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A RELAÇÃO ENTRE A EXPOSIÇÃO AO FUMO PASSIVO E OS NÍVEIS DE CONSCIENTIZAÇÃO E ANSIEDADE EM RELAÇÃO À SAÚDE DE ESTUDANTES UNIVERSITÁRIOS

THE RELATIONSHIP BETWEEN THIRDHAND SMOKE EXPOSURE AND AWARENESS AND HEALTH ANXIETY LEVELS OF UNIVERSITY STUDENTS

RELACIÓN ENTRE LA EXPOSICIÓN AL HUMO DE TERCERA MANO Y LOS NIVELES DE CONCIENCIACIÓN Y ANSIEDAD POR LA SALUD DE ESTUDIANTES UNIVERSITARIOS

RESUMO

Objetivo: este estudo foi realizado para determinar a relação entre a exposição ao fumo passivo e os níveis de conscientização e ansiedade em relação à saúde de estudantes universitários. **Método:** a amostra do estudo transversal e correlacional foi composta por 404 estudantes universitários. Os dados foram coletados entre fevereiro e setembro de 2022. **Resultados:** constatou-se que a conscientização dos estudantes sobre o fumo passivo era média-alta e suas preocupações com a saúde eram baixas. Uma relação positiva fracamente significativa foi concluída entre as pontuações médias do Inventário de Ansiedade em Saúde e da Escala de Crenças sobre o Fumo Passivo. Constatou-se que, à medida que as pontuações

médias da Escala de Crenças sobre o Fumo Passivo aumentavam, as pontuações médias do inventário de ansiedade em relação à saúde também aumentavam (r=0,285; p<0,001).

Conclusão: constatou-se que os estudantes que não permitiam fumar perto deles estavam mais cientes da fumaça passiva.

DESCRITORES: Ansiedade; Conscientização; Estudantes; Exposição ambiental; Fumo passivo.

ABSTRACT

Objective: this study was carried out to determine relationship between third-hand smoke exposure and awareness and health anxiety levels of university students. **Method:** sample of cross-sectional and correlational study consisted of 404 university students. Data were collected between February and September 2022. **Results:** it was found that students' awareness of third-hand smoke was medium-high and their health concerns were low. A weakly significant positive relationship was concluded between the mean scores of Health Anxiety Inventory and Beliefs about Third-hand Smoke Scale. It was found that as Beliefs about Third-hand Smoke Scale mean scores increased, health anxiety inventory mean scores also increased (r=0.285; p<0.001). **Conclusion:** it was found that students who did not allow smoking near them were more aware of third-hand smoke.

DESCRIPTORS: Anxiety; Awareness; Students; Environmental exposure; Thirdhand smoke.

RESUMEN

Objetivo: este estudio se realizó para determinar la relación entre la exposición al humo de tercera mano y los niveles de concienciación y ansiedad por la salud en estudiantes universitarios. **Método:** la muestra del estudio transversal y correlacional consistió en 404 estudiantes universitarios. Los datos se recopilaron entre febrero y septiembre de 2022. **Resultados:** se encontró que la concienciación de los estudiantes sobre el humo de tercera mano era media-alta y su preocupación por la salud era baja. Se concluyó una relación positiva débilmente significativa entre las puntuaciones medias del Inventario de Ansiedad por la Salud y la Escala de Creencias sobre el Humo de Tercera Mano. Se observó que a medida que aumentaban las puntuaciones medias de la Escala de Creencias sobre el Humo de Tercera Mano, también aumentaban las puntuaciones medias del Inventario de Ansiedad

por la Salud (r=0,285; p<0,001). **Conclusión:** se encontró que los estudiantes que no permitían fumar cerca de ellos eran más conscientes del humo de tercera mano.

DESCRIPTORES: Ansiedad; Concienciación; Estudiantes; Exposición ambiental; Humo de tercera mano.

