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Evaluating smoking cessation strategies in thoracic surgery outpatient clinics

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Abstract

Introduction: Smoking cessation remains a global challenge due to the complex and individualized nature of addiction. Understanding the interplay of psychological, social, and biological factors is crucial for developing effective, personalized cessation strategies.

Aim: This study investigated the factors influencing the success of smoking cessation efforts among patients visiting thoracic surgery outpatient clinics.

Material and methods: Between October 2022 and October 2023, 355 smokers sought assistance at thoracic surgery outpatient clinics, with 231 patients included in the study after exclusions. Data on demographics, comorbidities, cessation attempts, and Fagerström addiction scores were analyzed. Patients received nicotine replacement therapy (NRT), medical therapy (bupropion), and behavioral therapy. Follow-ups were conducted at 1, 3, and 6 months to assess cessation outcomes.

Results: The cohort included 137 males and 94 females, with an average age of 45 years. Overall, 81 patients (35.06%) quit smoking in the first month, and 15 (6.49%) additional patients quit by the third month. Relapse occurred in 36 (15.58%) patients, and 99 (42.86%) patients failed to quit. Success rates were similar between genders and unrelated to age, comorbidities, previous attempts, or smoking intensity. The success rate was slightly higher among those who received pharmacotherapy, but the difference was not statistically significant. However, full adherence to behavioral suggestions was significantly associated with increased cessation success ($p < 0.001$).

Conclusions: Behavioral therapy plays a critical role in smoking cessation success. Tailored behavioral strategies significantly enhance outcomes, highlighting the need for personalized approaches in cessation programs. Patients in thoracic surgery outpatient clinics benefit from comprehensive support, emphasizing behavioral adaptation to improve cessation rates.

Key words: smoking cessation, tobacco addiction, behavioral therapy, nicotine replacement therapy, pharmacotherapy.

Introduction

The persistent global challenge of tobacco smoking necessitates a nuanced exploration of factors influencing the success of smoking cessation efforts. Despite widespread acknowledgment of the health hazards associated with smoking, achieving lasting cessation remains a complex and individualized journey [1, 2].

As contemporary statistics underscore the ongoing prevalence of tobacco use worldwide, it becomes increasingly evident that a general approach to cessation is inadequate. From pharmacological interventions to behavioral therapies and beyond, the arsenal of smoking cessation methods continues to expand [3]. However, the varying success rates among diverse populations underscore the need for a comprehensive understanding of the underlying determinants that shape the effectiveness of these interventions [4]. By exploring the interrelated roles of psychological resilience, social support networks, and biological predispositions, our study seeks to provide valuable insights that can inform personalized and targeted approaches to smoking cessation [5].

Acknowledging this complexity, our research aimed to investigate the factors influencing smoking cessation success by studying these contributing factors. Through this holistic exploration, we aim to contribute to the refinement of smoking cessation strategies, fostering a deeper understanding of the individual and contextual factors that underpin successful outcomes.

Aim

In this paper, we embark on an in-depth investigation into the multifaceted determinants that contribute to the success of smoking cessation.

Material and methods

Between October 2022 and October 2023, 355 smokers who visited smoking cessation clinics under Thoracic Surgery

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Table I. Fagerström Test for Nicotine Dependence [6]

Questions	Answers	Points
How soon after you wake up do you smoke your first cigarette?	Within 5 minutes	3
	6 to 30 minutes	2
	31 to 60 minutes	1
	After 60 minutes	0
Do you find it difficult to refrain from smoking in places where it is forbidden (e.g. in church, at the library, in cinemas, etc)?	Yes	1
	No	0
Which cigarette would you hate most to give up?	The first one in the morning	1
	All others	0
How many cigarettes do you smoke each day?	10 or less	0
	11 to 20	1
	21 to 30	2
	31 or more	3
Do you smoke more frequently during the first hours after waking than during the rest of the day?	Yes	1
	No	0
Do you smoke if you are so ill that you are in bed most of the day?	Yes	1
	No	0

A score of 0 to 2 = very low dependence; 3 to 4 = low dependence; 5 = medium dependence; 6 to 7 = high dependence; 8 to 10 = very high dependence [6].

outpatient clinics asked for assistance and were supported for smoking cessation. Patients with insufficient follow-up time or missing data were excluded. A total of 231 patients were included. Demographic data, comorbidities, previous cessation attempts, Fagerström addiction score, and follow-ups of the patients were analyzed using hospital records. The nicotine addiction score was obtained using the Fagerström Test for Nicotine Dependence (FTND), a questionnaire developed in 1978 and refined in 1991 by Fagerström (Table I) [6].

