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SMOKING: LEGAL BUT DEADLY - THE EPIDEMIC OF THE CENTURY

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Abstract: Smoking is a disease that affects all age groups in the population, reflecting the high morbidity and mortality rates worldwide. Over the years, different types of cigarettes have emerged, attracting mainly young people. This relationship contributes to the increase in symptoms and predisposition associated with Electronic Smoking Devices (ESDs), such as dyspnea, headache, cough and various types of cancer. This study consists of a literature review, in which eight scientific articles were used, as well as information from societies specializing in the subject and websites with generalized data, such as that of the Ministry of Health. Based on the data and results obtained, it can be seen that the habit of smoking, whether conventional or electronic cigarettes, exposes the individual to sequelae that can be irreversible and compromise the health not only of the smoker, but also of the community, since the people around them become passive smokers. Although this drug is considered legal, it is worth reflecting: is it worth keeping up this habit and running the risk of entering the statistics of incidence of neoplasms and contributing to the increase in the mortality rate projected for the century?

INTRODUCTION/ HISTORICAL CONTEXT

In the 20th century, marketing and advertising not only romanticized cigarette use, but also promoted its distribution during world wars, solidifying it as a cultural symbol. Over time, however, the negative impacts of smoking began to be widely recognized and studied. What was previously idealized is now identified as one of the leading causes of global death, representing a serious threat to public health and contributing to a range of diseases, including stroke, respiratory infections and heart complications (Intercom, 2010).

Despite efforts to reduce smoking, the prevalence of active smokers remains alarming, with the diversity of tobacco products expanding and attracting not only adults, but especially young people. The e-cigarette industry, despite legal restrictions, has seen significant growth. In response, Resolution No. 46 of 2009 prohibits the sale of electronic smoking devices (Anvisa, 2009), and Collegiate Board Resolution No. 855 of 2024 maintains the illegality of marketing, distributing, stocking and advertising these products (Anvisa, 2024). However, the consumption of electronic smoking devices (ESDs) continues to grow, especially among young people. The romanticization of smoking habits persists, now manifested in the use of pods, vapes and pen-drives, with claims of lower risk, such as “it’s just vapor with water”, “the taste and smell are pleasant” and “it’s not addictive”. However, regardless of the form of consumption - whether inhaling, inhaling, chewing or smoking - tobacco continues to be addictive due to the presence of nicotine, one of the most consumed substances globally. Smoking, which caused the deaths of more than 100 million people in the 20th century, may be responsible for up to 10 times more deaths in the 21st century, with a significant contribution from ESDs (SBPT, 2022; Ministry of Health, 2022).

METHODOLOGY

This is a descriptive study, a literature review, with analysis of scientific articles in the Scielo, BVS, Pubmed databases, the Robbins and Cotran physiopathology textbook, publications from the Brazilian Pneumology Society, WHO (World Health Organization), PAHO (Pan American Health Organization) and INCA (National Cancer Institute). The descriptors used for data collection were DECS (Health Science Descriptors): smoking; nicotine addiction; passive smoking; electro-

nic cigarette use. With filters, (25) were found in the VHL, (6) SciELO, (5) Pubmed, totaling 36 articles. Of these, articles that did not centrally involve the topic were excluded, leaving 19 articles for analysis and review. The inclusion criteria for information from public access sites, such as the Ministry of Health, PAHO, the Brazilian Society of Pneumology and INCA, were subjects related to the theme of the keywords searched and with a publication year between 2009 and 2024. Exclusion criteria included years of publication other than those mentioned above, data from experiments without references and websites without reliability seals. The preparation of these studies had initial steps: choosing the topic, researching the subject, first reading the abstract and then the full article, completing the full paper and, finally, the abstract with the following parameters: introduction, objective, methodology, results and conclusion.

This study is a descriptive literature review, analyzing scientific articles and other relevant sources. The methodology was conducted according to the following steps:

DESCRIPTORS USED

Descriptors: The following keywords were used according to DeCS (Health Science Descriptors): “smoking,” “vaping” and, as synonymous terms, “electronic cigarette use,” “lung damage” and “electronic nicotine delivery systems or electronic cigarettes.”

SEARCH PROCESS

Search and Filtering: Filters were applied to refine the search, resulting in 26 articles in the VHL, 4 in SciELO and 41 in PubMed, totaling 71 articles.

