

RESEARCH
ARTICLE

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**Physicians' Beliefs and Opinions About Third-hand Smoke- A Cross-Sectional Study****ABSTRACT**

Objective: Research to date has revealed that communities lack adequate knowledge about third-hand smoke, and their beliefs and attitudes towards it are not well-developed. In this study, it was aimed to assess the beliefs and opinions of physicians from different clinics regarding third-hand smoke.

Method: This cross-sectional study was conducted from September 2022 to November 2022, with the participation of 245 physicians. We conducted face-to-face interviews to collect sociodemographic data, department of employment, chronic illness, smoking habits, and responses to the Beliefs About Third-Hand Smoke-Turkish scale. The significance level was set at $p < 0.05$.

Results: The participants had an average age of 33.46 ± 7.51 years, with 53.5% ($n=131$) being female. Among them, 55.51% ($n=136$) had never smoked, 31.83% ($n=78$) were current smokers, and 12.65% ($n=31$) had quit smoking. About three-fourths had never heard of third-hand smoke. Female, single, physicians with chronic obstructive pulmonary disease or asthma, non-smokers, those who prohibited smoking at home, and those who advised patients to quit smoking had significantly stronger beliefs about third-hand smoke exposure.

Conclusions: In this study, physicians' beliefs and opinions concerning third-hand smoke exposure were examined, and it was found that a significant number of them had no prior knowledge of third-hand smoke. This study underscores the importance of enhancing physicians' understanding and awareness in this regard. It also recommends conducting comprehensive studies targeting at-risk groups to protect public health.

Keywords: Passive Smoking, Physicians, Smoking Cessation, Tobacco Smoke Pollution, Third-Hand Smoke.

Hekimlerin Üçüncü El Sigara Dumanı Hakkındaki İnanç ve Görüşleri – Kesitsel Bir Çalışma**ÖZET**

Amaç: Günümüze kadar yapılan araştırmalar, toplumların üçüncü el sigara dumanı hakkında yeterli bilgiye sahip olmadığını ve bu konudaki inanç ve tutumlarının yeterince gelişmediğini ortaya koymuştur. Bu çalışmada, farklı kliniklerde görev yapan hekimlerin üçüncü el sigara dumanına ilişkin inanç ve görüşlerinin değerlendirilmesi amaçlanmıştır.

Yöntem: Bu kesitsel çalışma, Eylül-Kasım 2022 tarihleri arasında 245 hekimin katılımıyla gerçekleştirilmiştir. Katılımcılardan sosyodemografik veriler, çalıştıkları birim, kronik hastalık durumu, sigara içme alışkanlıkları ve Üçüncü El Sigara Dumanı İnanç Ölçeği - Türkçe formuna verdikleri yanıtlar yüz yüze görüşme yöntemiyle toplanmıştır. Anlamlılık düzeyi $p < 0,05$ olarak kabul edilmiştir.

Bulgular: Katılımcıların yaş ortalaması $33,46 \pm 7,51$ yıl olup, %53,5'i ($n=131$) kadındı. Katılımcıların %55,51'i ($n=136$) hiç sigara içmemiş, %31,83'ü ($n=78$) halen sigara içmekte, %12,65'i ($n=31$) ise sigarayı bırakmıştı. Katılımcıların yaklaşık dörtte üçü üçüncü el sigara dumanı terimini daha önce duymamıştı. Kadın, bekar, kronik obstrüktif akciğer hastalığı veya astımı olanlar, sigara içmeyenler, evde sigara içilmesine izin vermeyenler ve hastalarına sigarayı bırakmaları konusunda öneride bulunan hekimler, üçüncü el sigara dumanı maruziyeti konusunda anlamlı düzeyde daha güçlü inançlara sahipti.

Sonuç: Bu çalışmada hekimlerin üçüncü el sigara dumanına ilişkin inanç ve görüşleri değerlendirilmiş; önemli bir kısmının bu konuda daha önce bilgi sahibi olmadığı görülmüştür. Bu çalışma, hekimlerin bu konudaki bilgi ve farkındalıklarının artırılmasının önemini vurgulamaktadır. Halk sağlığının korunması açısından risk altındaki grupları hedef alan kapsamlı çalışmaların yapılması önerilmektedir.