INTRODUCTION

This residual smoke, which is caused by residues of tobacco products reacting with other substances on surfaces after they are used and becoming gaseous again and mixing into the air, is called "Third-hand smoke" (THS). It is emphasized that second-hand cigarette smoke (SHS), defined as smoke that occurs as a result of active smoking and spreads into environment, can be removed from the environment with ventilation, while THS remains stuck on surfaces for months, reacts with toxic substances, and has a much more toxic and harmful effect than SHS.[1] Moreover, when a smoker smokes outside home and then comes home, he/she can expose the people around to THS by bringing smoke residues home with his breath, skin, hair, and clothes.[2] Individuals of all ages, especially infants and children, are at risk for THS[2], and one of these risky groups is young people in university environment. In studies conducted on medical and nursing students, it was determined that more than half of the students were exposed to smoke in public spaces.[3]

For university students who have friends who smoke and are away from family supervision, university environment they are in is very effective in acquiring habit of smoking, or even in being exposed to passive smoking.[4] Especially student houses, where young people stay together, are among the most suitable places for university students to easily acquire harmful habits such as smoking, to smoke at home without any obstacles, or to be exposed to SHS and THS due to smoking in the environment.[5]

Many studies reveal that more than half of university students are exposed to SHS and 5-60% of harmful effects of this exposure are attributed to THS.[6] Although society has a relatively high awareness of first hand smoking, defined as active smoking and second-hand smoking, defined as passive smoking, knowledge and awareness levels of society are insufficient about exposure to residual smoke, namely THS, which remains in environment

for a long time after cigarette is put off and sticks to surfaces.[4] Studies show that university students have low level of knowledge and awareness about THS exposure.[7]

It has been reported that people who smoke or are exposed to smoke are at risk of developing many health problems[8], and that individuals exposed to third-hand smoke (THS) have increased anxiety levels about environmental health risks, and this increases risk of developing health anxiety over time.[9] Health anxiety is defined as excessive worry about current or future health threats, and it is emphasized that this anxiety is more pronounced in individuals who are constantly exposed to cigarette smoke.[10] It is stated that people who experience health anxiety and develop awareness on this issue exhibit behaviors aimed at avoiding smoking or exposure to smoke because it is an unhealthy lifestyle behavior.[11]

Although it is known that smoking is among the risky behaviors that cause health anxiety[12], there is no study in Turkish literature that examines smoke exposure and THS exposure together with health anxiety and examines relationship between third-hand smoke exposure and awareness and health anxiety levels of university students. It is of great importance that health workers, whose ultimate goal is to improve health of society, defend "right to access clean air" of individuals in society and educate and raise awareness of entire society about effects of exposure to smoke, while also using their "researcher" roles to determine individuals' passive smoking exposure and awareness. Based on this point, this study was carried out to determine relationship between third-hand smoke exposure and awareness and health anxiety levels of university students.

Research questions

What is third-hand smoke exposure status of university students?

What is third-hand smoke awareness status of university students?

Is there a relationship between university students' third-hand smoke exposure, awareness levels, and health anxiety levels?

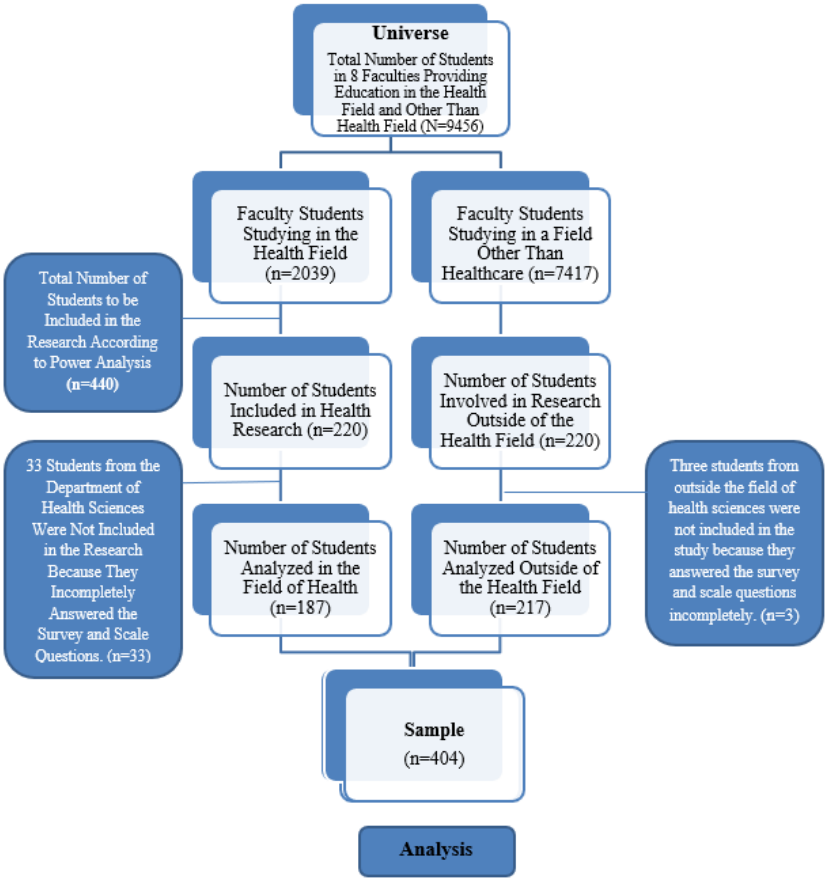
METHODS

Study design, setting, and participants

Study is of cross-sectional and correlational type. Target population of this study is university students studying at central campus of a university located in a province in the

