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Original Research

Perceptions of Patients with Respiratory Disorders About Environmental Smoke

Mufide Arzu Ozkarafakili,[1] Metin Yangin,[2] Aslihan Calim[3]

[1]Department of Chest Diseases, Sisli Hamidiye Etfal Training and Research Hospital, Istanbul, Türkiye
[2]Department of Statistics, Mimar Sinan Fine Arts University, Science and Literature Faculty, Istanbul, Türkiye
[3]Department of Internal Medicine, Sisli Hamidiye Etfal Training and Research Hospital İstanbul, Türkiye

Abstract

Objectives: Environmental smoke exposure is a poorly understood issue and might be a potential source of long-term respiratory exposure to toxic pollutants. Both secondhand and thirdhand smoke (THS) exposure are important matters of public health. We aimed to document the knowledge about smoke exposure of vulnerable groups with respiratory diseases.

Methods: A total of 911 currently smoking patients admitted to the outpatient clinics between October 2023 - October 2024 enrolled in our study. Following a medical examination and pulmonary function assessment, individuals were asked to complete the BATHS questionnaire on thirdhand smoking exposure.

Results: Of the 911smoker participants who comprised our sample, 322 (35.3%) had COPD, 227 (24.9%) had asthma and 570 (62.5%) experienced moderate to severe secondhand exposure. Patients with COPD had the lowest BATHS total and persistence scores (3.61±0.58 and 3.77±0.69, respectively), while asthmatics had the lowest BATHS health scores (3.41±0.46) ($p<0.05$). Total and subdimension scores were significantly higher among individuals aged 18-30, university graduates, employed in the workforce, and earning exceeds minimum wage ($p <0.05$). No gender difference was noted ($p>0.05$). BATHS total scores had significant negative correlation with secondhand smoke exposure and disease duration ($p<0.05$) whereas positively correlated with better pulmonary function values, attending a smoking cessation clinic, and living at home with children under sixteen ($p<0.05$).

Conclusion: This study identifies the knowledge gap about the detrimental effects of smoke exposure in patients with respiratory diseases. It underscores the importance of focusing initiatives to reduce both active and passive smoking through educational programs targeting active smokers at risk of lung illnesses.

Keywords: Attitudes, BATHS questionnaire, COPD patients, environmental smoke exposure

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Tobacco use is a significant contributor to preventable diseases and mortality in the entire world.[1] Today, smoking causes over 8 million deaths globally each year, with over 1.2 million of those deaths occurring from passive smoke inhalation rather than direct tobacco use.[1]

Secondhand smoke exposure (SHS), generally referred to as passive smoking, poses a serious health risk, involving the inhalation of a mixture of mainstream and sidestream smoke that contaminates the air surrounding tobacco consumption areas.[2] SHS comprises harmful carcinogen compounds in either particle or vapor phases, rendering it a primary source of indoor pollution.[2]

Address for correspondence: Mufide Arzu Ozkarafakili, MD. Department of Chest Diseases, Sisli Hamidiye Etfal Training and Research Hospital, Istanbul, Türkiye
Phone: +90 533 223 11 00 **E-mail:** aaarzup@yahoo.com

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The other term "thirdhand smoke" (THS) is defined as the accumulated chemical residue that is left behind when the smoke dissipates, because it contains toxic particles that can be deposited on surfaces, furniture, clothing, hair, and even in the atmosphere over time.[3] These compounds may persist on indoor surfaces for days and weeks, and can be ingested, inhaled, or absorbed via the skin by individuals, potentially exhibiting carcinogenic consequences.[4,5] Thus, THS is not directly "smoke". People can protect themselves from SHS exposure by moving away from areas where smoking is prevalent, but THS pollutants are stored in the environment and nothing can be done about it them if THS is present.[4,5]

In low-income populations, the prevalence of indoor smoking is still high despite the governmental regulations of smoking bans.[6] Since SHS is the forerunner of THS accumulation, environmental smoke exposure is more likely to occur in indoor settings where populations have higher smoking rates.[7, 8]

The goal of this study was to assess the understanding of presently smoking patients with respiratory disorders about environmental smoke exposure, as well as to raise their awareness of "toxic tobacco residue".

Furthermore, we intended to determine how respondents' perspectives differ depending on their current smoking behaviors, whether or not they had children living in their houses, and whether or not they were exposed to secondhand smoke in their surroundings.

Methods

This cross-sectional, analytical study was conducted in a training and research hospital after the approval of the Institutional Ethics Committee. The participants consisted of currently smoking patients older than 18 years who were admitted to the Outpatient Clinic of the Chest Disease Department between October 2023 and October 2024. After being informed about the study's purpose, each research participant provided an oral agreement and completed the face-to-face interview.

