TOBACCO CONSUMPTION AND RESPIRATORY CONSEQUENCES

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Abstract

Tobacco is a substance used for recreational purposes that is frequently included as a risk factor with multiple implications in the pathophysiology of the main diseases with high mortality and morbidity. Smoking is a habit with increased prevalence at the population level and the burden given by it resides in the high latency time between the first exposure and the appearance of the first symptoms. This study aimed to quantify the effects of smoking and the impact of relatively short-term withdrawal on the main parameters that are measured in any pulmonology service.

Material and method. *In the presented study, a group of 106 smokers was included, who applied their initiative to the STOP FUMAT program within the "Marius Nasta" Pneumology Institute Bucharest during 2022-2023.*

Results. *To study the impact of withdrawal in the relatively short term, the group that initially consisted entirely of smokers was divided after 6 months into group I - 41 smoking patients and group II - 54 weaned patients. A main characteristic of the group as a whole is represented by the main reason for quitting smoking represented by the ticking in the questionnaire by 93.4% of the concern about the impact on the health of smoking which correlates with the increased level of diagnosed respiratory pathologies (79.2%) and comorbidities associated with smoking 28.3%. It was also demonstrated that although there was a slight tendency towards a reduction in FEV1 in patients from the smoking group at the 6-month assessment, it was still statistically significant among weaned patients.*

Discussion*. Tobacco use increases the risk of cardiovascular, respiratory, and neoplastic diseases, currently representing the main preventable risk factor for death.*

Conclusion. *Smoking remains a public health problem due to the multitude of long-term effects it has on health. The current study reinforces the consequences of tobacco consumption on patients and at the same time highlights the positive effects of withdrawal on the evolution of the case, which represents an additional argument for the repeated support and recommendation from the medical staff to go to STOP FUMAT centers.*

Keywords: *tobacco, smoking, quitting smoking, respiratory pathologies, STOP FUMAT centers.*



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Tutunul reprezintă o substanță utilizată în scop recreațional, care este inclusă frecvent ca factor de risc cu implicații multiple în fiziopatologia principalelor boli cu mortalitate și morbiditate ridicate. În fond, fumatul este un obicei cu prevalență crescută la nivel populațional, iar povara dată de acesta rezidă din timpul ridicat de latență dintre prima expunere și apariția primelor simptome. Scopul acestui studiu a fost de a cuantifica efectele fumatului și impactul sevrajului pe termen relativ scurt asupra principalilor parametrii care se măsoară în orice serviciu de pneumologie.

***Material și metodă.** În studiul prezentat a fost inclus un lot format din 106 fumători, care s-au adresat din proprie inițiativă programului STOP FUMAT din cadrul Institutului de Pneumologie ,,Marius Nasta" București în perioada 2022-2023.*

***Rezultate.** Pentru a studia impactul sevrajului pe termen relativ scurt, lotul care la început s-a constituit inițial în totalitate de fumători s-a împărțit la 6 luni în: grupul I - 41 de pacienți fumători și grupul II - 54 de pacienți sevrați. O caracteristică principală a lotului în ansamblu este reprezentată de motivul principal de renunțare la fumat reprezentat de îngrijorarea cu privire la impactul asupra sănătății (93,4%) care se corelează cu nivelul crescut al patologiilor respiratorii diagnosticate (79,2%) și a comorbidităților asociate cu fumatul 28,3%. De asemenea s-a demonstrat că, deși există o tendință ușoară spre reducerea FEV1 la pacienții din lotul de fumători la evaluarea realizată la 6 luni, totuși este semnificativă statistic în raport cu pacienții sevrați.*

***Discuții.** Consumul de tutun crește riscul bolilor respiratorii, cardiovasculare și neoplazice, reprezentând în momentul de față principalul factor de risc de deces prevenibil.*

***Concluzie.** Fumatul rămâne în continuare o problemă de sănătate publică prin multitudinea de efecte pe care acesta le are pe termen lung asupra sănătății. Studiul de față accentuează consecințele consumului de tutun asupra pacienților și totodată evidențiază efectele pozitive ale sevrajului asupra evoluției cazului, ceea ce reprezintă un argument suplimentar pentru sprijinirea și recomandarea repetată din partea personalului medical spre adresarea la centrele STOP FUMAT.*