Central Anatolian Region of Türkiye. Universe of study consists of 9456 students studying at central campus of a university. Using known universe n=Nt2pq/(N-1)d2+t2pq sample formula, N=9456 p:0.80 q:0.20 d:0.05 t:2.58 and power analysis, t sample size was determined as 440 (220 students studying in field of health sciences and 220 students studying outside field of health). Stratified random sampling method was used as sampling method. Each school was accepted as a stratum and number of students to be sampled was determined proportionally to total number of students in schools. However, 33 students studying in field of health sciences and three students studying outside field of health filled out survey and scale forms incompletely, therefore a total of 36 students could not be included in study and these students were excluded from analysis. Thus, study was completed with a total of 404 students, 187 of whom were studying in field of health sciences and 217 of whom were studying outside field of health (Figure 1). Data were collected by face-to-face interviews conducted between February 2022 and September 2022. Interviews lasted for 20-25 minutes.

Figure 1 - Flowchart of Student Selection and Composition of the Research Sample



Study tools

The data of the study were collected using 'Personel Information Form, The Beliefs about Thirdhand Smoke Scale (BTHSS) and The Short Health Anxiety Inventory (SHAI)'.

The Personal Information Form, which was prepared by researcher by scanning literature[4,5], consists of three parts. The first section included questions regarding participants' sociodemographic characteristics (questions 1-14), the second section included questions regarding smoking behavior (questions 15-18), and the third section included questions regarding their exposure to secondhand smoke (questions 19-42).

The Beliefs about Thirdhand Smoke Scale (BTHSS) was developed by Haardörfer et al.[13] to determine third-hand smoke awareness level. It is a scale evaluated with nine items and a five-point Likert scale. Scale consists of a 5-item "Health Sub-Dimension" and a 4-item "Permanence Sub-Dimension". Turkish validity and reliability study of scale was carried out by Önal et al.[14] Scale items are scored from 1 to 5 as "1- Strongly Disagree, 2- Disagree, 3- Undecided, 4- Agree, 5- Strongly Agree". Total scale scores range from 9 to 45. There is no reverse item in the scale. A high score on the scale indicates that the person is highly aware of third-hand smoke. In this study, the Cronbach alpha coefficient of the scale was found to be 0.902.

The Short Health Anxiety Inventory (SHAI) was developed by Salkovskis et al.[15] to assess health anxiety. Inventory is a self-report scale consisting of 18 items and was created with a four-point Likert scale. Inventory consists of two sub-dimensions: "Hypersensitivity to Physical Symptoms and Anxiety" and "Negative Consequences of the Disease". 14 items of the inventory question mental state of patients. Remaining 4 questions ask patients to speculate about what their mental state might be like assuming they have a serious illness and question them accordingly. Turkish validity and reliability study was conducted by Aydemir et al.[16] The items in inventory range from 0 to 3, with each question receiving a score of "a- 0, b- 1, c- 2, d- 3", and total scores range from 0 to 54. A high score indicates a high level of

health anxiety[16]. In this study, the Cronbach alpha coefficient of the inventory was found to be 0.822.

Statistical analysis

Analyses were performed on computer using the SPSS 22.00 statistical package program. For analyses of data, frequency, percentage, Pearson product-moment correlation analysis, Durbin Watson test, t test, ANOVA, Dunnet T3 post hoc test, LSD post hoc test, Kruskal Wallis H test, Chi-Square test, Fisher's Exact Chi-Square test, Cronbabch alpha tests were applied. Significance level was accepted as $p<0.05$.

Ethical approval

Before conducting study, an application was made to Non-Interventional Clinical Research Ethics Committee of university in province where study was carried out, and ethics committee approval (Decision No: 2022-02/18) and written permission from university rectorate (numbered E-30182376-010.99-152409) were obtained. Study was conducted in accordance with ethical principles of university and Declaration of Helsinki. Before starting research, faculty administration and students were informed about research, and verbal and written “Informed Consent” was obtained from students who agreed to participate in the research.