Anahtar Kelimeler: Sigara İçimi, Edilgen, Doktorlar, Sigarayı Bırakma, Sigara Dumanı Kirliliği, Üçüncü El Sigara Dumanı.

INTRODUCTION

The World Health Organization considers tobacco use as an epidemic and one of the most significant public health threats the world has ever faced. Besides the adverse effects of tobacco or cigarette use on an individual's own health and the health of their surroundings, it also poses substantial harm to society. Globally, it is estimated that there are 1.3 billion tobacco users. When the countries where these individuals reside are examined, it becomes evident that more than 80% of them live in low and middle-income countries (1).

Second-hand smoke (SHS) is composed of both sidestream smoke released from burning tobacco products (cigarettes, pipes, or cigars) and mainstream smoke exhaled by the smoker. It is a well-established human carcinogen containing numerous harmful substances, often at higher concentrations than those inhaled during firsthand smoking (2). "Environmental tobacco smoke" and "passive smoke" are commonly used as synonyms for SHS. Third-hand smoke (THS) is increasingly recognized as a distinct exposure pathway, consisting of residual tobacco pollutants that persist on indoor surfaces and dust, and that may later re-enter the environment and affect non-smokers (3,4).

Evidence suggests that THS may even be more toxic than smoking and SHS (5). First introduced in 2006, THS is a relatively new concept, and its primary impacts became evident after the publications of Winickoff et al. in 2009 (6).

Experimental studies have demonstrated that exposure to THS in newborn mice results in decreased body weight, alterations in immunological parameters in their blood, and metabolic changes in human reproductive cells. Therefore, it has highlighted the relationship between potential harms of THS exposure and its adverse effects on health (7,8).

There haven't been enough studies conducted on the health effects of THS to date. Studies conducted thus far have found that communities lack sufficient knowledge about THS, and their beliefs and attitudes towards it are underdeveloped (9). Furthermore, there is limited information and evidence regarding the knowledge and opinions of healthcare professionals about THS (10).

In this study, using the Turkish version of the Beliefs About Third-hand Smoke (BATHS) scale, we aimed to assess physicians' knowledge and beliefs about THS. More specifically, we sought to examine physicians' awareness of the risks posed by THS, their perceptions of its impact on individual and public health, and the extent to which these beliefs shape their professional role in patient counseling and tobacco control. By doing so, this study aims to provide evidence that can

support targeted educational efforts and guide future health policies.

MATERIAL AND METHODS

This cross-sectional study included 245 actively practicing physicians from a training and research hospital between September 1, 2022, and November 1, 2022. Ethical approval was obtained from the university's Scientific Research Ethics Committee with decision number 17/14, dated July 1, 2022.

A total of 574 physicians were actively working in the hospital, and this population was considered the study universe. The sample size was calculated assuming a 50% prevalence, with a 5% margin of error and a 95% confidence interval, which indicated that at least 230 physicians were required. In total, 249 voluntary physicians, selected by simple random sampling, were informed about the study, and verbal and written consent were obtained. Participants completed a sociodemographic questionnaire and the BATHS-T scale through face-to-face interviews. The questionnaire included items on sociodemographic characteristics, department of employment, chronic illnesses, and smoking habits. Four participants were excluded from the analysis due to incomplete responses, leaving 245 physicians in the final sample.

The BATHS scale, developed by Haardörfer and colleagues, is designed to measure individuals' beliefs about THS. It consists of a Likert-type scale comprising a total of 9 questions, with 5 of them related to the persistence of THS particles in the environment and 4 related to the health effects of THS. The Likert scale uses a five-point scoring system: 5- strongly agree, 4- agree, 3- undecided, 2- disagree, 1- strongly disagree. The total score is obtained by dividing the sum of the scores by the number of items. The interpretation of the score is such that as the score approaches 5, the individual is believed to have strong beliefs in the environmental and health effects of THS, whereas as it approaches 1, the individual is believed to have minimal beliefs in the environmental and health effects of THS (11). The validation and reliability study of the BATHS-T scale was conducted by Çadırcı et al., and it was concluded that the Turkish version of the BATHS scale (BATHS-T) is reliable and valid (12). Recent studies have increasingly utilized BATHS (13) and BATHS-T (14,15).