***Cuvinte cheie:** tutun, fumat, oprirea fumatului, patologii respiratorii, centre STOP FUMAT.*

Introduction

Smoking is considered the result of the establishment of nicotine addiction, which has a major impact on the incidence and prevalence of diseases with the greatest impact on the mortality rate. Initially considered a habit associated with the vigor of the natives, later the treatment for various systemic ailments being recommended even by doctors, smoking gradually came to be associated with the increased incidence of respiratory and cardiovascular diseases that replaced the main cause of mortality before industrialization represented by infection. Although numerous studies have emerged confirming the negative impact smoking has on health and the medical community has reached a consensus on the importance of quitting, in the absence of a short-term impact on health there is still reluctance on the part of patients to initiate withdrawal, despite the awareness of the lack of safety associated with consumption. In this context, the STOP SMOKING program that was established in 2007 had as its main objective the reduction of the prevalence of smoking by providing counseling services, carried out by specialist psychologists, in which the patient is helped to become aware of the addiction he has and to implement certain strategies to reduce the risk of relapse as well as consulting a pulmonologist who, in addition to the optimal treatment method applicable to each case, can answer the questions asked by the patient regarding the role of smoking in the symptoms he has. experiences or its long-term impact.

Material and method

In this study, 106 patients who enrolled in the STOP SMOKING program during 2022-2023 were included, to whom a standardized questionnaire was applied regarding the motivation to quit smoking, the Fagerstrom addiction score was determined, and an anamnesis in which they insisted on the present symptomatology, respectively the comorbidities. From a paraclinical point of view, at the initial evaluation, a determination of the patient's biological status was made (blood count, ESR), spirometry, and chest X-ray. The patients were physically evaluated within the STOP SMOKING program every 2 weeks up to a maximum of 3 months (or earlier if withdrawal was established) for the release of nicotine replacement therapy. Later, at the 6-month evaluation, the patients were included in two groups according to the status of smoker vs. weaned and were questioned about the presence of symptoms, and the paraclinical parameters determined at the first evaluation were repeated.

Inclusion criteria:

- active smokers
- patients aged >35 years
- patients who applied to the STOP SMOKING program
- patients who signed the informed consent after previously explaining the protocol that the present study has

Exclusion criteria:

- patients aged <35 years
- pregnant or lactating patients
- patients who did not sign the informed consent or had difficulty understanding the study modality

Statistical analysis

Data were processed using IBM SPSS Statistics 25 and Microsoft Office Excel/Word. Quantitative variables were studied using the Shapiro-Wilk test, which was tested for normality using means and standard deviations or medians with interpercentile



intervals. The Student T-Test/Welch T-Test was also applied, which highlighted the independent quantitative variables that have a normal distribution, while the Mann-Whitney U test was used for the variables with non-parametric distribution. Regarding the qualitative values and differences between groups, absolute frequencies, and percentages were used along with Fisher's Exact/Pearson Chi-Square test.

Results

In this study, 106 smoking patients who applied to the STOP SMOKING program during 2022-2023 were included. 100% of the patients received psychological counseling and were evaluated by a pulmonologist who recommended, depending on the particularities of the case, nicotine substitutes in the form of patches (78.3%) and varenicline (21.7%) under tablet form. They were periodically monitored every 2 weeks up to a maximum of 3 months, at each evaluation being questioned about the presence of respiratory symptoms, the occurrence of withdrawal phenomena, or adverse effects associated with the chosen therapy.

At an interval of 6 months from the presentation, they were divided into two groups according to the response to the therapy: group I - 41 smoking patients (38.7%) and group II - 54 patients weaned (50.9%) over time what 11 patients (10.4%) abandoned the fight anitifumat at different times. The gender distribution in the group was relatively homogeneous, with a slight male predominance (48 (45.3%) F, 58 (54.7%) M). The average age of the group was 53.51 ± 9.72, but the values varied from 36 to 72 years. The majority of patients come from the urban environment (85.8%), being salaried (73.6%), with a minimum (59.7%) or average (33.8%) income (figure 1).