The participants were cathegorised as: 1- healthy individuals, 2- patients with Chronic Obstructive Pulmonary Disease (COPD) who were diagnosed with Global Initiative for Chronic Obstructive Pulmonary Disease (GOLD) criteria, followed up at least for 2 years in the outpatient clinic and in a stable state 3- patients having a diagnosis of asthma according to Global Initiative for Asthma (GINA) criteria, did not have an acute attack history in the previous month and have regular follow-ups in the outpatient department for the past 2 years.[9, 10] During the outpatient visit, professional staff members performed pulmonary function tests on each participant using the Spirolab (MIR II, Rome, Italy) devices and adhering to American Thoracic Society (ATS) standardized requirements.[9] Patients either with COPD or asthma were all under maintenance treatment according to guidelines.[9, 10] Asthma Control Test (ACT) was applied for patients with asthma, COPD assessment test (CAT) for patients with COPD and their exacerbation history of the previous year were all recorded.[11,10] The sociodemographic details, comorbidities, income level, qualification, and marital status were all noted.

The Fagerström Test for Nicotine Dependence (FTND) questionnaire, is a validated tool that rates nicotine dependency on a scale of 0 to 10, with 10 being the highest level of dependence.[12]

Secondhand smoke exposure which mainly forms by inhaling environmental tobacco smoke was evaluated with an 11-point scale questionnaire comprising four ranked questions which was developed by Vardavas and his colleagues.[13] This scale asks about many exposure sites, such as daily exposure at home or in a car, weekly exposure in public spaces, and weekly exposure at work. Each response is given a specific number of points. It allows for a quantitative assessment of SHS exposure, with a maximum score of 11.[13]

People's opinions on thirdhand smoke are measured by the Beliefs About Third-Hand Smoke Scale (BATHS-T).[14] At the beginning of the study, participants were given educational materials regarding the term "thirdhand smoke", and then a face-to-face Turkish-validated questionnaire, the BATHS-T, was used to assess their knowledge and attitudes around thirdhand smoke.[15] The questionnaire was created following a thorough review of the pertinent literature.

There are nine questions total; five address the impact of third-hand smoke on health (1, 2, 3, 7, and 8), and four address the longevity of THS in the environment (4, 5, 6, and 9). The answers are arranged using the Likert type with five points.[14]

People select one among the five options: strongly disagree, disagree, agree, disagree, and remain undecided. The average score can be found by dividing the total score by the total number of questions. It's possible to receive one point at the very least and five at the most. People's levels of awareness are seen as increasing with their scores.

Statistical Analysis

The suitability of the variables in the study to normal distribution was evaluated graphically and with Shapiro Wilk's test, and the mean and standard deviation were used as descriptive statistics of the variables with normal distribution. The median (minimum; maximum) was used as descriptive statistics for variables that were determined not to have a normal distribution. The relationship between demographic characteristics and smoking-related variables and groups was examined with Pearson Chi-square. Kruskal-Wallis analysis of variance was used to compare the differences in age at smoking initiation, duration of disease, Forced Vital Capacity (FVC) %, Forced Expiratory Volume in 1st second (FEV1) %, FEV1/FVC % values, as well as scores on BATHS total (BATHSt), BATHS health (BATHSh), and BATHS persistence (BATHSp), regarding the health status of the participants. If a difference was detected between groups, Bonferroni corrected pairwise comparison results were examined. Mann Whitney U test was used to compare the differences in demographic characteristics and smoking-related variables according to scores on BATHSt, BATHSh, and BATHSp. Pearson correlation analysis was performed for the relationship between scores on BATHSt, BATHSh, and BATHSp with age at smoking initiation, duration of disease, values of FVC%, FEV1%, FEV1/FVC%.

IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp. Armonk, NY) and MS-Excel 2016 programs were used for statistical analyses and calculations. Statistical hypotheses were evaluated by taking the Type-I error level $\alpha=0.05$.

Results

A total of 911 smokers completed the surveys with all the required answers, of whom 35.3% had COPD, 24.9% had asthma and 39.7% were healthy adults. Table 1 presents a comparison of the research groups' demographics regarding their smoking-related factors.

The study group consisted of 510 (55,9%) men, and 189 (20.7%) of the individuals were over 65. The most common comorbidities among them were hypertension (16%) and cardiovascular diseases (12%), while 12% had more than one comorbidity. 57.7% of the respondents stated that their parents smoked at home when they were growing up, and 49% currently share their homes with a family member who smokes. The proportion of participants living with a child under the age of 16 at home was 50%.

69.2% of the 911 participants reported smoking at home, whereas 35% continued to smoke at work despite government policies prohibiting smoking in enclosed areas and public locations. Furthermore, 62% of the study participants noted moderate to smoke exposure at home, work, in cars, or in public places.

According to the Fagerström test, 17% of research participants had significant nicotine dependency, 45% smoked more than 20 cigarettes a day. Only 20% of the total stated that they had been admitted to a smoking cessation clinic.

Asthmatics had a significantly younger smoking start age (18.85±3.63 years) compared to healthy individuals and COPD patients ($p<0.05$).

COPD patients had longer disease duration and lower lung function test results compared to asthmatics ($p <0.05$). Asthmatics scored higher on the BATHSt and BATHSp knowledge assessment of thirdhand smoke than COPD patients, who scored lower on the BATHSt and BATHSp knowledge assessment ($p<0.05$).

The associations between patients' BATHS total and subscale scores and smoking-related characteristics were thoroughly examined. It was concluded that there is a statistically significant relationship between the third-hand tobacco smoke exposure awareness scale (BATHS) total scores and the variables of the participants, which were documented in Table 2.

