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Evaluation of smoking behaviour according to gender, symptoms and diagnoses at a pulmonology outpatient visit

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Abstract

Smoking during the hours prior to an examination in a pulmonology outpatient clinic may provide valuable information regarding patients' smoking behaviour. The objective of our study was to examine the association of gender, symptoms, and current diagnoses with active smoking status and smoking on the day of outpatient visits. This was a retrospective, observational, cross-sectional study. A total of 1863 patients were included. Symptoms, diagnoses, smoking history, and the last smoking time prior to the outpatient clinic visit were recorded. Males were more likely to be active or ex-smokers, while females were more likely to be non-smokers ($p<0.001$, for all). The rate of continued smoking was higher in younger patients ($p<0.001$), patients with chest/back pain ($p=0.003$), and in women ($p<0.001$), whereas smoking cessation was more common in COPD ($p<0.001$) and bronchiectasis patients ($p=0.002$), sputum producing patients ($p=0.02$), and men ($p<0.001$). A total of 66.9 % (n=420) of the active smoking group smoked on the day of the outpatient clinic visit. The median value of the smoking duration before the examination was 60 minutes (64.5%, n=271) on the day of the outpatient clinic visit. Smoking behaviour was significantly more common within the last 24 hours ($p<0.001$) and on the day of the clinic visit among female smokers ($p<0.001$). Patients with COPD, bronchiectasis, or sputum production were significantly less likely to smoke on the day of outpatient visit ($p<0.001$, $p=0.05$, and $p=0.004$, respectively), while younger patients, asthmatic patients, and those with chest/back pain were significantly more likely to smoke on outpatient visit day ($p<0.001$, $p=0.02$, $p<0.001$, respectively). Thus, female gender and pain emerged as the most important determinants of smoking behaviour on the outpatient visit day. The success of anti-smoking campaigns may be positively impacted by paying more attention to gender differences, specific patient groups, and appropriate management of existing symptoms.

Keywords: Smoking, gender, age, symptom, diagnosis

Introduction

Currently, it is estimated that there are 1.3 billion tobacco users worldwide. The age-standardized prevalence of smoking reported in 2015 by the World Health Organization (WHO) in men and women is 34.1% and 6.4%, respectively, despite regional variations [1,2]. Smoking is an important cause of death, leading to malignancy, chronic obstructive pulmonary disease (COPD) and cardiovascular disorders [3-5]. Moreover, the association between smoking and sputum production, wheezing, shortness of breath, and chest pain has been well established [6-8]. Determinants of smoking behaviour involve some complex interactions between genetic, environmental factors, and physical and psychological addiction [9]. It has been known that approximately 70% of the smokers desire to quit smoking, 50% attempt to quit at least once in the past year, while only 6% were successful [10].

The reported "successful smoking quit" rates are generally lower in women [11-13], who also have been found to have higher relapse rates and exhibit more smoking behaviour as a coping strategy against stress [14,15], although a clear consensus does not exist regarding these findings. Smoking behaviour may continue despite presence of complaints and medical disorders, and even some smokers have been reported to smoke in hospitals. However, published data on exact figures are limited [16].

This study was carried out to evaluate the smoking history of patients who applied to the Chest Diseases outpatients clinics and to determine whether symptoms, diagnosis

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and gender have an effect on active smoking status and behaviour on the day they applied to the outpatient clinic.

Materials and Methods

This study was a retrospective, observational, cross-sectional study. The study protocol was approved by the hospital's ethics committee in accordance with the Helsinki Declaration (date: 06.01.2022, protocol number 235). Signed informed consent was not collected from the patients, due to retrospective nature of the study. All data were retrieved from the hospital database, and patients' personal information was kept strictly confidential.

Two chest diseases physicians at a third level chest diseases training and research hospital evaluated their patients about their complaints and smoking history between July and December 2019.