To assess beliefs about THS to different information sources, participants were asked to rate five sources (medical school/specialization, academic resources, smoking cessation-related training, social media/media, and friends/close environment) on a scale from 0 ("least information") to 5 ("most information"). For each source, participants were categorized into "least" and "most" information groups.

In the study, demographic information such as gender, marital status, department of employment, chronic disease status, and smoking status were included in the questions, and the distribution of participants in response to these questions was presented using both the number (n) and percentage (%) values.

The normal distribution conformity of the continuous variable, the BATHS-T total score, was assessed both graphically and with the Shapiro-Wilks test. It was determined that this variable did not follow a normal distribution. Therefore, for the presentation of descriptive statistics, median (IQR-Interquartile Range) values were used.

Participants' BATHS-T total scores were compared based on categorical variables with more than two categories such as the department of employment, smoking status, and chronic disease status using the Kruskal-Wallis non-parametric analysis of variance. For the comparison of BATHS-T Total scores for two-group variables, the Mann-Whitney U test was employed. IBM SPSS Statistics 21.0 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0.

Armonk, NY: IBM Corp.) and MS-Excel 2007 were used for statistical analysis and calculations. A significance level of $p < 0.05$ was considered.

RESULTS

This study was conducted with a total of 245 physicians representing various medical departments. The average age of the participants in the study was found to be 33.46 ± 7.51 years. The mean BATHS-T Total score was determined to be 4.00 ± 0.89 . Among the participants in the study, 53.46% (n=131) were female. In terms of their departments of employment, 73.06% (n=179) worked in internal medicine sciences, 25.30% (n=62) in surgical medical sciences, and 1.63% (n=4) in basic medical sciences. Looking at their titles, 70.20% (n=172) were resident physicians, 27.75% (n=68) were specialist physicians, and 2.04% (n=5) were academician. It was determined that 55.51% of the participants (n=136) had never smoked, 31.83% (n=78) were current smokers, and 12.65% (n=31) had quit smoking. Female and single participants had higher BATHS-T scores. The comparison of BATHS-T scores among participant groups is shown in Table 1.

Table 1. Comparison of Beliefs About Third-hand Smoke-Turkish Total Scores in Different Variable Groups of Participants

		n(%)	BATHS-T TOTAL SCORE	Test Statistic*	
			Median (IQR)	Z ; χ^2	p
Gender	Male	114 (46.53)	3.94 (1.22)	z=2.226	0.026
	Female	131 (53.46)	4.11 (1.11)		
Marital Status	Single	114 (46.53)	4.22 (0.94)	z=2.301	0.021
	Married	131 (53.46)	4.00 (1.1)		
Department of Employment	Internal Medical Sciences	179 (73.06)	4.11 (1.11)	$\chi^2=3.576$	0.167
	Surgical Medical Sciences	62 (25.30)	3.94 (1.25)		
	Basic Medical Sciences	4 (1.63)	4.17 (1.06)		
Title	Resident Physician	172 (70.20)	4.11 (0.97)	$\chi^2=3.990$	0.136
	Specialist Physician	68 (27.75)	4.00 (1.39)		
	Academician	5 (2.04)	4.00 (1.00)		
Chronic Disease Status	No Illness	202 (82.44)	4.00 (1.03)	$\chi^2=15.065$	0.005
	Asthma or Chronic Obstructive Pulmonary Disease	5 (2.04)	4.89 (0.33)		
	Hypothyroidism or Hyperthyroidism	15 (6.12)	3.78 (1.56)		
	Cardiovascular Disease	5 (2.04)	3.22 (1.17)		
	Other (Diabetes Mellitus, Hypertension, PCOS, Ankylosing Spondylitis)	18 (7.34)	4.11 (1.39)		
Smoking Status	Never Smoked	136 (55.51)	4.33 (1.00)	$\chi^2=19.110$	< 0.001
	Currently Smoking	78 (31.83)	3.89 (0.81)		
	Quit Smoking	31 (12.65)	4.00 (0.78)		
Attitude Towards Smoking at Home	I never allow smoking in my home	54 (22.04)	4.39 (1.11)	$\chi^2=7.723$	0.021
	I allow smoking in certain areas of my home	168 (68.57)	4.00 (1.11)		
	I freely allow smoking in my home	23 (9.38)	4.00 (1.33)		
Have You Heard of THS?	No	173 (70.61)	4.00 (1.11)	z=1.415	0.157
	Yes	72 (29.38)	4.11 (1.11)		
Do You Refer Your Patients to Quit Smoking?	No	13 (5.30)	3.78 (1.11)	$\chi^2=6.242$	0.044
	Sometimes	87 (35.51)	3.89 (1.11)		
	Yes, always	145 (59.18)	4.11 (1.22)		

