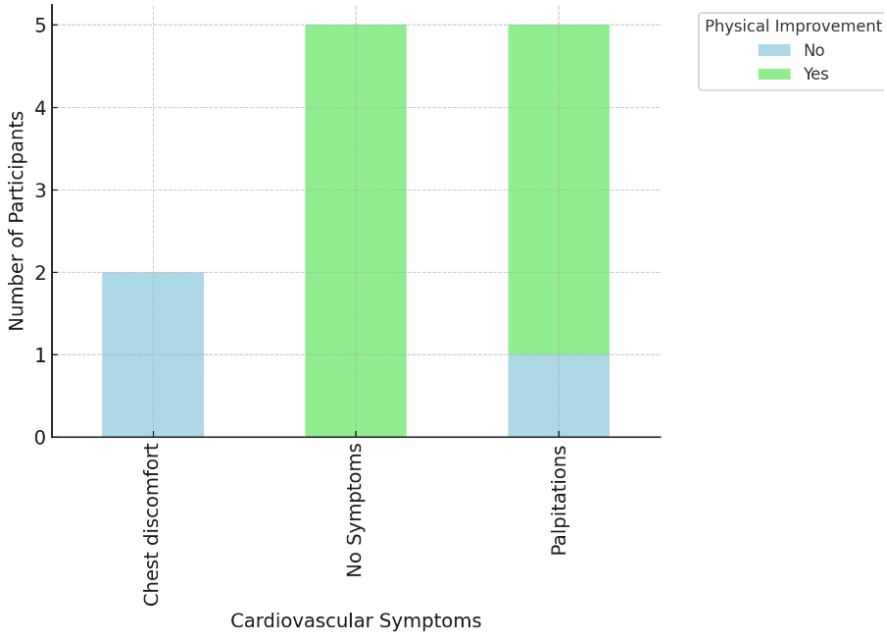

Figure 1: Cardiovascular Endorsements vs. Cardiovascular Improvement

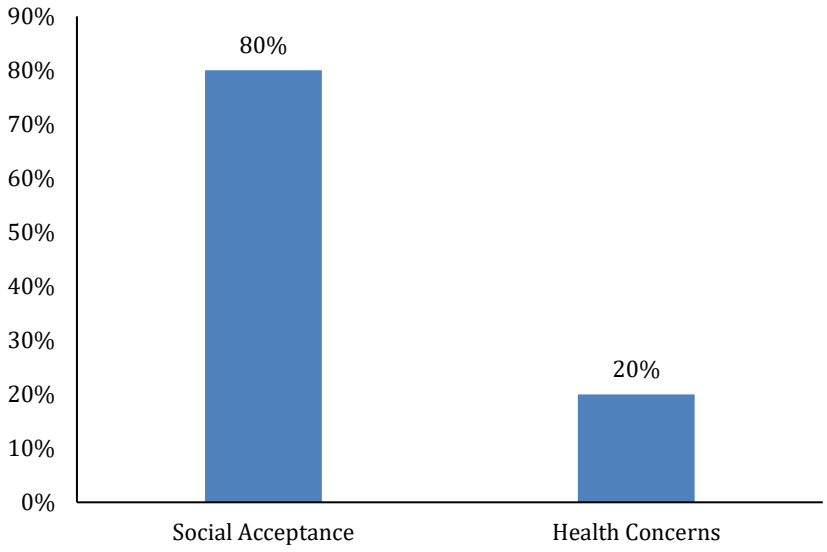

Figure 2: Social Acceptability and Health Issues.

Discussion

This study explored the lived experiences and cardiovascular health perceptions of e-cigarette users in Peshawar, Pakistan. Five prominent themes emerged perceived harm reduction and control, awareness and experiential physical changes, ambivalence toward cardiovascular symptoms, social acceptance and normalization, and a strong desire for trustworthy health information. Together, these themes reflect the complex and

often contradictory perceptions that characterize e-cigarette use in this population.