The following definitions were used to evaluate smoking history, respectively: Active smokers, smoker for at least one year, and those who continue to smoke or have quit smoking for less than one year; Non-smokers, people who have never smoked before; Ex-smokers who have smoked before and have not smoked for at least one year.

Inclusion criteria for the study

Patients over the age of 18 years who were examined by the two pulmonologists within the study period and provided accurate information about their smoking status.

Exclusion criteria for the study

Provision of incomplete or no information about smoking status, and having smoked for less than one year.

The amount and duration of smoking were calculated by multiplying the number of cigarette packs smoked per day with the total smoking duration in years. The following information was collected and recorded: diagnoses, complaints, smoking history (pack/years), current smoking status (i.e. non-smoker, active smoker, and ex-smoker), and the time of last cigarette smoked prior to the outpatients visit (in hours or days). Patients who smoked within 24 hours prior to the examination were identified based on the recorded data. Those who smoked after 12:00 am were considered as having smoked on the day of the examination. Among these, the proportion of patients who smoked within 60 minutes before the outpatient visit was calculated. Gender differences in smoking status (active, ex-, or non-smoker) were examined. Active smoking/ex-smoking groups defined on the basis of smoking history were compared in terms of age, symptoms, and diagnoses, as were the patients who did or did not smoke on the day of examination. Finally, determinants of smoking behaviour on the day of outpatient clinic visit were investigated.

Statistical Analysis

Data analysis was performed with SPSS 20.0 software pack. Descriptive data for sociodemographical characteristics were provided as frequency tables (n, %). The continuous variables were expressed using median value (minimum-maximum). Kolmogorov-Smirnov test was used to determine the normal distribution of the study data, at a significance level of $p < 0.05$. Significant differences between groups in terms of a variety of numerical parameters were evaluated using the non-parametric Mann Whitney U test. Categorical variables were compared with chi-square or Fisher's exact test. A multivariate logistic regression analysis was carried out to examine the effect of several parameters on the smoking behaviour on the day of outpatient visit. A p level < 0.05 was considered statistically significant.

Results

During the study period, a total of 1863 patients (n=937; 50.3% male), whose smoking status was evaluated in accordance with the protocol during 2.345 examinations were included in the study. Four-hundred and fourteen patients were excluded due to lack of smoking history, and 68 were excluded for having smoked for less than a year. Table 1 presents the demographic characteristics, smoking status, symptoms, and the most common chronic respiratory diagnoses among the participants. A total of 79.5% (n=499) of the active smoking group smoked within 24 hours prior to their outpatient clinic visit, whereas 66.9 % (n=420) of this group also smoked on the day of outpatient clinic visit. The median value of the smoking duration before the examination was 60 minutes (64.5%, n=271) on the day of outpatients clinic visits.

Table 1. Demographic information, complaints and diagnoses of the patients

Gender n (%)	
Women	926(49.7)
Men	937(50.3)
Age median (min-max)	52(40–63)
Smoking status n (%)	
Active smoker	628(33.7)
Ex-smoker	289(15.5)
Non-smoker	946(50.8)
Pack/year median (min-max)	23(12–40)
Complaints n (%)	
Cough	759(40.7)
Haemoptysis	42(2.3)
Chest/back pain	389(20.9)
Dyspnoea	729(39.1)
Sputum	247(13.3)
Nose/throat Itching	66(3.5)
Wheeze	91(4.9)
Diagnoses n (%)	
Chronic obstructive pulmonary disease	136(7.3)
Asthma	259(13.9)
Bronchiectasis	25(1.3)
Lung Cancer	15(0.8)

Males were significantly more likely to be active smokers compared to females ($p<0.001$) (Table 2) There were significantly more non-smokers among female patients compared to male patients ($p<0.001$) (Table 2). The rate of smoking within the last 24 hours and on the day of the examination was significantly higher in women compared to men ($p<0.001$ and $p<0.001$, respectively) (Table 2).

