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Perceived Stress in Life and Smoking

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ABSTRACT

Objective: We believe that it is very important to identify the factors that increase smoking, which is known to be the cause of many chronic diseases in the family medicine practice. In this study, we aimed to investigate the effect of stress perceived by people on cigarette smoking.

Methods: The study was conducted with 384 participants out of 1150 people who met the inclusion criteria, who were followed in the University of Health Sciences Turkey, İstanbul Bağcılar Training and Research Hospital, Clinic of Family Medicine, Güneşli Educational Family Health Center between 01.02.2022 and 28.02.2022. Sociodemographic data form, Perceived Stress scale-14 and Fagerström test for Nicotine Dependence (to current smokers only) were responded by the participants. The study was analyzed by SPSS version 23.0 statistical program and cut-off value of statistical significance was accepted as $p<0.05$.

Results: According to our study, it was determined that perceived stress levels are higher in young people, women, those who have never worked, those who use 2 or more regular medications, those who do not exercise regularly, and those who do not have a regular sleep pattern. In this study, we found that elders and men have higher nicotine addiction levels. Additionally, men's risk of smoking was found to be approximately twice that of women.

Conclusion: In our study, no significant relationship was found between high perceived stress and nicotine addiction level, cigarette consumption amount and smoking status. However, various factors such as age, gender and regular physical activity have been found to be significantly related to perceived stress. Additionally, gender, insufficient self-efficacy and perceived stress/discomfort were found to be effective on smoking.

Keywords: Perceived stress, smoking, family medicine, nicotine addiction, perception of self-efficacy, holistic approach

INTRODUCTION

According to World Health Organization (WHO) 2021 data, approximately 1.3 billion people around the world use tobacco, and more than 80% of them live in low- and middle-income countries (1). Turkey ranks tenth among the countries that use the most tobacco in the world. In Turkey, 18 million people (28%) aged 15 and overuse tobacco every day (41.3% of men and 14.9% of women) (2). For this reason, smoking is considered an important public health problem in our country.

Smoking is the most important preventable cause of premature death in the world and in our country. Smoking is a leading cause of many diseases, including lung cancer, stroke, transient ischemic attacks, cardiovascular diseases, and chronic obstructive pulmonary disease (3). WHO estimates that tobacco use causes the death of 8.7 million people worldwide every year. More than 1.2 million of these deaths are caused by passive smoking. Almost half of children regularly breathe air polluted with tobacco smoke in public places, and 65 thousand children die from diseases related to passive smoking every year (4).

Pharmacological research has found that the main addictive agent in tobacco smoke is nicotine. Nicotine, which has been believed to cause milder addiction than other substance addictions for many years, has been shown to be one of the most powerful addictive substances in epidemiological and animal studies (5). Nicotine exposure activates the mesocorticolimbic pathway, also known as the reward pathway, and increases dopamine release from dopaminergic neurons in the ventral tegmental area and nucleus accumbens. It has also been demonstrated that nicotine, unlike other addictive substances, increases sensitivity to subsequent exposure in the reward circuit (6).

Stress is a state of emotional and physical tension felt by a person. Many different situations or life events can cause stress. It is usually triggered when we experience something new, unexpected, threatening to our sense of self, or when we feel like we have little control over a situation. The same situation or event can cause different stress levels in individuals depending on their previous experiences, personal characteristics, educational background and beliefs. This reveals the concept of perceived stress, which is a

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subjective experience. Perceived stress is the feelings or thoughts an individual has about how stressed they are during a certain period of time. It has been shown that the excess of negative thoughts about a situation or event is significantly related to the high level of stress perceived by the person (7).

We believe that in family medicine practice, where preventive health services are a priority, it is very important to reveal the factors that increase smoking, which is known to be the cause of many chronic diseases, and to approach the individual holistically, considering factors that are not questioned at first, such as perceived stress in life. Based on this idea, this study aims to investigate the effect of stress perceived by people in life on smoking.

METHODS

This study was an observational, descriptive and cross-sectional study. It was conducted between 01.02.2022-28.02.2022 at Güneşli Education Family Health Center (EASM) affiliated with the Family Medicine Clinic of Health Sciences University Turkey, İstanbul Bağcılar Training and Research Hospital. The sociodemographic data form and the Perceived Stress scale (PSS-14), prepared by examining similar studies, were responded by 384 participants who met the inclusion criteria out of 1150 patients who were admitted within a month, and the Fagerström test for Nicotine Dependence (FTND) was applied to current smokers using face-to-face interview technique. Informed written consent was obtained from those who participated in the study. Our study was reviewed at the meeting of the İstanbul Medipol University Non-invasive Clinical Research Ethics Committee on 23.12.2021 and was found ethically appropriate according to decision no 1297.

Those who filled out the survey forms incompletely, those who were not registered in Güneşli EASM, those who were mentally unstable, those under the age of 18, and pregnant women were not included in the study.