The patients in the studied group constantly used conventional cigarettes (93.4%), although some of them stated that they owned an electronic cigarette-type device although they did not use it regularly. The mean PA number was 30.86 ± 15.55, with a median of 30 PA. The largest part of the group (82%) was represented by smokers with several packs/year greater than or equal to 20 and an average Fagerstrom addiction score of 6.82 ± 1.84 points, the median being 7 points which outlines a significant presence of a heavy smoker profile with a moderate to high addiction score. In both groups, the values followed by spirometry (FEV1, FVC, FEV1/FVC, MEF50) had statistically significant lower values in patients who declared consumption >20 PA, a trend that was preserved at the 6-month assessment. Exposure to occupational pollutants was an aspect that we considered could interfere with demonstrating the effect that smoking has as the only pollutant on the prevalence of diseases in the studied population, but only a small part of the group

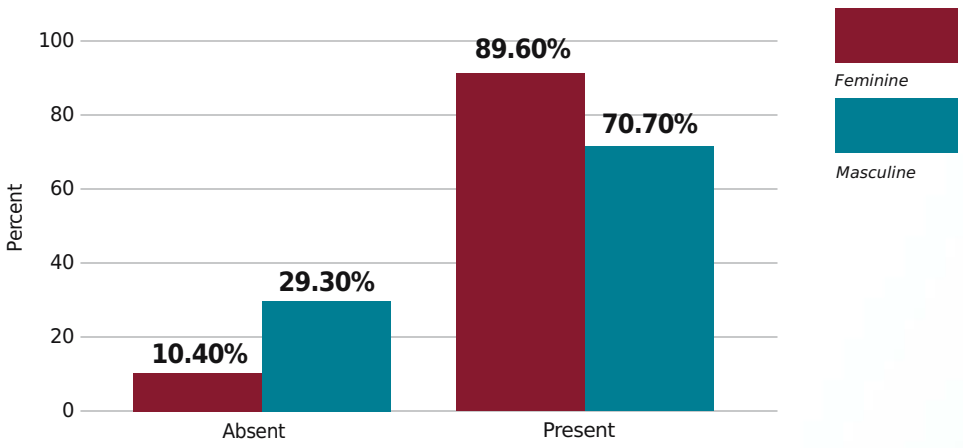


Figure 1. *Distribution of patients according to sex and the existence of lung diseases*