Table 2. Smoking status based on gender

	Smoking Status	Women n(%)	Men n(%)	P value
Active smoker status	Non-smoker	635 (68.6)	311 (33.2)	p<0.001
	Active Smoker	233 (25.2)	395 (42.2)	
	Ex-smoker	58 (6.3)	231 (24.7)	
Smoking status within the last 24 hours	Smoked	156 (67)	192 (48.6)	p<0.001
	Not smoked	77 (33)	203 (51.4)	
Smoking status on the day of the examination	Smoked	133 (57)	160 (40.6)	p<0.001
	Not smoked	100 (43)	235 (59.4)	

When active smokers and ex-smokers were compared, the rate of smoking cessation was found to be significantly higher in men than in women (p<0.001) (Table 3). Patients with chest and back pain were significantly more likely to be current smokers, while smoking cessation was significantly more common among those with sputum production (p=0.003, p=0.02, respectively). Moreover, COPD and bronchiectasis patients had significantly higher rates of smoking cessation, and continued smoking behaviour was more common in those with asthma, although without significant difference (p<0.001, p=0.002, and p=0.09, respectively) (Table 3). Current smokers were significantly younger than those who had quit smoking (p < 0.001) (Table 3).

A comparison of individuals who did or did not smoke on the day of outpatients visits showed significantly higher rate of smoking in subjects with chest/back pain, and in asthmatics (p < 0.001, and p = 0.02, respectively), while smoking behaviour on the day of outpatient visit was significantly less frequent in those with sputum production as well as in COPD and bronchiectasis patients (p=0.004, p < 0.001, and p=0.05, respectively) (Table 4). Patients who smoked on outpatient visit day were significantly younger as compared to those who did not (p < 0.001) (Table 4). Collectively, the most important determinants of smoking on the day of outpatients visits included female gender, pain, and sputum production (OR: 1.60, OR: 1.73, and OR: 0.43, respectively) (Table 5).

Table 3. Comparison of active smoker and ex-smoker groups

	Active smoker	Ex-smoker	P value
Gender n (%)			
Women	233(80.1)	58(19.9)	<0.001
Men	395(63.1)	231(36.9)	
Age median (min-max)	47(38-58)	62(54-70)	<0.001
Symptoms n (%)			
Cough	228(36.3)	100(34.6)	0.617
Haemoptysis	16(2.5)	8(2.8)	0.846
Chest/back pain	160(25.5)	48(16.6)	0.003
Dyspnoea	249(39.6)	104 (36)	0.290
Sputum	76(12.1)	51(17.6)	0.02
Itching	12(1.9)	11(3.8)	0.088
Wheeze	33(5.3)	14(4.8)	0.793
Diagnoses n (%)			
Chronic obstructive pulmonary disease	50(8.0)	51(17.6)	<0.001
Asthma	60(9.6)	18(6.2)	0.094
Bronchiectasis	2(0.3)	8(2.8)	0.002
Lung Cancer	6(1.0)	5(1.7)	0.337

Mann Whitney U test, Chi Square test, Fisher's Exact test, p<0.05 statistically significant

Table 4. Comparison of smokers and non-smokers on the day of outpatient clinic examination

	Smokers	Non-smokers	P value
Age median (min-max)	47(37–56)	59(48–68)	<0.001
Symptoms n (%)			
Cough	178(35.7)	150(35.9)	0,946
Haemoptysis	13(2.6)	11(2.6)	0.980
Chest/back pain	136(27.3)	72(17.2)	<0.001
Dyspnoea	200(40.1)	153(36.6)	0.281
Sputum	54(10.8)	73(17.5)	0.004
Itching	10(2)	13(3.1)	0.286
Wheeze	28(5.6)	19(4.5)	0.466
Diagnoses n (%)			
Chronic obstructive pulmonary disease	34(6.8)	67(16)	<0.001
Asthma	52(10.4)	26(6.2)	0.023
Bronchiectasis	2(0.4)	8(1.9)	0.05
Lung Cancer	3(0.6)	8(1.9)	0.124
Mann Whitney U test, Chi Square test, Fisher's Exact test, p<0.05 statistically significant			