The Dunn-Bonferroni test was used in a pairwise comparison of BATHS scores according to the study groups to determine which group was responsible for the variation in age, comorbidity, daily cigarette consumption, and the Fagerström dependence test (not shown).

The following instances had higher BATHS total scores: individuals who were between the ages of 18 and 30 and university graduates, patients with allergic rhinitis; those who smoke one to ten cigarettes a day and score lower on the Fagerström dependence test; those who live at home with children under the age of 16; patients who smoke at work; patients who do not smoke at home; those who seek help from a smoking cessation clinic; those who lead active lives in the workforce; and those whose income exceeds the minimum wage ($p<0.05$). The BATHS total scores of individuals with COPD were recorded as the lowest and those with asthma as the highest in the survey ($p<0.05$).

The relationship between BATHS health scores and the smoking-related variables of the groups is shown in Table 3.The BATHS health scores showed a statistically significant correlation with smoking status at home or at the workplace, having a parent who smoked when they were a child, being employed full-time, admission to a smoking cessation clinic, income level, and educational status ($p<0.05$). The Dunn-Bonferroni test was utilized to identify the group responsible for the variation between the study groups based on health status, exposure to secondhand smoke, comorbidity, and daily cigarette consumption (not shown).

The highest BATHS health scores were noted in those in-

Table 1. Comparison of the demographic characteristics and smoking related variables of the groups

	Healthy group n (%)	Patients with COPD, n (%)	Patients with asthma, n (%)	Statistics of the test	
Total	362 (39.7)	322 (35.3)	227 (24.9)		
Variables				x^2	p
Age					
18 – 30 years	52 (14.4)	0 (0.0)	56 (24.7)	342.224	< 0.001
31 – 50 years	119 (32.9)	9 (2.8)	123 (54.2)		
51 – 65 years	125 (34.5)	198 (61.5)	40	(17.6)	
>65 years	66 (18.2)	115 (35.7)	8 (3.5)		
Gender					
Female	154 (42.5)	124 (38.5)	123 (67.3)	13.808	0.001
Male	208 (57.5)	198 (61.5)	104 (32.7)		
Living with a child<16 years old					
Absent	145 (40.1)	221 (68.6)	86 (37.9)	72.317	< 0.001
Present	217 (59.9)	101 (31.4)	141 (62.1)		
Comorbidities					
-	210 (58.0)	80 (24.8)	97 (42.7)	244.524	< 0.001
Hypertension	36 (9.9)	86 (26.7)	32 (14.1)		
Cardiovascular diseases	37 (10.2)	58 (18.0)	21 (9.3)		
Diabetes	20 (5.5)	3 (0.9)	7 (3.1)		
Chronic Renal Diseases	5 (1.4)	23 (7.2)	4 (1.8)		
Allergic Rhinitis	8 (2.3)	11 (3.5)	58 (25.5)		
≥1 comorbidities	46 (12.7)	61 (18.9)	8 (3.5)		
Smokers among the household members					
Absent	203 (56.1)	122 (37.9)	131 (57.7)	29.638	< 0.001
Present	159 (43.9)	200 (62.1)	96 (42.3)		
Smoking at home					
No	72 (19.9)	77 (23.9)	131 (57.7)	104.625	< 0.001
Yes	290 (80.1)	245 (76.1)	96 (42.3)		
Having smoker parents during childhood					
No	125 (34.5)	120 (37.3)	140 (61.7)	47.216	< 0.001
Yes	237 (65.5)	202 (62.7)	87 (38.3)		
Exposure to secondhand smoke (home, car, workplace, public areas)					
-	23 (6.4)	20 (6.2)	103 (45.4)	252.161	< 0.001
Mild	80 (22.1)	52 (16.1)	63 (27.8)		
Moderate	214 (59.1)	169 (52.5)	47 (20.8)		
High	45 (12.4)	81 (25.2)	14 (6.2)		
Occupational status					
Unemployed	123 (34.0)	140 (43.5)	69 (30.4)	11.414	0.003
Active working	239 (66.0)	182 (56.5)	158 (69.6)		
Smoking at workplace					
No	217 (59.9)	198 (61.5)	176 (77.5)	21.441	< 0.001
Yes	145 (40.1)	124 (38.5)	51 (22.5)		
Marital status					
Single	133 (36.7)	106 (32.9)	137 (60.4)	46.431	< 0.001
Married	229 (63.3)	216 (67.1)	90 (39.6)		
Number of cigarettes smoked per day					
1 - 10	17 (4.7)	16 (5.0)	158 (59.6)	473.316	< 0.001
11 - 20	122 (33.7)	118 (36.6)	66 (29.1)		
>21	223 (61.6)	188 (58.4)	3 (1.3)		

Table 1. Comparison of the demographic characteristics and smoking related variables of the groups (Cont.)