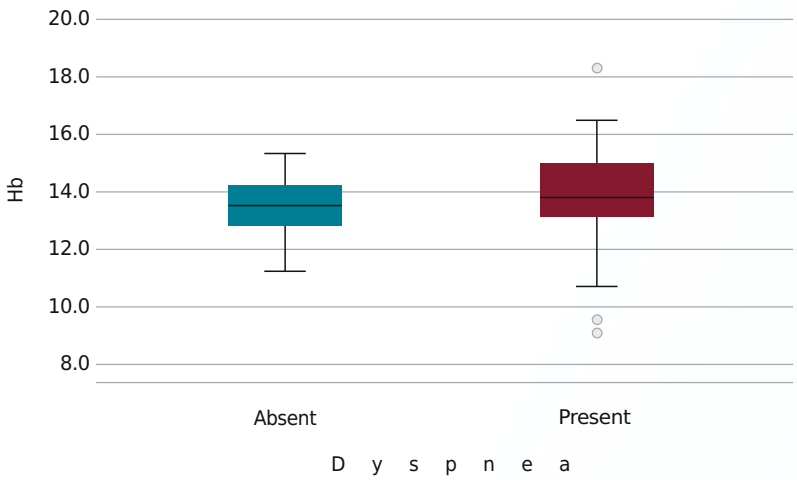


Figure 2. *Comparison of hemoglobin value related to the presence of dyspnea*

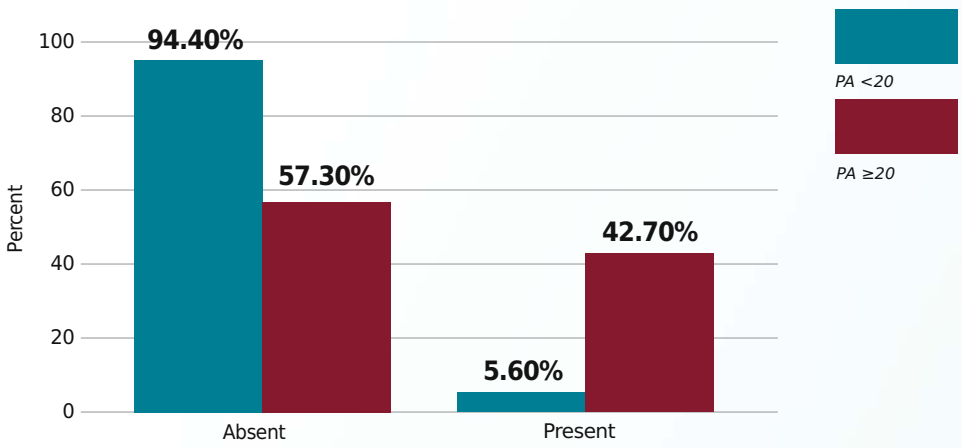


Figure 3. *Distribution of patients related to the existence of COPD and no. PA*



declared the presence of exposure 11 (10.4%) The motivation for stopping smoking, specific to each patient, is a main point of the intervention of the psychologist and also of the doctor. Most of the respondents (93.4%) declared that they want to quit smoking for health reasons, an aspect that correlates with the frequency of diagnosed respiratory diseases (79.2%), comorbidities (28.3%) and the symptoms that the patients declared in the anamnesis, present in 79.2%. Women were significantly more frequently associated with lung diseases (89.6% vs. 70.7%) compared to men (29.3% vs. 10.4%) (figure 1).

Among the symptoms reported most frequently by the patients included in the group was dyspnea (50.9%) with an average mMRC score of 1.68 ± 1.35, 2 (0–3). Patients who complained of dyspnea had on average higher values of leukocytes (median = 7.8, IQR = 7.1-8.81) compared to patients without dyspnea (median = 7.1, IQR = 6.2-7.8) and hemoglobin (median = 13.9, IQR = 12.8-14.7 vs. median = 13.5, IQR = 12.6-14) (figure 2). Also, the values of the parameters monitored during spirometry were statistically significantly lower in the case of patients who complained of dyspnea.

Cough is a frequent symptom for which smokers turn to the pulmonologist, often associated with the status of a smoker. In the studied group, cough was reported by most patients (51.9%. It has been demonstrated that there is a correlation between the presence of cough and the values determined by spirometry and a statistically significant reduction in lung function in this category of patients.

Regarding the frequency of diagnosed conditions, the most common was represented by COPD (35.8%), followed by infectious lung diseases (31.1%). In the studied group, a statistically significant correlation was observed according to the Fisher test ($p = 0.002$) between the number of packages >20 and the prevalence of COPD (42.7% vs. 5.6%)(figure 3).

During the study, patients were questioned about hospitalizations both from the pneumology service and from other services, with 43.4% of patients requiring at least one hospitalization per year, with an average of 1.78 ± 1.05, 1 (1-2).

Most of the patients had radiological changes (66.7%) consistent with the increased frequency of diagnosed lung diseases (79.2%). The most frequent changes on the radiograph were represented by the accentuated interstitial pattern (36.3%), bronchiectatic territories (18.9%), and hyperinflation (10.8%). In the studied group, it was observed that patients who had hyperinflation on radiography were associated significantly more frequently with the need for hospitalization (18.6% vs. 5.1%). Of these, 28.3% required a chest CT scan, which revealed centrilobular emphysematous changes in 16.7% of patients and bronchiectasis.