Table 5. Factors affecting smoking on the day of outpatient clinic examination according to logistic regression analysis

Variables	OR (95%CI)	P value
Age	0.96 (0.95-0.97)	<0.001
Gender (Women)	1.60 (1.17-2.18)	0.003
Chest/back pain (Yes)	1.73 (1.23-2,41)	0.001
Sputum (Yes)	0.43 (0.28-0.67)	<0.001
Chronic obstructive pulmonary disease (Yes)	1.20 (0.74-1.94)	0.460
Asthma (Yes)	1.10 (0.66-1.82)	0.712
Bronchiectasis (Yes)	0.38 (0.07-1.86)	0.234
Lung Cancer (Yes)	0.68 (0.17-2.63)	0.578
R2=0.17, -2 loglikelihood=1139.505		

Discussion

This study was carried out to evaluate the smoking history of patients who applied to the Chest Diseases outpatient clinic and to determine whether symptoms, diagnosis and gender have an effect on active smoking status and behaviour on the day they applied to the outpatients clinics. The rate of continued smoking was higher in younger patients, women, and in subjects with chest/back, whereas the rate of smoking cessation was higher among COPD patients, men, and in those with sputum production. The rate of smoking within the last 24 hours and on the day of the examination was significantly higher in women compared to men (Table 2). On the day of outpatient visit, 66.9% (n=420) of the active smokers reported smoking. Women were 1.6 times more likely to smoke on the day of outpatient visit as compared to men. Asthmatic patients with chest and back pain complaints, and younger patients were more likely to continue smoking on the outpatients visit day. On the other hand, smoking on the day of outpatient visit was less common among patients with COPD, and sputum production. Major determinants of smoking behaviour on the day of outpatients visits included female gender and chest/back pain.

To the best of our knowledge, this is the first study to investigate smoking behaviour by gender, diagnosis, and symptoms hours before a pulmonary outpatients clinics.

Active smokers comprised 33.7% of the patients attending to our outpatients clinics. The proportion of active smokers was significantly higher in men compared to women (42.2% and 25.2%, respectively; p<0.001). According to 2016 Global Adult Tobacco Survey (GATS) household data, 31.6% of the participants were active smokers in our country (44.1% in men, and 19.2% in women) [17]. These figures regarding the rate of active smokers in the general population and among men are in line with our observations. However, proportion of active smokers in our female participants was higher than these previous observations, which may be associated with the trend toward increased rates of active smoking among women. Moreover, GATS data were based on household input, whilst this study was conducted in a third level research and training hospital for chest diseases. Consistent with our findings, the incidence of active smoking in men and women in the previous year was 44.2% and 25.6%, as reported by another study from our country [18].

Among our participants, smoking cessation rate was higher in men compared to women in the overall group of smokers (36.9% and 19.9%, p<0.001, respectively). A 2015 meta-analysis looking at the prevalence of age-standardized active smoker status between 2005 and 2015 found that the proportion of active smokers decreased by 27% in men and by 16% in women in 195 countries included [19]. Moreover, another large-scale study investigating the prevalence of smoking between 1996 and 2012 found more pronounced decline in smoking rates among men compared to women (0.9% per year in men and 0.6% in women) [20]. The rate of smoking in women was lower compared to that in men, and the rate of smoking cessation was also lower. Our observations are in agreement with the results of the abovementioned studies. In our study, the mean age of active smokers was significantly lower than that of ex-smokers (47 and 62 years, respectively; p < 0.001). A study conducted in Iran found that the rate of active smoking was highest between 46 and 55 years of age, while ex-smoking was most common between 56 and 65 years of age [21]. According to a study conducted in Ghana on males, 47.5% of active smoking males were aged between 45 and 59 years [22]. Another study in developing countries reported highest prevalence of active smoking among males between the ages of 45 to 49 years, similar to our study. However, in contrast with our findings, highest prevalence was found over 65 years of age in females in that study [23].