The filters applied in the VHL were: use of the descriptor “vaping”, selection of full text, LILACS and MEDLINE databases, main subject “tobacco products and vaping”, Portuguese language and publications from

the last 10 years. From this screening, 8 papers were found, of which 2 were selected. Next, when applying the filters with the descriptor “smoking”, the following were selected: full text, LILACS database, main subject “smoking and nicotine”, type of study “qualitative research”, Portuguese language and publications from the last 5 years. This search resulted in 11 papers, of which 1 was used. For the descriptor “lung injury”, 7 articles were found, of which 1 was used, using the following filters: full text, LILACS database, main subject “lung injury, pneumopathies and vaping”, Portuguese language and publications from the last 5 years.

In PubMed, the filters applied were: full and free text, adolescent age group and the term “pod mod”, resulting in 16 articles, of which 1 was selected. The search for the term “electronic cigarette” was refined by full and free text, in the interval from 2017 to 2024, resulting in 8 papers, of which 1 was used. The last screening in PubMed used the term “consequences and lung injury”, with the filters: full and free text, type of article “review, experimental clinical, books and documents”, publications from the last 5 years and population over 19 years old, resulting in 15 articles, of which 1 was selected.

In SciELO, the search for the word “smoking” applied the following filters: Brazil collection, Portuguese language, full article, citable and area of health sciences, resulting in 4 papers, of which 1 was used.

Outcome: The research resulted in 6 articles of literature review and 2 articles of epidemiological study and qualitative research.

Main author	Study design	Article topic
Araújo <i>et al</i>	Literature review	Electronic cigarettes and their histopathological consequences related to lung diseases
Barrington-Trimis <i>et al</i>	Literature review	Use of “Pod Mod” electronic cigarettes by teenagers - urgent concerns
Bertoni <i>et al</i>	Prevalence study	Electronic smoking devices in Brazilian capitals: prevalence, use profile and implications for the National Tobacco Control Policy
Cao <i>et al</i>	Literature review	Review of the health consequences of e-cigarettes and the outbreak of lung damage associated with the use of the electronic cigarette, or vaping, product
Côrrea, Paulo	Literature review	No controversy: e-cigarettes are not a treatment for tobacco/nicotine cessation
Silva <i>et al</i>	Literature review	The ban on electronic cigarettes in Brazil: success or failure?
Silva, Daniel	Qualitative research	Tobacco use and nicotine dependence among health university students in the interior of São Paulo
SBPT <i>et al</i>	Literature review	Smoking: part I

Table 1- Articles on smoking included in this review.

Source: Author’s table, 2024. Abbreviations: SBPT (Brazilian Society of Pneumology and Phthisiology).

1. Inclusion and exclusion criteria

Inclusion: Articles that directly addressed the topic were included, selected based on the keywords searched, language, type of study, proposed age group and publications between 2014 and 2024, totaling 8 articles used to construct the work. Data from 2009 to 2024 was also included, taken from publicly accessible websites with relevant content (11). In addition, a chapter from a pathophysiology textbook was used, focusing on the pages that address the pathophysiological process of tobacco use in the human body (1). Two authors (BSC and JWM) carried out the search for complete works and information on public websites, prioritizing quality and potentially eligible content, due to its relevance to the theme of “Smoking” and “Vaping” in the target population.

Exclusion: Articles that did not deal with the topic in a central way, publications outside the specified period, studies in languages other than the one selected, other types of study, works without full text, data without adequate references, websites without reliability certifications and book pages that did not deal with the pathophysiological processes related to the topic were excluded.

Analysis process:

Initial steps: The review followed the following steps: choice of topic, initial research, preliminary reading on the subject, followed by summarizing the selected articles and reading the most relevant ones in full. The articles were read in a specific order: methodology, introduction, results/discussion, conclusion, keywords and references. All the main information and data relevant to the target population was gathered. For better organization, the complete paper was prepared on a Google Docs page, including the abstract structured in the following parameters: introduction, objective, methodology, results/discussion and conclusion. Any text that did not have the proposed theme as its central focus was excluded during the selection process, from the analysis of the title to the bibliographical references.

DEVELOPMENT

EPIDEMIOLOGY AND RISKS OF PASSIVE EXPOSURE

It has been identified that a cigarette contains around 7,000 chemical substances, of which at least 1% are carcinogenic, contributing to tobacco causing the death of up to half of its users. It is estimated that around 8 million people die from smoking every year, making it the leading cause of preventable

death in the world. Being a smoker has many consequences, since on average 50 diseases are associated with smoking or passive inhalation of the substances released by cigarettes (American Cancer Society, 2022; PAHO, 2019). Individuals who live with smokers also face significant risks, since cigarette smoke is dispersed evenly in the air and contains high levels of nicotine and carbon monoxide. Thus, passive smokers - whether they smoke conventional or electronic cigarettes - are exposed to diseases such as cancer, rhinitis and pulmonary emphysema. This shows that living with smokers can have a negative impact on quality of life, even without the direct use of smokable products (Ministry of Health, 2024).