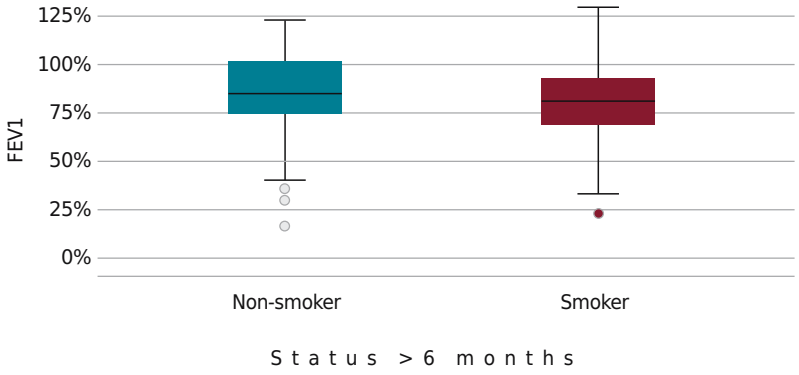


Figure 4.
Comparison of FEV1 value by smoking status at 6 months

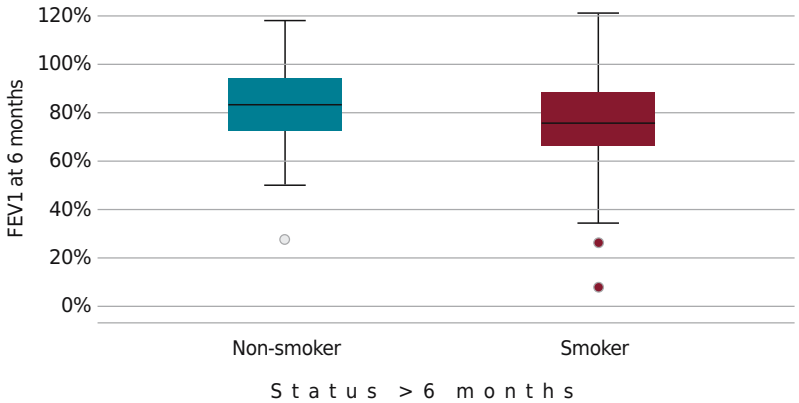


Figure 5.
Comparison of FEV1 value measured at 6 months relative to smoking status at 6 months

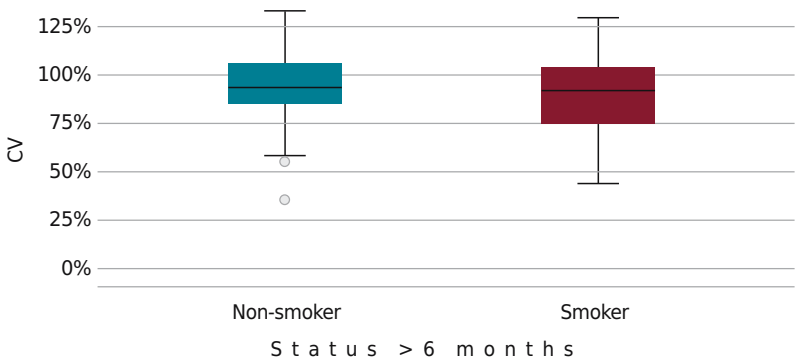


Figure 6.
Comparison of CV value by smoking status at 6 months

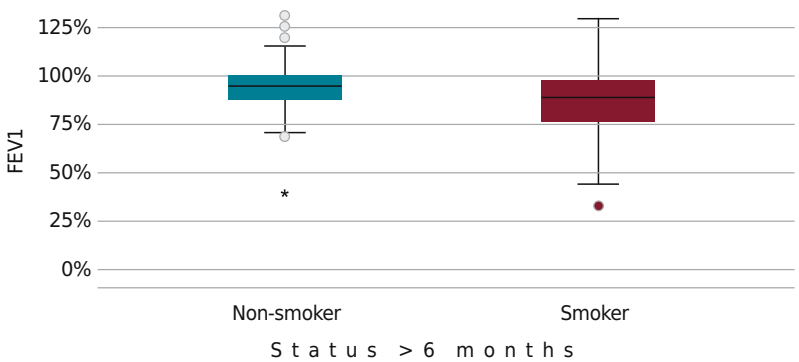


Figure 7.
Comparison of CV value measured at 6 months relative to smoking status at 6 months



In both groups at T0, the values monitored in spirometry (FEV1, FVC, FEV1/FVC, MEF 50) did not demonstrate statistically significant differences, which indicated that everything had a homogeneous distribution at the time of inclusion. Later, at the T6 assessment, slight improvements in respiratory symptoms were observed in the weaned patients. Although a statistically significant decline was observed in both the FEV1 value (76.2 ± 23.98 vs. 85 ± 20.18) and FVC (89.1 vs. 95) in the case of the smoking population, the FEV1/FVC ratio did not change statistically significantly ($p = 0.466$) (Figures 4, 5, 6, 7). Although the period between evaluations was relatively short, we can conclude that withdrawal had a positive impact by improving the quality of life of former smoking patients.

Discussions

According to the World Health Organization, there is a decline in smoking among the population from 1 in 3 adults in 2000 to 1 in 5 adults in 2022 as a result of the establishment of public health policies through the application of MPOWER measures and solidarity at the level of the medical community regarding the necessity of weaning. However, tobacco consumption remains a public health problem due to its high prevalence and incidence, which is considered a risk factor involved in 8 million deaths per year secondary to active smoking and 1.3 million as a result of passive exposure.