z: Mann Whitney U Test Statistic, χ^2 =Kruskal Wallis Test Statistic **Abbreviations:** BATHS-T: Beliefs About Third-hand Smoke-Turkish, IQR: Interquartile Range, PCOS: Polycystic Ovary Syndrome THS: Third-hand Smoke

In pairwise comparisons of BATHS-T total scores by disease status, statistically significant differences were observed between physicians with cardiovascular disease and those with chronic obstructive pulmonary disease (COPD) or asthma, as well as between physicians with hypothyroidism or hyperthyroidism and those with COPD or asthma ($p=0.003$, $p=0.049$, respectively). Physicians with COPD or asthma had higher BATHS-T total scores. Regarding smoking status, significant differences in BATHS-T total scores were found between physicians who were current smokers and those who had never smoked ($p<0.001$), and between physicians who had quit smoking and those who had never smoked ($p=0.033$). Physicians who had never smoked had higher BATHS-T total scores.

A statistically significant difference was found between "No" and "Yes, always" regarding guiding patients to quit smoking ($p=0.043$). Physicians who guide their patients to quit smoking had higher BATHS-T Total scores. Additionally, in binary comparisons of BATHS-T Total scores based

on attitudes toward smoking at home, a statistically significant difference was observed between "I allow smoking in certain areas of my home" and "I never allow smoking in my home" ($p=0.016$).

In the study, participants who had previously heard of the concept of THS were asked about the source from which they obtained their information on the subject. Participants who obtained the most information about THS from smoking cessation-related training had an average BATHS-T total score of 4.54 ± 0.57 , while participants who obtained the least information about THS from smoking cessation-related training had an average BATHS-T total score of 3.97 ± 0.98 . In the option of smoking cessation-related training, a statistically significant difference was detected in BATHS-T total scores between participants who obtained the most and the least information about THS ($z=1.988$, $p=0.047$). The comparison of BATHS-T total scores among participants based on their source of information about THS is presented in Table 2.

Table 2. Comparison of Beliefs About Third-hand Smoke-Turkish Total Scores in Participants Based on Their Third-hand Smoke Information Source

		BATHS-T TOTAL SCORE	Test Statistic*	
		Median (IQR)	Z	p
Medical School Education/Medical Specialization	I received the least information	4.11 (1.11)	0.973	0.330
	I received the most information	4.06 (0.81)		
Academic Resources	I received the least information	4.11 (1.11)	1.075	0.282
	I received the most information	4.44 (1.11)		
Smoking Cessation-Related Training	I received the least information	4.11 (1.00)	1.988	0.047
	I received the most information	4.89 (0.94)		
Social Media/Media	I received the least information	4.11 (1.11)	0.359	0.720
	I received the most information	4.44 (1.31)		
Friends and Close Environment	I received the least information	4.11 (1.11)	1.329	0.184
	I received the most information	4.89 (1.11)		

z: Mann Whitney U Test Statistic **Abbreviations:** BATHS-T: Beliefs About Third-hand Smoke-Turkish, IQR: Interquartile Range

DISCUSSION

This study holds the characteristic of being one of the few studies that investigates physicians' beliefs about THS. All participants were physicians, and among them, those who had never heard of the term THS constituted approximately three-fourths of the participants. It was also found that female, single physicians with patients who had COPD or asthma, non-smokers, those who did not allow smoking in their homes, and those who encouraged

their patients to quit smoking had stronger beliefs regarding THS exposure and its harms.