Comparison based on gender showed significantly higher rates of smoking within the last 24 hours and on the day of outpatients clinics in women than in men. As suggested by some previous studies, this might be related with the fact that smoking is more commonly utilized as a coping strategy against stress in women, while men are more likely to report smoking for pleasure [15]. Weinberger et al. observed that women smoked more quickly following negative mood induction [24]. Another study found that women had a higher stress-induced desire to smoke compared to men. This behaviour was particularly more common in women whose first degree relative were smoker [25]. Byrne et al. showed that adolescent girls and boys attending secondary schools started smoking, mostly due to stress and non-stress related triggering factors, respectively. These authors suggested that incorporation of stress management strategies into anti-smoking campaigns intended for adolescent girls may prove to be useful [26]. Considering that presenting to a hospital for examination is a source of stress, the results of the present study are consistent with those of the aforementioned studies. There are few studies suggesting that women are less affected by negative mood changes, or that there is no difference based on gender [27,28]. More frequent smoking behaviour among women than among men, even on the day of outpatient clinic appointment, as well as the lower rates of smoking cessation in women than in men suggest that female patients should be given priority in educational/awareness activities regarding smoking cessation.

In our study, cessation rate was lower among smokers with chest/back pain, while it was significantly higher in patients with COPD or bronchiectasis as well as in those with sputum production. Asthmatics and patients with chest/back pain were more likely to exhibit smoking behaviour on the day of the examination, while COPD and bronchiectasis patients as well as those with sputum production were less likely to smoke. It is well established that smoking is the most important risk factor for the development of COPD [29,30]. Studies showing lower rates of quitting among active smoker patients with COPD than in general population have been published [30,31]. However, consistent with our findings, others have reported higher rates of quitting among COPD patients in recent years, mostly as a result of effective treatments [32,33]. Studies as well as meta-analyses have suggested a lower rate of smoking cessation among asthmatics [34,35]. Many asthmatic patients did not consider smoking as a risk factor for their disease [36]. In our study asthmatic patients had lower rates of smoking cessation, although the difference was not significant. Furthermore, our asthmatic patients were found to be more likely to smoke on the day of outpatient clinic appointment. Several previous studies indicated higher rates of smoking in patients with pain [37,38]. Many patients with chronic pain described pain as the motivator of smoking behaviours and stated that they were reluctant to quit smoking due to their pain [39]. Moreover, in experimental conditions, induction of pain was associated with increasing smoking behaviour in humans [40]. Studies report an at least two-fold increased smoking frequency among individuals with pain as compared to general population [39]. In our study, we found a higher rate of active smoking, a lower rate of smoking cessation, and a higher rate of smoking on the day of the outpatients clinics in patients with chest pain. Reduced frequency of smoking behaviour on outpatients clinics day among patients with sputum production might be related with the fact that the sputum production was attributed to smoking, or because these individuals were diagnosed with COPD or bronchiectasis.

The limitations of our study include its retrospective and single-center design. However, since our unit was a special pulmonology center, we believe that characterization of smoking behaviour occurring despite the presence of symptoms may provide significant insights regarding patients' attitudes. Moreover, it is possible that some patients might have provided inaccurate data of their smoking behaviour.

Conclusion

In this study, one third of our patients presenting to a pulmonology outpatients unit were active smokers. Patients with chest/back pain, women, and younger patients were more likely to smoke on the day of the outpatients clinics, and more than half of those who smoked on the day of outpatients visits smoked within the hour prior to the appointment time. The lower rate of smoking cessation as well as higher rate of smoking on the day of outpatients clinics in women, in patients with pain, and among younger patients suggest a higher level of addiction in these groups. Success of anti-smoking campaigns may be positively impacted by paying more attention to gender differences, specific patient groups, and appropriate management of existing symptoms.

Conflict of interests
The authors declare that there is no conflict of interest in the study.

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Ethical approval
This study was approved by the hospital's local ethics committee (date 06.01.2022, protocol number 235).

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