Smoking is a preventable risk factor associated with the etiopathogenesis of the main diseases diagnosed. However, a downward trend is observed in terms of the prevalence of smoking. In the last century, we have witnessed a gradual increase in the incidence of smoking in the female sex. In this study, there was a slight difference in the prevalence of smoking between the female and male sexes, in favor of the latter. However, we demonstrated that female smokers were more frequently diagnosed with respiratory diseases compared to men. These data are consistent with studies that demonstrated that women had fewer respiratory diseases and a lower rate of smoking, but once similar prevalences were reached, women would have a more accelerated rate of respiratory function decline compared to the male population, which would predispose them to the earlier development of COPD.

Lower incomes were associated with higher rates of smoking, an aspect that should intensify the identification of patients in this risk category and the establishment of withdrawal measures along with psychological counseling.

Electronic cigarettes are devices that use an e-liquid that, heated through an atomizer, delivers a substance consisting mainly of a

mixture of nicotine, propylene glycol, vegetable glycerin, and flavors. The rate of use of electronic cigarettes was reduced in the presented group, probably as a result of the age criterion > 35 years. According to Brandi et al., the tendency to use electronic cigarettes is inversely proportional to the age of the patients, explained mainly as a result of the difference between the physicochemical properties of electronic cigarettes and conventional ones.

The reasons why the patient wants to quit smoking represent an important point in establishing achievable goals both in psychological counseling and in medical evaluation. The period in which the patient becomes vulnerable in front of the medical staff and in which he exposes his main fears and asks questions regarding the risks associated with continued consumption and possible adverse effects caused by the treatment ensures the increased success of the therapy. Duncal et al. indicate that the main reasons for the motivation to initiate withdrawal are related to concern about the impact of tobacco on health, data that are consistent with the study presented.

According to Neumann et al., the heavy smoker profile is represented by a Fagerström score >=7 and consumption of more than >20 cigarettes per day, or >20 PA. In our study, the patients were heavy smokers, a fact that decreased the success rate of withdrawal by up to 6%. These data demonstrate that the STOP SMOKING program may need to have a different protocol for heavy smokers with more frequent sessions.

Many diseases are associated with smoking, whose incidence is directly proportional to the period of exposure and the amount consumed. As a result of age >35 years at inclusion, heavy smoking status, and a high frequency of symptoms, the increased rate of respiratory disease was not surprising. It is currently estimated that approximately 20% of all smokers will develop COPD. This study revealed that 35.8% had spirometric values and symptomatology that fit them into COPD; however, the diagnosis rate would probably be higher if spirometric evaluations were performed over a longer period because 6.6% presented criteria that included them in pre-COPD (symptoms and decline in FEV1 without impacting the Tiffeneau index). Although it was not an objective of the study to perform spirometry, it was observed that it had a positive impact on the patient's psyche, and although it is difficult to quantify whether the application of spirometry influenced the withdrawal rate without having a control group, it would be an interesting point to study. At the moment, the performance of spirometry is not part of the standard protocol of the STOP SMOKING program due to the lack of meta-analyses that indicate the benefit. However, a study by Ben et al. demonstrated that the withdrawal rate was higher by 8.8% in patients who performed spirometry, although other studies indicated a difference of up to 20% between groups.

Another argument for the use of spirometry as part of the protocol is represented by the positive impact that withdrawal had on the values monitored in spirometry, say the studies, and at a 3-month evaluation, evidence that could strengthen the patient's motivation to obtain long-term withdrawal.

Limitation

The study included a relatively small batch as a result of the decrease in addressability with the COVID-19 pandemic starting in 2020 and also the possibility of conducting investigations as a result of the prioritization of emergencies. However, there is an upward trend in enrollment in the STOP SMOKING program, and perhaps it would represent an

opportunity in the future to carry out a study to demonstrate the positive impact of withdrawal and the effectiveness of the program.

Conclusions

The implementation of public health policies through the MPOWER measures had a positive impact that can be quantified by the downward trend in the incidence and prevalence of smoking. However, smoking continues to cause an increase in the incidence of chronic diseases every day, being a risk factor involved in the etiology of most deaths. This study demonstrated the clinical-paraclinical effects associated with long-term exposure to tobacco and the diseases they developed that have smoking as an associated risk factor.

The improvement in the quality of life and the positive impact on the evolution of respiratory diseases diagnosed in a relatively short interval of 6 months represent an additional argument for the need to encourage the population to address a STOP SMOKING center.

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