The Tobacco Cessation Program was mainly designed and standardized by the Republic of Türkiye Ministry of Health. The addiction therapy consists of three main treatments: nicotine replacement therapy (NRT), medical therapy and behavioral therapy.

Nicotine replacement therapies (NRT)

There are three common forms of NRT available in pharmacies. Two of them are meant to be taken orally (chewing gum and lozenges) and one is for dermal usage (patches). Chewing gum and patches are most widely used.

Medical therapy

The only remaining medicine provided by the Minister of Health Department of Fight Against Tobacco and Substance Addiction is bupropion hydrochloride, since varenicline was removed from the program due to reports of side effects. Bupropion is also prohibited for patients with uncontrolled hypertension, bipolar disorder, hepatic cirrhosis and other conditions stated in the prospectus. Routine dosage was 150 mg/day in the first 5 days and 300 mg/day afterwards.

Behavioral therapy

The most personalized part of the cessation program is behavioral therapy because of each patient's unique background story and daily routines. In our practice we suggest to the patients to follow a 6-step program to achieve the adaptation to a non-smoking life.

Set a Quit Date: Select a specific date to embark on your journey towards smoking cessation. Establishing a clear quit date provides a tangible goal, allowing for mental preparation and a focused commitment to a smoke-free future.

Assess Triggers: Identify and evaluate the triggers that stimulate your desire to smoke. Understanding these situational, emotional, or activity-related cues is paramount for developing effective coping strategies that can withstand the challenges of quitting.

Replace Habits: Exchange smoking for healthier alternatives. Cultivate habits that offer positive outlets for stress or boredom, such as engaging in exercise, pursuing hobbies, or socializing. Reinforcing these positive behaviors contributes to a successful transition away from smoking.

Break the Everyday Smoking Loop: Disrupt the routine by actively breaking the everyday smoking loop. Stop smoking in your comfort zone and in groups. Avoid consuming anything along with the cigarette. This strategic interruption can weaken the connection between activities and the urge to smoke.

Avoid Carrying Cigarette Packs: Reduce temptation by refraining from carrying cigarette packs. Creating physical distance between yourself and cigarettes minimizes the immediate accessibility, making it easier to resist the urge to smoke and reinforcing your commitment to quitting.

Yield A Better Life: Embrace the positive transformations that accompany a smoke-free life. Focus on the health improvements, enhanced well-being, and the freedom from addiction. Recognize that quitting smoking is a transformative journey yielding a better, healthier life. Share your successes to inspire others on their own path to a smoke-free future.

Patient follow-up

Patients were called for routine follow-up in the first, third and sixth months to record the cessation outcome. Patients were contacted via phone call by hospital staff if absent from the follow-up. Any adverse effects due to medical therapy, smoking cessation date, and cause of failure were also noted.

Statistical analysis

Continuous variables are shown as mean ± standard deviation and interquartile range. Categorical variables are shown as numbers and percentages. Odds ratios are presented with 95% confidence intervals. The independent *t* test or Mann-Whitney *U* test was performed where appropriate. The relationship between categorical variables was evaluated with the χ^2 test. The Pearson correlation test was used to analyze the relationship of independent variables. The program IBM SPSS Statistics for Windows version 25.0 (IBM Corp., Armonk, NY, United States) was used for statistical analysis. The statistical significance level was accepted as $p < 0.05$.

Results

Our study included a diverse cohort of participants, with 137 males and 94 females. Average age was 45 (range: 21–82) years. The participants exhibited varying smoking behaviors, with an average of 33 pack-years (range: 5–120).