For active smokers, smoking, a chronic disease, continues to spread in the population, being responsible for a greater number of deaths each year than those caused by malaria and tuberculosis. In addition, when analyzing the components of both traditional cigarettes and electronic smoking devices (ESDs), it is observed that both can cause a series of pathophysiological changes, including cancer, lung irritation, coronary heart disease and skin changes (Sociedade Brasileira de Pneumologia e Tisiologia, 2010; Araújo et al., 2022).

PATHOPHYSIOLOGY

According to studies by the Heart Hospital, tobacco is responsible for 25% of deaths from myocardial infarction and is associated with various risk factors, such as high cholesterol, diabetes and stroke (Ministério da Saúde, 2021). This figure is explained by the fact that the toxic substances in cigarettes cause endothelial damage, resulting in narrowing of the blood vessels, especially the coronary arteries, which are responsible for irrigating the heart. As the lumen of the vessels narrows, the risk of a heart attack increases, as this change in the arteries also raises blood pressure, increasing the likelihood of

Comparison between smokers and non smokers in relation to exposure to risks

SMOKING

<i>Heart Problems</i>	Risk of developing coronary heart disease 2 to 4 times;
<i>Problems Neurological</i>	Risk of developing a stroke 2 to 4 times;
<i>Lung Cancer</i>	A man's risk of developing lung cancer is 23 times higher;
<i>Lung Cancer</i>	A woman's risk of developing lung cancer is 13 times higher;
<i>Lung Diseases Chronic Obstructive</i>	Dying from chronic obstructive pulmonary disease is 12 to 13 times higher.

Figure 1- The additional risks posed by smokers:

Source: - National Cancer Institute Smoking-related diseases - National Cancer Institute - INCA (www.gov.br). Author image, 2024.

developing heart failure. Another factor that compromises heart function is the formation of atheromatous plaques in the coronary arteries. The deposition of fats in the vessels, often due to the smoker's lifestyle, can lead to blood obstruction, culminating in a heart attack. In the same vein, the formation of plaques in the arteries reduces oxygen-rich blood flow to the brain, resulting in the death of cells sensitive to ATP depletion, which can cause a stroke (Mitchell; Conolly, 2016). Because both traditional cigarettes and electronic cigarettes contain numerous toxic and carcinogenic substances, there is a predisposition to the formation of tumors in various organs, such as the lungs, bladder and stomach (Sociedade Brasileira de Pneumologia e Tisiologia, 2022). In addition, smoking is the main cause of developing chronic obstructive pulmonary disease (COPD), as exposure to toxic fumes and particles causes the lungs to

develop abnormally, leading to progressive and heterogeneous inflammation, where the problem can be alveolar destruction in the case of pulmonary emphysema or narrowing of the airways, as can be seen in chronic bronchitis (Sociedade Brasileira de Pneumologia e Tisiologia, 2021; GOLD, 2024).

ELECTRONIC CIGARETTES AND THE CLINICAL PICTURE

Electronic smoking devices (ESDs) represent a major threat to public health, since they include various devices, such as pods, pen-drives and vapes, each with different amounts of substances. Pods, for example, have a high addictive potential, causing a sensation similar to that of a conventional cigarette. Furthermore, the concentration of nicotine in ESDs can be up to 10 times higher, generating a high level of addiction in users. This addiction was mentioned in an exploratory

study with university students in the health area, who, despite knowing the consequences of using these electronics, continue to use them due to dependence (Tremis; Leventhal, 2018; Silva, 2019). Studies point to a variety of symptoms, such as sore throats, coughs, asthma attacks and chest pains, caused by exposure to heated tobacco aerosol. Thus, air quality is affected with the use of these devices because, although the vapor does not contain carbon monoxide or tar, there is an increase in volatile organic compounds, such as glycerol, benzene, acetaldehyde and propylene glycol, compared to the environment without the use of these products. This suggests that even people who do not use e-cigarettes are exposed to the consequences (INCA, 2023; Ministry of Health, 2023). Although ESDs are banned, with Brazil being one of the first countries to implement this ban, there has been much debate about their release from the outset, as it is believed that they would be used for smoking cessation. However, proof of an effective treatment is inconclusive. According to Paulo Corrêa, there are no controversies regarding e-cigarettes, and the fact that they are not an option for smoking cessation should be maintained as a certainty (Silva; Moreira, 2019; Corrêa, 2022). In addition to not being a treatment for smoking, ESDs attract the attention of young people, as evidenced by a Vigitel study, which revealed that the prevalence of current ESD use in individuals aged 18 to 24 was almost 10 times higher than in other age groups. In addition, it was confirmed that electronic devices act as a gateway to other types of smoking, since, according to the survey, half of the users had never smoked before (Bertoni; Szklo, 2021). In 2019, a lung disease associated with the