	Healthy group n (%)	Patients with COPD, n (%)	Patients with asthma, n (%)	Statistics of the test	
Admission to cigarette cessation department					
No	282 (77.9)	239 (74.2)	200 (88.1)	16.107	< 0.001
Yes	80 (22.1)	83 (25.8)	27 (11.9)		
Nicotine dependency (Fagerström test)					
Mild nicotine dependence	261 (72.1)	63 (19.6)	166 (73.1)	340.442	< 0.001
Moderate nicotine dependence	97 (26.8)	110 (34.2)	51 (22.5)		
High nicotine dependence	4 (1.1)	149 (46.2)	10 (4.4)		
Educational status					
Primary or secondary school	109 (30.1)	189 (58.7)	78 (34.4)	63.409	< 0.001
University graduates	253 (69.9)	133 (41.3)	149 (65.6)		
Level of income					
Below minimum wage	169 (46.7)	260 (80.7)	153 (67.4)	87.307	< 0.001
Above minimum wage	193 (53.3)	62 (19.3)	74 (32.6)		
Having an exacerbation or attack last year for patients with COPD and asthma					
No		167 (51.9)	144 (63.4)	7.261	0.007
Yes		155 (48.1)	83 (36.6)		
	Mean±SD	**Mean±SD**	**Mean±SD**	**x^2**	**p**
Start age for smoking initiation	19.81±3.35	19.73±3.70	18.85±3.63	24.116	< 0.001
Duration of the disease (years)		14.68±7.87	11.00±5.96	29.928	< 0.001
FEV1%	86.32±11.99	51.67±12.49	84.91±12.48	582.158	< 0.001
FVC %	96.38±10.95	74.16±18.09	96.12±12.09	302.375	< 0.001
FEV1/FVC %	91.36±8.24	72.38±12.60	90.75±7.69	370.646	< 0.001
BATHS Total Scores	3.98±0.50	3.61±0.58	4.05±0.51	122.014	< 0.001
BATHS Health Scores	3.80±0.49	3.47±0.55	3.41±0.46	104.356	< 0.001
BATHS Persistence Scores	4.19±0.60	3.77±0.69	4.83±0.65	293.406	< 0.001

dividuals who had completed their university education, those who led active lives in the workforce, and those whose income exceeded the minimum wage; those who smoked at home or the workplace, had moderate levels of secondhand tobacco exposure, had grown up with a smoker parent, sought assistance from a smoking cessation clinic, had diabetes, and smoked twenty-one or more cigarettes per day ($p < 0.05$). The healthy participants had the highest BATHS health scores in the survey, while the patients with asthma recorded the lowest ($p<0.05$).

There was a statistically significant relationship between the BATHS scale persistence scores and the smoking-related variables shown in Table 4. The Dunn Bonferroni test was used to determine which group the difference originated from according to variables (not shown).

Individuals with the highest BATHS persistence scores were single, aged 18 to 30, university graduates, led active lives at work, earned more than the minimum wage every month, had allergic rhinitis, were not exposed to secondhand tobacco smoke, smoked one to ten cigarettes per day, and had the mildest nicotine dependence ($p<0.05$).

Furthermore, those individuals who did not smoke at home, did not have a family member who smoked, did not have a child under the age of sixteen living at home, did not have a parent who smoked when they were children, and were COPD or asthma patients with no exacerbation in the previous year all had higher BATHSp scores ($p<0.05$). It's interesting to notice that COPD patients scored the lowest on the BATHSp survey, while asthma patients obtained the highest scores ($p<0.05$).

Table 5 presents the correlation analysis between the patients' clinical features and their BATHS total and subscale scores. While BATHS total scores were positively correlated with visiting a smoking cessation clinic, living at home with children under sixteen, and FEV1%, FVC%, FEV1/FVC%, CAT, and ACT values ($p<0.05$). However, they showed a significant negative correlation with disease duration and secondhand smoke exposure ($p<0.05$).

Tablo 2. Relationship between BATHS total score and the variables

Variable	Median (Min., Max.)	Test Statistics	
		z	p
Gender			
Female	4.00 (2.22; 4.78)	-0.821	0.412
Male	4.00 (2.44; 4.67)		
Living with a child <16 years old			
No	4.00 (2.22; 4.67)	-2.030	0.042
Yes	4.00 (2.44; 4.78)		
Smokers among the household members			
No	4.00 (2.22; 4.78)	-1.909	0.056
Yes	4.00 (2.44; 4.78)		
Smoking at home			
No	4.00 (2.44; 4.78)	-1.981	0.048
Yes	4.00 (2.22; 4.67)		
Having smoker parents during childhood			
No	4.00 (2.22; 4.78)	-0.337	0.736
Yes	4.00 (2.22; 4.78)		
Occupational status			
Unemployed	3.89 (2.22; 4.67)	-5.448	< 0.001
Active working	4.00 (2.44; 4.78)		
Smoking at workplace			
No	4.00 (2.22; 4.78)	-2.162	0.031
Yes	4.00 (2.44; 4.78)		
Marital status			
Single	4.00 (2.22; 4.78)	-1.651	0.099
Married	4.00 (2.22; 4.67)		
Admission to cigarette cessation department			
No	4.00 (2.22; 4.78)	-2.138	0.033
Yes	4.00 (2.44; 4.67)		
Educational status			
Primary or secondary school	3.78 (2.22; 4.67)	-15.403	< 0.001
University graduates	4.00 (2.22; 4.78)		
Level of income			
Below minimum wage	3.89 (2.22; 4.78)	-6.630	< 0.001
Above minimum wage	4.00 (2.22; 4.78)		
Having an exacerbation or attack last year for patients with COPD and asthma			
No	4.00 (2.22; 4.78)	-1.722	0.085
Yes	3.89 (2.44; 4.67)		
Variables	**Median (Min.; Max.)**	**Test Statistics**	
		x^2	p
Healthy group	4.00 (2.44; 4.67)	122.014	< 0.001
COPD	3.78 (2.22; 4.67)		
Asthma	4.00 (2.44; 4.78)		
Age			
18 – 30	4.00 (2.67; 4.78)	53.268	< 0.001
31 – 50	4.00 (2.44; 4.78)		
51 – 65	4.00 (2.22; 4.78)		
≥65	3.89 (2.22; 4.67)		