Consistent with global literature, many participants viewed e-cigarettes as a harm-reduction tool, noting improvements such as reduced coughing, easier breathing, and enhanced stamina after switching from combustible cigarettes[1]. Similar perceptions of relative safety have been widely reported among e-cigarette users internationally [6]. However, despite these perceived benefits, participants also described experiencing cardiovascular symptoms including palpitations and chest discomfort which they often struggled to interpret. The coexistence of perceived physical improvement and episodic symptoms created a sense of uncertainty regarding the long-term cardiovascular effects of vaping.

The statistically significant association between cardiovascular symptoms and reduced perception of physical improvement underscores this ambivalence. Users without symptoms were more likely to report feeling physically better, whereas those with symptoms expressed confusion and concern. These findings align with existing evidence showing that e-cigarettes may still contribute to oxidative stress, endothelial dysfunction, and altered cardiovascular physiology, despite being perceived as "safer" alternatives[2,5,8].

International research has similarly reported associations between e-cigarette use and increased cardiovascular risk. A U.S. study by Vindhyal et al. found higher rates of myocardial infarction among adult e-cigarette users[3], while European studies have emphasized the need for caution due to emerging evidence of long-term cardiovascular harm[4]. Although results vary across settings, the direction of concern remains consistent. The present study reinforces that these global findings may also carry relevance for Pakistani users.

At the same time, the local context adds nuance. Social acceptance emerged as a strong driver of continued vaping. Participants noted that vaping is less stigmatized than cigarette smoking, often perceived as trendy or socially favorable. Family and peer influences played important roles in shaping behavior, a pattern distinct from Western contexts where vaping is often framed through individual choice rather than collective norms. This sociocultural dimension highlights the importance of localized prevention strategies.

Another key finding was the widespread dissatisfaction with inconsistent or unclear medical guidance. Participants frequently encountered conflicting information from healthcare professionals, leading to further uncertainty. Given that research from Pakistan on e-cigarettes remains limited[7,13,14], this inconsistency is understandable but concerning. Healthcare providers may lack adequate training or local evidence to confidently counsel patients about cardiovascular risks. Strengthening clinician education and creating locally relevant guidelines could significantly improve patient understanding. The findings emphasize that while short-term perceived benefits of vaping may encourage adoption and continued use, emerging symptoms, sociocultural influences, and inconsistent health messaging shape a complicated risk narrative. This underscores the urgent need for longitudinal studies examining cardiovascular outcomes in Pakistani e-cigarette users, as global evidence may not fully account for local patterns of use, dual-use behaviors, or regional health disparities.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the sample size was small (n = 12), which is appropriate for phenomenological research but limits generalizability to the broader population of e-cigarette users in Pakistan. Larger samples across different regions would provide more representative insights. Second, because the study design was qualitative and cross-sectional, it cannot establish causal relationships or capture long-term cardiovascular changes associated with vaping. Longitudinal designs are necessary to track symptom progression and clinical outcomes over time. Third, data were based on self-reported experiences, which may be affected by recall bias,

social desirability, or underreporting of symptoms. Incorporating objective measures such as blood pressure, heart rate variability, or biomarkers of inflammation would strengthen future research. Additionally, while thematic analysis offers depth, interpretation may be influenced by researcher subjectivity despite efforts to maintain reflexivity and analytic rigor. Finally, the study was conducted at a single institution in Islamabad and may not fully reflect the diverse sociocultural factors influencing vaping in other Pakistani settings.

Conclusion

This study highlights important insights into how e-cigarette users in Peshawar perceive their cardiovascular health. While many participants described short-term physical improvements and viewed vaping as a safer alternative to smoking, several reported cardiovascular symptoms such as palpitations and chest discomfort, contributing to uncertainty about long-term safety. The significant association between cardiovascular symptoms and lower perceived improvement reinforces the need for caution and further investigation.

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