use of electronic cigarettes emerged in the United States, highlighting components of the liquid in these devices: EVALI (E-cigarette and Vaping Associated Lung Injury), which resulted in several deaths of young people with severe respiratory symptoms (Cao et al., 2020). Based on the literature presented, smoking cessation is considered the best solution, as tobacco can kill around half of its users who do not quit (World Health Organization, 2023).

FINAL CONSIDERATIONS

Therefore, it can be concluded that both conventional and electronic cigarettes have consequences that can be irreversible. Due to their composition and toxicity, not only for those who smoke, but also for those around them, it is clear that there should be no encouragement to use electronic devices as a way of quitting smoking, as there is a high risk of intensifying addiction, of transitioning to other forms of tobacco consumption, as well as the development of serious diseases such as EVALI. Smoking cannot be normalized just because e-cigarettes have different flavours, aromas or formats. The spread of these devices must be combated in all age groups, especially among young people, since, like conventional cigarettes, they can be lethal.

Furthermore, if the use of these products continues to expand, the economically active workforce will become sicker and more debilitated, adults will age with compromised health and the population's life expectancy will decrease. Given all this information, cigarettes remain a legal drug in the country. However, is it worth smoking or continuing to smoke if your goal is to grow old healthily and see the people around you grow old healthily too?

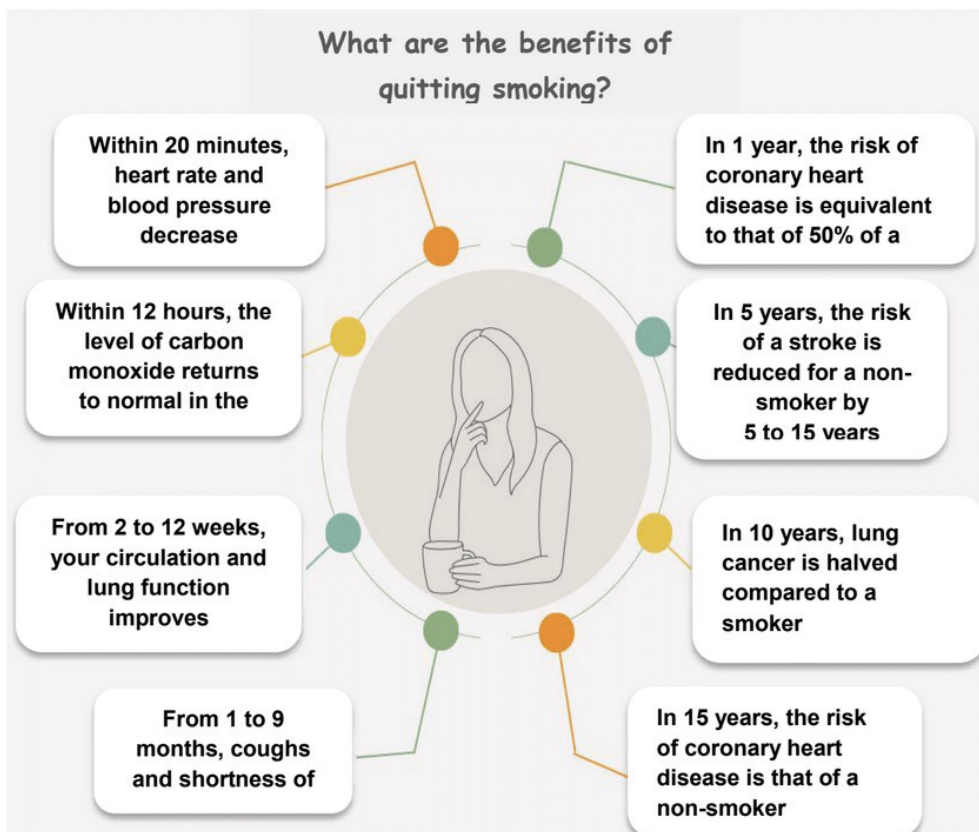


Figure 2- Positive returns on quitting smoking

Source: “Commit to quit smoking today!” 31/5 - World No Tobacco Day | Biblioteca Virtual em Saúde MS (saude.gov.br). Author image, 2024.

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