RESULTS

Students 53.8% of participating in study were studying in faculties other than health sciences, their average age was 22.54±2.00. Of students, 85.9% were in the 19-24 age group, and 55.7% were female. Students 62.9% of living in dormitories or student houses during their university education, 48% of them smoke. It was determined that 98.8% of students participating in study were exposed to smoke, and environments where they were most exposed to smoke were 74.4% a rate of at social environments.

In study, it was determined that smoking rates of students who had no idea about THS and who did not see THS as a disease factor were significantly higher ($p<0.05$) (Table 1).

Table 1 - The Relationship Between Students' Smoking and Exposure to Smoke and Their Knowledge Levels and Opinions on ThirdHand Smoke (THS)

	Smoking Status						Smoke Exposure Status					
	Smoking n=194		Non-Smoking n=210				Exposed n=399		Not Exposed n=5			
	n	%	n	%	X^2	p	n	%	n	%	X^2	p
Having an idea about what thirdhand smoke is												
Not having an idea about THS	177	91.2	173	82.4	6.830	**0.012***	2	6.0	348	99.4	9.508	**0.019***
Having an idea about THS	17	8.8	37	17.6			3	5.6	51	94.4		
Definition of thirdhand smoke (n=54)												
Defines THS correctly	14	82.4	34	91.9	1.073	0.365	3	6.3	45	93.8	0.397	1.000
Defines THS incorrectly	3	17.6	3	8.1			0	0.0	6	100.0		
Opinions on whether exposure to thirdhand smoke causes any disease												
THS does not cause any disease	147	75.8	132	62.9	7.873	**0.005***	1	0.4	278	99.6	5.703	**0.034***
THS is a disease factor	47	24.2	78	37.1			4	3.2	121	96.8		

X^2= Fisher's Exact Chi-Square Test
*p<0,05
p= Level of Significance

Weak and positive significant relationships were found between SHAI and BTHSS and health effects and environmental permanence sub-dimensions (p<0.05). As THS awareness of students increased, their health anxiety levels also increased (Table 2).

Table 2 - Relationship Between The Beliefs About Thirdhand Smoke Scale (BTHSS) and The Short Health Anxiety Inventory (SHAI) Scores

		The Short Health Anxiety Inventory
Health Dimension	r[a]	0.232
	p	**0.000***
Persistence Dimension	r[a]	0.317
	p	**0.000***
Thirdhand Smoke Scale	r[a]	0.285
	p	**0.000***

[a]Pearson correlation analysis

*p<0,05
p= Level of Significance

It was determined that the BTHSS total mean score of students differed significantly depending on gender, smoking status, having a family member who smoked, status of being allowed to smoke in the current place of residence, status of smoking in circle of friends, environment in which smoke was exposed, and method of protection from smoke exposure. It was found that the BTHSS total mean score of students who were female, non-smokers, had no family members who smoked, were not allowed to smoke in their current place of residence, did not have friends who smoked in their circle of friends, were exposed to smoke in social environments, reacted to someone smoking indoors, and adopted an effective method of protection from smoke exposure were significantly higher (p<0.05) (Table 3).

Table 3 - Mean Scores of Students on the Short Health Anxiety Inventory and The Beliefs About Thirdhand Smoke Scale According to Some Introductory Characteristics

		Health Dimension	**Persistence Dimension**	**Thirdhand Smoke Scale**	**Health Anxiety Inventory**
		X±SS	**X±SS**	**X±SS**	**X±SS**
Gender	Female	19.49±4.05	15.98±3.18	35.47±6.76	18.05±7.06
	Male	18.70±4.03	15.06±2.96	33.77±6.68	16.29±6.99
	Test*	t=1.937 p=0.053	t=2.974 **p=0.003**	t=2.530 **p=0.012**	t=2.496 **p=0.013**
Smoking status	Smoker	18.33±4.27	14.91±2.93	33.24±6.75	15.68±6.47
	Non-smoker	19.91±3.76	16.19±3.21	36.10±6.61	18.96±7.24
	Test*	t=7.786 **p=0.000**	t=8.717 **p=0.000**	t=9.214 **p=0.000**	t=9.214 **p=0.000**
	Difference	**2>1**	**2>1**	**2>1**	**2>1**
Smoking is not allowed in the place where one stays	No	19.47±4.04	15.81±3.10	35.32±6.72	17.98±7.5
	Yes	18.64±4.04	15.21±3.12	33.81±6.77	16.20±6.10
	Test*	t=2.027 **p=0.043**	t=1.893 p=0.059	t=2.087 **p=0.037**	t=2.571 **p=0.011**
Smoking status in friends' circle	No	20.34±2.97	16.20±3.08	36.54±5.59	19.23±8.05
	Smoking	18.85±4.23	15.42±3.11	34.27±6.97	16.79±6.75
	Test*	t=3.651 **p=0.000**	t=2.003 **p=0.046**	t=2.696 **p=0.007**	t=2.763 **p=0.006**
Exposure to smoke	Not exposed	21.20±2.68	16.80±2.17	38.00±4.85	18.60±9.53
	Exposed	19.12±4.07	15.56±3.13	34.67±6.79	17.25±7.06
	Test*	t=1.142 p=0.254	t=0.884 p=0.377	t=1.091 p=0.276	t=0.422 p=0.673
Protective behavior from	Adopting	19.75±4.02	15.98±3.04	35.73±6.60	17.25±6.74
	Adopting	18.36±3.98	15.06±3.14	33.42±6.79	17.29±7.50