Tablo 2. Relationship between BATHS total score and the variables (Cont.)

Variable	Median (Min., Max.)	Test Statistics	
		z	p
Comorbidity			
-	4.00 (2.44; 4.78)	38.320	< 0.001
Hypertension	4.00 (2.22; 4.78)		
Cardiovascular diseases	4.00 (2.44; 4.67)		
Diabetes	4.00 (2.67; 4.67)		
Chronic renal diseases	3.78 (2.22; 4.67)		
Allergic Rhinitis	4.00 (2.44; 4.67)		
Comorbidities ≥1	3.78 (2.44; 4.67)		
Exposure to secondhand smoke			
-	4.00 (2.44; 4.78)	6.082	0.108
Mild	4.00 (2.22; 4.78)		
Moderate	4.00 (2.22; 4.67)		
High	4.00 (2.44; 4.67)		
Number of cigarettes smoked per day			
1-10	4.00 (2.44; 4.78)	24.588	< 0.001
11-20	3.89 (2.22; 4.78)		
≥ 21	4.00 (2.22; 4.67)		
Nicotine dependency (Fagerström Test)			
Mild nicotine dependence	4.00 (2.22; 4.78)	39.762	< 0.001
Moderate nicotine dependence	4.00 (2.33; 4.78)		
High nicotine dependence	3.89 (2.22; 4.67)		

A positive correlation was found between BATHS health scores and FEV1%, FVC%, FEV1/FVC% values, the status of visiting a smoking cessation clinic, exposure to secondhand smoke, age of smoking initiation, and having grown up with smoking parents (p <0.01). The BATHS persistence scores were positively correlated with FEV1%, FVC%, FEV1/FVC% values and living at home with children under sixteen, whereas, they were negatively correlated with disease duration, exposure to secondhand smoke, and having grown up with smoker parents (p<0.01).

There was a positive and significant relationship between exposure to secondhand smoke and visiting a smoking cessation clinic and having grown up with smoker parents (p<0.01). It was found that visiting a smoking cessation clinic among the study participants was positively correlated with having grown up with smoker parents, disease duration, and CAT scores (p<0.05).

S.D.: Standard Deviation, BATHS: Beliefs About Third-Hand Smoke Scale, FEV1%: Forced expiratory volume in 1. second, FVC%: Forced vital capacity, FEV1/FVC%: Forced expiratory volume in 1. second to forced vital capacity ratio, CAT: Chronic Obstructive Pulmonary Disease Assessment Test, ACT: Asthma Control Test, SHS: Second hand smoke.

Discussion

The potential health outcomes of firsthand smoke are well-recognized and research priorities have shifted to focus on secondhand and thirdhand smoke exposures, two public health concerns. Approximately 80% of tobacco products consumed worldwide are found in low- and middle-income nations.[1]

Research indicates that approximately 40% of patients with COPD or asthma persist in smoking, despite being aware of their respiratory condition and the adverse effects of smoking on their prognosis and disease progression.[16,17]

The main objective of our study was to assess current smokers' awareness of the negative effects of smoking on not only themselves but also on family members and colleagues, as well as the particular concept of THS. We intended to draw attention to the fact that these smokers should at least follow the smoking ban at home or in other enclosed spaces.

Our findings highlight a lack of awareness about thirdhand smoke among smokers with COPD who displayed the lowest scores in BATHS total and persistence scores. These scores may be associated with the individual's educational background or insufficient health literacy.