Forty-four percent of the participants (101) had at least one comorbidity. Common medical conditions within the cohort included chronic obstructive pulmonary disease (COPD), hypertension (HT), diabetes mellitus (DM), and depression, contributing to the complexity of their health profiles.

Participants with no contraindication for bupropion treatment (n = 208, 90%) received the medicine. Due to the various side effects such as mild headache and nausea, 7 (3%) participants stopped the medical treatment. Seventeen (7.36%) participants stated that the medicine was ineffective and they stopped taking it. Twenty-three (10%) participants who were not suitable or refused medicine received psychosocial support.

Cessation outcomes demonstrated that 81 (35.06%) individuals successfully quit smoking in the first month and 15 quit (6.49%) by the next follow-up following the second round of bupropion and repeated suggestions of behavioral changes. Another 36 (15.58%) faced challenges, experiencing relapse within 6 months, and 99 (42.86%) participants failed and refused to try again.

The average age of successful quitters and failed participants were similar, at 45 years (p = 0.952). Male participants had a higher success rate (43.8%) compared to female participants (38.3%), but difference was not statistically significant (p = 0.418).

Statistical analyses revealed no significant differences in cessation success between participants with and without comorbidities (p = 0.616). The results showed no advantage or disadvantage of prior failed quit attempts for success. Patients who were evaluated for the first time had a very close rate compared to those who had made earlier attempts with different methods or no support (p = 0.896).

Fagerström scores were found to be significantly higher in the younger population (p = 0.039). Yet there was no significant difference in addiction score between successful and failed participants, with both having high scores (p = 0.952). Likewise, there was no correlation between smoking intensity and quitting (p = 0.396).

There was weak evidence for medical treatment with bupropion to slightly contribute to the success rate, but the association was not statistically significant (p = 0.125). The NRT effect seemed not to be a significant factor in success, as participants who used chewing gum (n = 96) had slightly better quitting rates (42.7% versus 40.7%) (p = 0.788) (Table II). Dermal patches were used by only 11 of the participants. The number was not considered as sufficient for further analysis.

Participants who successfully adopted behavioral suggestions had a significantly higher cessation success rate of 54.2% compared to those who adopted partially or did not follow the behavioral suggestions, with rates of 34.8% and 16.7%, respectively ($p < 0.001$) (Table II). Area under the receiver operating characteristics curve was found to be 0.773 (95% confidence interval: 0.709–0.837).

Table II. The impact of the parameters affecting the cessation success of participants

Parameter	Successful	Failed	*P*-value
Gender			
Male	60 (43.8%)	77 (56.2%)	0.405
Female	36 (38.3%)	58 (61.7%)	
Mean age	45.1	45.2	0.952
Comorbidities			
Yes	29 (39.2%)	45 (60.8%)	0.616
No	67 (42.7%)	90 (57.3%)	
Prior attempts			
Yes	57 (41.9%)	79 (58.1%)	0.896
No	39 (41.1%)	56 (58.9%)	
Mean Fagerström Score	8	9	0.952
Pharmacotherapy			
Yes	90 (43.3%)	118 (56.7%)	0.125
No	6 (26.1%)	17 (73.9%)	
Nicotine replacement			
Yes	41 (42.7%)	55 (57.3%)	0.765
No	55 (40.7%)	80 (59.3%)	
Behavioral suggestions			
Fully adopted	43 (79.6%)	11 (20.4%)	< 0.001
Partially followed	26 (60.5%)	17 (39.5%)	
Avoided	27 (20.1%)	107 (79.9%)	

Discussion

Türkiye had the 5th highest overall rate of lung cancer cases in 2020 with an age-standardized rate of 40/100,000 [7]. Lung cancer was the most common type of cancer in men with 75 cases in 100,000 and the 4th most common type for women with a rate of 12 cases in 100,000 in that year. Despite the health risks, the smoking rate has increased over the years in Türkiye. From 2010 to 2022, the percentage of daily smokers climbed from 25.4% to 28.8%. Based on the census, there were around 18.7 million smokers in 2010 and 24.5 million in 2022 [8].