passive smoking and cigarette smoke exposure	**Test***	t=3.454 **p=0.001**	t=2.973 **p=0.003**	t=3.444 **p=0.001**	t=0.060 p=0.952

It was determined that SHAI total mean score of the students differed significantly depending on the gender, smoking status, status of being allowed to smoke in their current place of residence, status of smoking in circle of friends. It was found that SHAI total mean score of students who were female, were non-smokers, were not allowed to smoke in their current place of residence, did not have friends who smoked in their circle of friends were significantly higher ($p<0.05$) (Table 3).

DISCUSSION

In study, it was found that students with low-income levels had a higher rate of smoking in their families and friends and these studets were more exposed to smoke. Moreover, it was determined in study that as income level of the students decreased, the BTHSS mean scores decreased, although not significantly, and the SHAI mean scores were significantly lower. Studies have shown that smoking prevalence and cigarette smoke exposure are higher in groups with lower socioeconomic status[17] and THS belief scores are lower[18]. Considering research and literature findings, it is an expected result that education and therefore consciousness and awareness levels and health anxiety are lower, especially on health-related issues, in groups with lower socioeconomic status.

In study, students who adopted method of "ensuring that environment is 100% smoke-free" had higher mean scores on the BTHSS and its sub-dimensions than those who adopted ineffective methods (opening doors and windows etc). Many studies have shown that ventilation and air cleaning systems are ineffective in preventing THS exposure.[19] In study, mean total scores of the BTHSS and its sub-dimensions and the health anxiety scale of non-smoking students were found to be higher than those of smoking students ($p<0.05$). In studies, rate of supporting a smoke-free air space was found to be high in individuals who banned smoking in the home environment and had a high perception that THS was harmful and in non-smoking university students.[3] The most effective step in preventing exposure to secondhand smoke is for active smokers to quit smoking, and for those who continue to

smoke to absolutely not smoke near others and in living spaces. Because smoking in a different room, ventilating to remove smoke or using a fan does not eliminate exposure to THS for those who come to same environment later. Literature findings support our research findings and these findings show that non-smoking university students have higher awareness of passive smoking and that methods of protection against passive smoking are more effective.

Our study finding showed that as university students' awareness of smoke increased, their health anxiety levels also increased. Health anxiety is an important psychological experience that occurs with physical and emotional reactions arising from thought that something is wrong with someone's health. In studies conducted with university students, it was determined that health anxiety and awareness levels were higher in students who did not smoke and had increased awareness of addiction.[20] Study and literature findings reveal that as level of health anxiety increases, there is an increase in positive behaviors aimed at protecting health.

Limitations

The study is limited to university students studying at a single university, limiting the generalizability of the findings to broader contexts.

CONCLUSION

It was determined that almost all of students participating in study were exposed to cigarette smoke, more than one third had no idea about THS, their THS awareness levels were moderate and their health anxiety levels were low. It has been found that as students' awareness of thirdhand smoke increases, their health anxiety levels also increase. Given that students who do not smoke, are not exposed to secondhand smoke, or do not allow smoking near them have higher levels of awareness about thirdhand smoke, it is recommended that health professionals, especially public health nurses, provide thirdhand smoke awareness training to university students, and that universities adopt and implement "smoke-free campus" policies. Additionally, university curricula should include a "Smoking Addiction" course, comprehensively covering passive smoking, second- and third-hand smoke, and the effects of secondhand smoke, as well as active smoking.

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