Table 3. Relationship between BATHS health scores and the variables

Variables	Median (Min., Max.)	Test Statistics	
		z	p
Gender			
Female	3.60 (2.00; 4.60)	-1.013	0.311
Male	3.60 (2.00; 5.20)		
Living with a child <16 years old			
No	3.60 (2.00; 5.20)	-0.203	0.839
Yes	3.60 (2.00; 5.20)		
Smokers among the household members			
No	3.60 (2.00; 5.20)	-0.401	0.688
Yes	3.60 (2.00; 4.60)		
Smoking at home			
No	3.60 (2.00; 4.60)	-2.562	0.010
Yes	3.60 (2.00; 5.20)		
Having smoker parents during childhood			
No	3.60 (2.00; 4.60)	-3.491	< 0.001
Yes	3.60 (2.00; 5.20)		
Occupational status			
Unemployed	3.60 (2.00; 4.60)	-4.575	< 0.001
Active working	3.60 (2.00; 5.20)		
Smoking at workplace			
No	3.60 (2.00; 5.20)	-4.414	< 0.001
Yes	3.80 (2.20; 5.20)		
Marital status			
Single	3.60 (2.00; 5.20)	-1.125	0.261
Married	3.60 (2.00; 4.80)		
Admission to cigarette cessation department			
No	3.60 (2.00; 5.20)	-4.350	< 0.001
Yes	3.80 (2.20; 5.20)		
Educational status			
Primary or secondary school	3.40 (2.00; 4.60)	-12.335	< 0.001
University graduates	3.80 (2.20; 5.20)		
Level of income			
Below minimum wage	3.60 (2.00; 5.20)	-6.191	< 0.001
Above minimum wage	3.80 (2.20; 5.20)		
Having an exacerbation or attack last year for patients with COPD and asthma			
No	3.60 (2.00; 4.40)	-0.176	0.860
Yes	3.60 (2.00; 4.40)		
Variables	**Median (Min.; Max.)**	**Test Statistics**	
		x^2	p
Healthy	3.80 (2.40; 5.20)	104.356	< 0.001
COPD	3.60 (2.00; 4.40)		
Asthma	3.40 (2.00; 4.00)		
Age			
18 – 30	3.60 (2.00; 4.60)	2.405	0.493
31 – 50	3.60 (2.00; 4.60)		
51 – 65	3.60 (2.00; 5.20)		
≥ 65	3.60 (2.00; 4.60)		

Table 3. Relationship between BATHS health scores and the variables (Cont.)

Variables	Median (Min., Max.)	Test Statistics	
		z	p
Comorbidity			
-	3.60 (2.00; 5.20)	17.131	0.009
Hypertension	3.60 (2.00; 4.60)		
Cardiovascular diseases	3.60 (2.00; 4.40)		
Diabetes	3.70 (2.60; 4.60)		
Chronic renal diseases	3.40 (2.20; 5.20)		
Allergic rhinitis	3.60 (2.40; 4.40)		
Comorbidities ≥ 1	3.60 (2.00; 4.60)		
Exposure to secondhand smoke			
-	3.60 (2.00; 4.40)	18.889	< 0.001
Mild	3.60 (2.20; 5.20)		
Moderate	3.60 (2.00; 5.20)		
High	3.60 (2.20; 4.60)		
Number of cigarettes smoked per day			
1- 10	3.60 (2.00; 4.20)	36.723	< 0.001
11- 20	3.60 (2.00; 5.20)		
≥ 21	3.80 (2.20; 5.20)		
Nicotine dependency (Fagerström test)			
Mild nicotine dependence	3.60 (2.00; 5.20)	4.961	0.084
Moderate nicotine dependence	3.60 (2.00; 4.60)		
High nicotine dependence	3.60 (2.00; 5.20)		

The prevalence of smoking among parents (62.7%), increased rates of household smokers (62.1%), moderate to high exposure to secondhand smoke (77.7%), and workplace smoking (38.5%) among patients with COPD may be regarded as influential factors in their attitudes. Tobacco addiction is a chronic disease, thus quitting smoking may be more challenging for those with COPD than for those without it due to increased nicotine dependence.[18]

Furthermore, plenty of information has pointed out that newly diagnosed COPD is increasingly prevalent in younger adults and females, proving that the illness is no longer limited to older men.[1] The tobacco industry may contribute to the rise in female smokers worldwide since it encourages women to smoke by messages as a symbol of gender equality in the media.[19]

The low scores for persistence beliefs suggested that patients with COPD believed that simply opening the windows or turning on the air conditioner in interior spaces at home or the workplace was sufficient to purify the air and that smoke particles could not remain on walls or furniture.

According to a recent study examining THS beliefs, patients with asthma or COPD had lower health domain scores and had impairments in self-awareness of their health state.[20] Despite their vulnerability to smoke exposure, which could exacerbate respiratory symptoms, those individuals have continued to smoke inside under prevailing restrictions and do not care about their family members or colleagues. WHO recommends that all individuals be educated on the health effects of tobacco, including its addictive characteristics and risk factors associated with secondhand smoke exposure.[1]

Based on their BATHS total scores, our research participants with asthma were generally aware of the adverse effects of tobacco smoke. However, they are likely to underestimate the health risks and still have some knowledge gaps because, like the previously cited study, they recorded the lowest scores in health beliefs.[20] Additionally, participants with asthma began smoking at younger ages and visited the cigarette cessation department less frequently than those in the healthy group and COPD patients.