A study conducted by Darlow et al. showed that two-thirds of the physicians included in their study had never heard this term before (16). In the study conducted by Quispe-Cristobal et al., it was shown that approximately half of the physicians had heard this term, but the rate was lower among nurse participants (10). While smoke-free air policies are being implemented more extensively in

both public and private spaces (17), individuals' understanding of THS and its effects will be critical in reducing the harm of tobacco smoke (11). It can be considered that a more detailed knowledge of THS by physicians and other healthcare workers will be important for the quality of healthcare services.

In a study conducted by Xie et al. in Shanghai, involving families of primary school children, the average BATHS scores of female parents were found to be similarly high as in the present study (18). Darlow et al. also found in their study involving healthcare workers that female participants had higher beliefs in the harms of THS (16). In this study, similar to the literature, the average BATHS total scores of women were found to be higher. In the study by Xie and colleagues, although single participants had higher total scores, no statistically significant relationship was found between marital status and BATHS total scores (18). Similarly in the present study, single participants had higher BATHS-T total scores compared to married participants, and the difference was found to be statistically significant.

Oxidant gases can promote oxidative damage through the production of free radicals, triggering allergic symptoms and exacerbating asthma (19). Xie et al. demonstrated that participants who had children with respiratory illnesses believed that THS would persist in the environment for a longer period (18). It is known that cadmium in cigarette smoke may increase the risk of lung cancer in smokers. Additionally, exposure to lead and cadmium in third-hand smoke has been suggested to increase the risk of cardiovascular disease, kidney disease, and osteoporosis (20). Participants with COPD or asthma had higher BATHS-T average scores compared to other groups, in this study. It can be assumed that these participants may have a higher awareness of the subject, possibly received education on the topic, and therefore had higher beliefs in THS exposure. On the other hand, the significant reduction in BATHS-T scores in groups with a history of thyroid disorders and cardiovascular diseases suggests the need for information regarding THS exposure in these groups for protective health purposes.

Smoking status can influence beliefs regarding THS. In a pioneering study by Winickoff et al., among 1,478 participants, 65.20% of non-smokers compared to 43.30% of smokers believed that THS was harmful to children (6). Darlow et al. demonstrated that smokers were less likely to support the belief that THS is harmful (16). In a study by Özpınar et al., the BATHS total scores of pregnant women who smoked were found to be lower than non-smokers (21). Similarly, in Haardörfer et al.'s study, non-smoking participants had higher average BATHS total scores compared to smokers (11). Conversely, in Xie et al.'s study, no

statistically significant difference was found between smokers and non-smokers (18). In alignment with existing literature, this research similarly identified elevated beliefs in THS among participants who do not smoke. Given the likelihood that non-smokers possess heightened awareness of the hazards associated with smoking, it follows organically that their convictions regarding THS would be elevated.

In a study conducted by Drehmer et al., parents who received recommendations to quit smoking or provide a smoke-free environment for their children during pediatric visits were found to have a higher belief in the harmful effects of THS on children and infants (22). The study by Winickoff and colleagues also emphasized that strict smoking bans at home were directly related to beliefs about THS and the effects on child health. Highlighting the impact of THS on child health can be an important factor in promoting home smoking bans (6). Similarly, in the study by Haardörfer and colleagues, individuals who strictly enforced a no-smoking policy at home had higher BATHS scores (11). In this study, participants who never allowed smoking at home had significantly higher BATHS-T total scores. THS as a secondary indoor pollutant is a relatively new health risk. The presence of residual nicotine indoors leads to the formation of nitrosamines, known to be carcinogenic specifically to tobacco (23). Therefore, smoking bans at home are important for reducing THS and, consequently, preventing cancer formation.

A study involving pediatricians showed that only 13% of them always asked about exposure to SHS during visits for ear infections, and 33% provided advice on creating a smoke-free home (24). In a study by Tong et al., apart from inquiring about smoking, it was demonstrated that physicians' advice on smoking cessation was associated with the desire to quit smoking (25). In the present study, physicians who always guided their patients to quit smoking had higher BATHS-T total scores compared to those who did not provide such guidance. The widespread use of smoking cessation clinics is important for both individual and public health (26,27). It has been argued that increasing the number and duration of face-to-face meetings with physicians, as well as making physicians' work schedules suitable for telephone and/or online visits, can enhance the success rates of smoking cessation clinics (28). Given that smoking cessation clinics are considered the most important centers for smoking cessation and prevention of smoking-related diseases (26), it is crucial for physicians to refer their patients to these clinics.