In 2022, 41.3% of male and 15.5% of the female population were smoking tobacco products daily. Men between the ages of 25 and 34 had the highest percentage of daily smokers (51.4%). Women had their peak between the ages of 35 and 44 (23.2%). The main reasons behind starting tobacco product use in both genders were defined as the influence of friends, curiosity and trends (31.3%, 23.8% and 23.2%, respectively) [9].

Smoking cessation services emerged to provide solutions for individuals who want to quit smoking. According to 2017 data, smoking cessation services were available in 169 countries, with over 75% of them offering financial coverage either in part or in full [2]. In Türkiye, smoking cessation outpatient clinics were introduced, with support provided by professionals who were trained as consultants for smoking cessation and with pharmacotherapy drugs provided free-of-charge. The number of these clinics exceeded 400 in recent years [10]. The success of smoking cessation programs varies widely across countries and programs [3].

A national survey conducted in China revealed that 43% of the patients received medical therapy [4]. Various studies from Türkiye showed that pharmacotherapy rates vary between 20% and 56.8% [10, 11]. It was more commonly used in our study group, where 90% of the participants received the medicine bupropion. Bupropion was shown to increase the odds of smoking cessation in a systematic review (OR = 1.97, 95% CI: 1.67–2.34) [12]. In the present study group, the increase in the cessation success rate with bupropion treatment was not statistically significant ($p = 0.125$).

There are studies suggesting the benefits of individual behavioral counseling. A recent review including 33 prior Cochrane reviews stated that behavioral interventions are effective for smoking cessation, with a high level of evidence for individual counseling, even in the absence of pharmacotherapy [13]. Lancaster *et al.* presented a meta-analysis providing high-quality evidence that smoking cessation counseling can assist quitting (RR = 1.57, 95% CI: 1.40–1.77; 27 studies, 11,100 participants; $I^2 = 50\%$) [5]. Results of a similar study using the Cochrane Tobacco Addiction Group Specialised Register by Stead and Stead showed that combined pharmacotherapy and behavioral support increases smoking cessation success (RR = 1.83, 95% CI: 1.68–1.98; 52 studies, 19,488 participants; $I^2 = 36\%$) [14]. Another study by Lindson *et al.* suggested that the number of people who achieve smoking cessation can be increased with counseling by an allied health professional (RR = 1.31, 95% CI: 1.10–1.55; 22 studies, 18,150 participants; $I^2 = 44\%$), free smoking cessation medication (RR = 1.36, 95% CI: 1.05–1.76; 10 studies,7560 participants; $I^2 = 63\%$) and printed materials (RR = 1.29, 95% CI: 1.04–1.59; 6 studies, 15,978 participants; $I^2 = 37\%$) [1].

Recent studies have emphasized the effectiveness of tailored interventions in smoking cessation programs. Linwei He *et al.* highlighted that motivational interviewing outperforms confrontational counseling in enhancing user experience and engagement, underscoring its superiority in digital interventions [15]. Similarly, the Quit Smoking Lung Health Intervention Trial showed that immediate, remote support significantly boosts cessation rates during lung health screenings, advocating for timely interventions [16]. Additionally, a machine learning approach in digital interventions has proven particularly effective for individuals with depressive symptoms, further personalizing cessation strategies [17].

In the present study, behavioral change suggestions consisted of setting a quitting date, assessing and avoiding triggers, replacing habits for free time, breaking the smoking routine, and avoiding cigarette packs, and yielded great results. Fully adopting behavioral suggestions increased the smoking cessation success ($p < 0.001$). The positive correlation between behavioral adaptation and success rates emphasizes the importance of tailored strategies to address individual behaviors, which will ultimately contribute to more effective smoking cessation programs.

Conclusions

Every tobacco smoker with any background has a potentially similar chance of quitting smoking. Age, gender, earlier attempt, addiction score, smoking intensity and pharmacotherapy did not show a significant difference. Behavioral changes had a key role in increasing the success rate. Adopting suggestions helped individuals to cope with the quitting process. Patients visiting thoracic surgery outpatient clinics should be encouraged and supported for smoking cessation or referred to a designated smoking cessation clinic. Our study supported earlier studies in a regional population.

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Ethical approval

Not applicable.

Disclosures

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