Although the risks of environmental smoke inhalation are higher in active smokers, adult smokers with asthma may continue to smoke because they have learnt to use tobacco as a coping mechanism for stressful situations or unpleasant emotional experiences. In line with the results of our study and earlier research, younger people with higher levels of education and financial status were more likely to believe that THS components will contaminate cloth-

Tablo 4. Relationship of BATHS persistence scores in terms of variables

Variable	Median (Min., Max.)	Test statistics	
		z	p
Gender			
Female	4.25 (2.25; 6.50)	-1.368	0.171
Male	4.25 (2.00; 5.75)		
Living with a child <16 years old			
No	4.25 (2.25; 6.00)	-2.732	0.006
Yes	4.25 (2.00; 6.50)		
Smokers among the household members			
No	4.25 (2.25; 6.50)	-2.143	0.032
Yes	4.25 (2.00; 5.75)		
Smoking at home			
No	4.50 (2.50; 6.00)	-5.093	< 0.001
Yes	4.25 (2.00; 6.50)		
Having smoker parents during childhood			
No	4.25 (2.25; 6.00)	-2.276	0.023
Yes	4.25 (2.00; 6.50)		
Occupational status			
Unemployed	4.25 (2.25; 5.75)	-4.938	< 0.001
Active working	4.25 (2.00; 6.50)		
Smoking at workplace			
No	4.25 (2.25; 6.00)	-0.375	0.707
Yes	4.25 (2.00; 6.50)		
Marital status			
Single	4.50 (2.50; 6.00)	-3.383	0.001
Married	4.25 (2.00; 6.50)		
Admission to cigarette cessation department			
No	4.25 (2.00; 6.50)	-0.328	0.743
Yes	4.25 (2.50; 5.75)		
Educational status			
Primary or secondary school	4.00 (2.00; 5.75)	-12.727	< 0.001
University graduates	4.50 (2.25; 6.50)		
Level of income			
Below minimum wage	4.25 (2.00; 5.75)	-4.914	< 0.001
Above minimum wage	4.50 (2.22; 4.78)		
Having an exacerbation or attack last year for patients with COPD and asthma			
No	4.25 (2.00; 6.00)	-2.171	0.030
Yes	4.25 (2.50; 6.50)		
Variables	**Median (Min., Max.)**	**Test statistics**	
		x^2	p
Healthy group	4.25 (2.50; 5.00)	293.406	<0.001
COPD	4.00 (2.00; 5.00)		
Asthma	5.00 (3.00; 6.50)		
Age			
18 – 30	4.50 (2.50; 6.00)	120.189	< 0.001
31 – 50	4.50 (2.50; 6.50)		
51 – 65	4.25 (2.00; 6.00)		
≥ 65	4.00 (2.50; 5.00)		

Tablo 4. Relationship of BATHS persistence scores in terms of variables (Cont.)

Variable	Median (Min., Max.)	Test statistics	
		z	p
Comorbidities			
-	4.25 (2.00; 6.50)	73.035	< 0.001
Hypertension	4.25 (2.50; 5.75)		
Cardiovascular diseases	4.25 (2.50; 5.75)		
Diabetes	4.50 (2.75; 5.75)		
Chronic renal diseases	4.00 (2.25; 5.50)		
Allergic Rhinitis	5.00 (2.50; 5.75)		
Comorbidities ≥1	4.00 (2.50; 5.00)		
Exposure to secondhand smoke			
-	4.75 (2.50; 5.75)	45.615	< 0.001
Mild	4.25 (2.25; 6.00)		
Moderate	4.25 (2.50; 5.75)		
High	4.25 (2.00; 6.50)		
Number of cigarettes smoked per day			
1-10	4.75 (2.50; 6.00)	138.346	< 0.001
11- 20	4.25 (2.50; 6.50)		
≥ 21	4.25 (2.00; 5.00)		
Nicotine dependency (Fagerström test)			
Mild nicotine dependence	4.50 (2.50; 6.00)	67.481	< 0.001
Moderate nicotine dependence	4.25 (2.50; 6.50)		
High nicotine dependence	4.00 (2.00; 5.00)		

ing, hair, or furniture and harm other people's health.[20,21] Participants over 65 reported the lowest BATHS total and persistence belief scores in our survey.

Unlike previous studies, we did not find a gender difference on behalf of women in the beliefs regarding the influence of THS on health.[20,21]

Even though half of our study population were living with someone under the age of sixteen, 69% declared no smoking ban at home and 49% of them had a household member who also smokes. Another concern was that these people viewed smoking exclusively on the balcony or in the bathroom as a means to a home smoking ban or reduce exposure.

It is the indispensable duty of parents to provide a healthy and smoke-free environment for their children. Homes stand still as an important site of unintentional smoke exposure for the kids, even if the data THS may induce fetal lung injury.[22] Besides, children who are exposed to secondhand smoke may potentially mimic smoking as a result of modeling their parents or friends.[23,24]

Consistent with previous research, our study participants who had children under the age of sixteen and did not smoke at home scored higher overall on the BATHS than those without children.[5,23,25,26,27] Nonetheless, the fact that they smoked at workplaces might suggest that these parents believed passive smoking only harmed children. Another investigation showed the disparity between parents' practical approach and their awareness of THS, which may have contributed to our current finding.[28]

Furthermore, similar to the recent study, BATHS persistence scores were highest among participants without children younger than sixteen years of age. In line with previous findings, growing awareness of THS appears to have a greater impact on smoker parents' views on smoke exposure in children than SHS.[5,23]

63% of our recruited individuals were active workers, 35% reported smoking at work despite indoor smoking bans, and 62% reported moderate to severe environmental tobacco smoke exposure in their vehicles or public places. Our investigation revealed a negative correlation between BATHS scores, secondhand smoke exposure, and disease duration, which may be interpreted as a consequence of this interaction.