Ferrante et al. conducted a study in which they argued that training pediatricians and general practitioners in smoking cessation and incorporating the assessment of children's exposure to passive smoking into their routine clinical practice would be a significant intervention in

protecting children from passive smoking (19). We found that receiving training on smoking cessation made a significant difference among physicians who had knowledge about THS.

As with all studies, ours has both strengths and weaknesses. To the best of our knowledge, our study is one of the very few in the literature conducted with physicians from different specialties, examining their knowledge and beliefs about THS and the factors influencing these beliefs. Nevertheless, this study has several limitations. First, its single-center design and the relatively small number of participants with chronic illnesses may restrict the generalizability of the findings. Second, in evaluating information sources, collapsing the 0–5 scale into “least” and “most” categories may have led to a loss of information and reduced statistical power, so the results should be interpreted with caution. Third, the use of self-reported data may have introduced response bias. Therefore, larger multicenter studies with more detailed analytic approaches are recommended to better understand physicians’ knowledge and beliefs about THS.

CONCLUSION

In the present study, it was determined that a significant portion of the participating physicians had never heard of the term THS. This indicates that the overall level of knowledge about THS

among the physicians is low. Increasing physicians’ knowledge and awareness about THS within the context of smoking cessation is essential, both in medical education and through continuous training. Comprehensive studies in this field will contribute to raising public awareness and protecting public health, especially among at-risk populations.

Article Information

Author’s Contributions: E.T., Ö.B.D., and M.T.E. were responsible for medical practices. The concept of the study was developed by E.T., Ö.B.D., M.T.E., and G.B., while the design was also contributed to by all four authors. Data collection and processing were carried out by E.T. and Ö.B.D., with analysis and interpretation performed by E.T., M.T.E., and G.B. Literature search was conducted by E.T. and M.T.E., and the manuscript was written collaboratively by E.T., Ö.B.D., M.T.E., and G.B. All authors have read and approved the final version of the manuscript.

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REFERENCES

1. World Health Organization. WHO Framework Convention on Tobacco Control [Internet]. Geneva: World Health Organization; 2003 [cited 2025 Oct 16]. Available from: <https://iris.who.int/server/api/core/bitstreams/264104b3-241a-4e48-88f9-aa7120779ffc/content>
2. Štěpánek L, Ševčíková J, Horáková D, Patel MS, Durdáková R. Public health burden of secondhand smoking: case reports of lung cancer and a literature review. *Int J Environ Res Public Health*. 2022;19(20):13152.
3. Parks J, McLean KE, McCandless L, de Souza RJ, Brook JR, Scott J, et al. Assessing secondhand and thirdhand tobacco smoke exposure in Canadian infants using questionnaires, biomarkers, and machine learning. *J Expo Sci Environ Epidemiol*. 2022;32(1):112-23.
4. Matt GE, Quintana PJ, Destailats H, Gundel LA, Sleiman M, Singer BC, et al. Thirdhand tobacco smoke: emerging evidence and arguments for a multidisciplinary research agenda. *Environ Health Perspect*. 2011;119(9):1218-26.
5. Guan Q, Mai J, Teng K, Liu Z, Lin L, Zhou L, et al. Thirdhand smoke beliefs, exposure status and associated factors among young people in China: a cross-sectional study. *Tob Induc Dis*. 2023;13:21:132.
6. Winickoff JP, Friebely J, Tanski SE, Sherrod C, Matt GE, Hovell MF, et al. Beliefs about the health effects of "thirdhand" smoke and home smoking bans. *Pediatrics*. 2009;123(1):e74-9.
7. Hang B, Snijders AM, Huang Y, Schick SF, Wang P, Xia Y, et al. Early exposure to thirdhand cigarette smoke affects body mass and the development of immunity in mice. *Sci Rep*. 2017;7:41915.
8. Hang B, Wang P, Zhao Y, Sarker A, Chenna A, Xia Y, et al. Adverse health effects of thirdhand smoke: from cell to animal models. *Int J Mol Sci*. 2017;18(5):932.
9. Acuff L, Fristoe K, Hamblen J, Smith M, Chen J. Third-hand smoke: old smoke, new concerns. *J Community Health*. 2016;41(3):680-7.
10. Quispe-Cristóbal B, Lidón-Moyano C, Martín-Sánchez JC, Pérez-Martín H, Cartanyà-Hueso À, Cabriada-Sáez Í, et al. Knowledge and opinions of healthcare professionals about thirdhand smoke: a multi-national, cross-sectional study. *Healthcare (Basel)*. 2022;10(5):945.
11. Haardörfer R, Berg CJ, Escoffery C, Bundy LT, Hovell M, Kegler MC. Development of a scale assessing Beliefs About ThirdHand Smoke (BATHS). *Tob Induc Dis*. 2017;15:4.
12. Çadirci D, Terzi NK, Terzi R, Cihan FG. Validity and reliability of Turkish version of Beliefs About Third-Hand Smoke Scale: BATHS-T. *Cent Eur J Public Health*. 2021;29(1):56-61.