The majority of our participants were middle-aged and employed in furniture and textile manufacturing. It is noteworthy that the risk of patients being subjected to tobacco smoke and its harmful toxicants was rising because smoke residues were likely to be stored in a substantial amount in

Table 5. Correlation analysis findings

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
BATHS total	3.86	0.57	1,00													
BATHS health	3.59	0.53	0.876**	1.00												
BATHS persistence	4.20	0.76	0.908**	0.596**	1.00											
Start age of smoking	19.54	3.57	0.031	0.095**	-0.033	1.00										
Duration of disease	13.16	7.36	-0.178**	-0.061	-0.230**	0.335**	1.00									
FEV1%	73.72	20.43	0.263**	0.127**	0.327**	-0.085*	-0.252**	1.00								
FVC%	88.46	17.64	0.210**	0.102**	0.259**	-0.092**	-0.177**	0.856**	1.00							
FEV1/FVC%	84.50	13.35	0.216**	0.100**	0.271**	-0.062	-0.240**	0.737**	0.327**	1.00						
CAT	21.49	5.21	-0.057	-0.066	-0.044	-0.245**	-0.213**	-0.614**	-0.498**	-0.268**	1.00					
ACT	21.28	1.85	-0.014	-0.037	0.008	-0.077	-0.080	0.223**	0.211**	0.072	0.001	1.00				
Exposure to SHS	1.62	0.93	-0.078*	0.115**	-0.199**	0.164**	0.072	-0.181**	-0.144**	-0.129**	0.029	-0.092	1.00			
Admission to smoking cessation department	0.21	0.41	0.071*	0.114**	-0.011	0.177	0.097*	-0.073*	-0.049	-0.116**	0.121*	-0.085	0.241**	1.00		
Having a smoker parent during childhood	0.58	0.49	0.011	0.116**	-0.075*	0.052	0.053	-0.023	0.004	-0.078*	0.144**	-0.018	0.606**	0.319**	1.00	
Living with a child<16 years old	0.50	0.50	0.067*	0.007	0.091**	-0.021	-0.271**	0.253**	0.207**	0.189**	-0.070	-0.027	-0.061	-0.069*	-0.040	1.00

** The correlation was found to be significant at the 0.01 level. * The correlation was found to be significant at the 0.05 level.

organic products such as cotton and upholstery fabric. The problem lies in the encouragement of smoking and exposure to secondhand smoke when individuals who smoke remain in situations where smoking is allowed. A previous study found that a total smoking ban in the workplace prompts individuals to also prohibit smoking among their families.[24]

Moreover, in susceptible individuals, inhaling secondhand smoke in enclosed places may increase the likelihood of developing an early onset of respiratory disorder.[25]

The current study discovered a positive correlation between overall BATHS scores and pulmonary function tests and admittance to the smoking cessation clinic based on the correlation analysis carried out concurrently.

These findings might reflect the importance of health literacy and nicotine dependence as influential factors in environmental tobacco smoke exposure. It should be kept in mind that, even after they quit smoking, THS is still present in homes of smokers. Researchers have demonstrated that, since homes are contaminated by cigarette smoke, the existence of nicotine in settled house dust before quitting smoking may increase the likelihood of relapse in people who have tried to give up tobacco usage.[8] This contamination must be adressed as a matter of consumer protection.

Unlike most other studies, we did not examine the views of nonsmokers because of the significance of widespread exposure to anti-tobacco messages as a community-level strength for current smokers.[5,20,23] A few of these investigations revealed no statistically significant difference in THS beliefs between smokers and nonsmokers.[23,28] As shown in our results, the healthy smokers recorded the highest scores in BATHS health scale.

This study had several limitations. It was an exploratory observational study conducted in a single center using patient self-reports, therefore the findings should be interpreted with cautiously.

On the other hand, our strength was that the questionnaires were administered face-to-face not online, so, during the interviews, health professionals' advice on quitting was also reaffirmed as part of the counseling process.

Conclusion

Even though it is commonly recognized that smoking impairs lung function and the course of COPD disease, our respondents with COPD tend to underestimate the harmful effects of THS.

The respondents with asthma expressed a lack of knowledge regarding the health implications of THS. Further-

more, exposure to secondhand smoking was higher than expected among the examined subjects, which was a very intriguing finding. Involuntary exposure to secondhand or thirdhand smoke produces harmful environmental conditions that persist over time and for protecting non-smokers, this research might shed light on the duty of physicians.

The questionnaire administered during the outpatient visit included statements such as "the residue of the smoke stays at home even after several months," which made sense to patients with smoking-related diseases and may have convinced them to change their opinions toward tobacco usage. Spreading the awareness of people about tobacco smoke exposure and changes in social skills might result in feedback that motivates people creating smoke-free homes and vehicles. Therefore, even stating a simple message to the smokers that THS cannot be completely removed from the furniture or walls by regular cleanup might help implement a smoke-free home policy and improve the health of children by limiting smoke exposure, which are essential components of tobacco control programs.

In this way, we may better understand how social influences and risk perceptions make people continue smoking and so by developing new educational strategies and paying attention to these challenges, we will ultimately achieve our more significant objective of preventative action against tobacco use and its adverse health effects.

Disclosures

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