13. Shehab K, Ziyab AH. Beliefs of parents in Kuwait about thirdhand smoke and its relation to home smoking rules: a cross-sectional study. *Tob Induc Dis.* 2021;19:66.
14. Aras A, Bayraktar M. Third-hand smoke perception and awareness among medical students: a survey study. *Sci Rep.* 2024;14(1):13355.
15. Coşgun İG, Çilekar Ş, Balcı A, Köymen BN, Moral S, Nur B, et al. The beliefs of medical faculty students about thirdhand smoke. *Tob Induc Dis.* 2023;21:17.
16. Darlow SD, Heckman CJ, Munshi T, Collins BN. Thirdhand smoke beliefs and behaviors among healthcare professionals. *Psychol Health Med.* 2017;22(4):415-24.
17. King BA, Patel R, Babb SD. Prevalence of smokefree home rules--United States, 1992-1993 and 2010-2011. *MMWR Morb Mortal Wkly Rep.* 2014;63(35):765-9.
18. Xie Z, Chen M, Fu Z, He Y, Tian Y, Zhang X, et al. Thirdhand smoke beliefs and behaviors among families of primary school children in Shanghai. *Tob Induc Dis.* 2021;19:10.
19. Ferrante G, Simoni M, Cibella F, Ferrara F, Liotta G, Malizia V, et al. Third-hand smoke exposure and health hazards in children. *Monaldi Arch Chest Dis.* 2013;79(1):38-43.
20. Yang AM, Lo K, Zheng TZ, Yang JL, Bai YN, Feng YQ, et al. Environmental heavy metals and cardiovascular diseases: Status and future direction. *Chronic Dis Transl Med.* 2020;6(4):251-9.
21. Özpınar S, Demir Y, Yazıcıoğlu B, Bayçelebi S. Pregnant women's beliefs about third-hand smoke and exposure to tobacco smoke. *Cent Eur J Public Health.* 2022;30(3):154-9.
22. Drehmer JE, Ossip DJ, Nabi-Burza E, Rigotti NA, Hipple B, Woo H, et al. Thirdhand smoke beliefs of parents. *Pediatrics.* 2014;133(4):e850-6.
23. Wu JX, Lau ATY, Xu YM. Indoor secondary pollutants cannot be ignored: third-hand smoke. *Toxics.* 2022;10(7):363.
24. Hawkins SS, Berkman L. Increased tobacco exposure in older children and its effect on asthma and ear infections. *J Adolesc Health.* 2011;48(6):647-50.
25. Tong EK, Ong MK, Vittinghoff E, Pérez-Stable EJ. Nondaily smokers should be asked and advised to quit. *Am J Prev Med.* 2006;30(1):23-30.
26. Egici MT, Ozturk GZ, Bukhari MH, Toprak D. Smoking Cessation with Medication and Behaviour Therapy. *Pak J Med Sci.* 2017;33(6):1459-62.
27. Ayaz D, Asi E, Meydanlioglu A, Oncel S. Effectiveness of smoking cessation interventions in the workplace: A systematic review and meta-analysis. *Am J Ind Med.* 2024;67(8):712-22.
28. Börklü Doğan Ö, Egici MT, Ozkaya H. The effect of treatment methods and continuity of follow-up on success rates in patients followed in the smoking cessation polyclinic. *Ankara Med J.* 2022;22(4):499-509.