The PSS-14 was developed by Cohen et al. (8) in 1983. Turkish validity and reliability study was conducted by Eskin et al. (9). It is an easily applicable scale that measures how stressful life events in a person's life are perceived (8,9). In the scale, participants are asked a total of 14 questions about their personal experiences in the last month. Participants evaluate each item on a 5-point Likert-type scale ranging from "Never (0)" to "Very often (4)". Seven of the items containing positive statements are reverse scored. The first of the two sub-dimensions obtained by factor analysis using the principal components method is called the perception of insufficient self-efficacy, consisting of 7 questions with positive statements, and the other is called the perception of stress/discomfort, consisting of 7 questions with negative statements. The total score obtained as a result varies between 0 and 56. A high score indicates a person's perception of stress is high.

The FTND was developed by Heatherton et al. (10) in 1991. Turkish validity and reliability study was conducted by Uysal et al. (11) published. It is a short and practical scale that measures nicotine addiction in smokers and is used as a basis in smoking cessation clinics (10,11). In the scale, participants are asked a total of 6 questions about their smoking habits. The total score obtained as a result of the answers given to the test varies between 0 and 10. Depending on the score the person receives from FTND, the degree of nicotine addiction is classified as very low (0-2 points), low (3-4 points), medium (5 points), high (6-7 points) and very high (8-10 points) (12).

Statistical Analysis

The SPSS version 23.0 program was used for statistical analysis. When evaluating study data, descriptive statistics were shown as mean ± standard deviation, median (interquartile range), frequency or percentage. The suitability of quantitative data for normal distribution was tested using the Shapiro-Wilk test and graphical analysis. Student's t-test was used for two-group comparisons of normally distributed quantitative variables, and Mann-Whitney U test was used for non-normally distributed variables. One-Way ANOVA test was used for more than two group comparisons of normally distributed quantitative variables, and Bonferroni test was used for post-hoc evaluations. Kruskal-Wallis test and post-hoc Dunn-Bonferroni test were used for variables that did not show normal distribution. Spearman correlation analysis was used to evaluate the relationships between quantitative variables. Logistic regression analysis was used in multivariate evaluations. Statistical significance was accepted as $p<0.05$.

RESULTS

The study was conducted with a total of 384 participants, 44.5% of whom (n=171) were female and 55.5% (n=213) were male. The ages of the participants ranged from 18 to 67 and the average was 33.23±10.94. The distribution of the descriptive characteristics of the participants is given in detail (Table 1).

It was observed that 37.8% (n=145) of the participants smoked, 6.8% (n=26) had quit, and 55.4% (n=213) did not smoke. Participants' cigarette use varied between 1 and 60 cigarettes per day and average daily usage was 15.00±9.00 cigarettes. Duration of smoking varied between 1 and 50 years, and the average duration was 12.56±9.51 years. The total cigarette smoking amount of the participants varied between 0.10 and 100 packs/year, and the average amount was 10.57±13.03 packs/year. The relationship between the participants' scores from the total and sub-dimensions of the PSS-14 and sociodemographic data is shown (Table 2).

Perceived stress levels of individuals who were young, female, had never worked, used 2 or more regular medications, did not exercise regularly and had no regular sleep pattern were found to be higher than other groups ($p=0.001$, $p=0.007$, $p=0.028$, $p=0.014$, $p=0.008$ and $p=0.001$, respectively). In addition, individuals who were young, female, single, high school or undergraduate graduates, never worked or quitted their jobs, did not have children, and had poor sleep quality were found to have higher stress/discomfort perceptions than other groups ($p<0.001$, $p=0.001$, $p=0.020$, $p=0.003$, $p=0.014$, $p=0.015$ and $p=0.001$, respectively). In addition, individuals who were obese,

whose total family income was at or below the minimum wage, who used 2 or more regular medications, who did not exercise regularly, who exercised a small number of times per week, who did not have a regular sleep pattern, who did not drink alcohol and who did not smoke, were found to have higher inadequate self-efficacy perceptions compared to other groups (p=0.031, p=0.001, p=0.012, p=0.012, p=0.007, p=0.001, p=0.031 and p=0.009, respectively).

Table 1. Distribution of descriptive characteristics

		n	%
Gender	Female	171	44.5
	Male	213	55.5
Age	Mean ± SD	33.23±10.94	
BMI	Underweight	18	4.7
	Normal	171	44.5
	Overweight	141	36.7
	Obese	49	12.8
	Morbidly obese	5	1.3
Marital status	Single	194	50.5
	Married	177	46.1
	Divorced	13	3.4
Educational status	Primary school	34	8.9
	Middle school	36	9.4
	High school	70	18.2
	Associate degree	54	14.1
	Bachelor's degree	153	39.8
	Master's degree and Above	37	9.6
Working status	Never worked	27	7
	Housewife	23	6
	Working	285	74.2
	Quitted the job	21	5.5
	Retired	14	3.6
	Student	14	3.6
Having child/children	No	232	60.4
	Yes	152	39.6
Income	Below the minimum wage	24	6.3
	Minimum wage	81	21.1
	Between the minimum wage and 2 times of the minimum wage	148	38.5
	2 times of the minimum wage and above	131	34.1
Chronic disease		77	20.1
Drug use		63	16.4
Exercise		151	39.3
Sleep		231	60.2
Alcohol	No	270	70.3
	Yes	109	28.4
	Quitted	5	1.3
Smoking	No	213	55.5
	Yes	145	37.8
	Quitted	26	6.8

BMI: body mass index, SD: standard deviation

Table 2. Comparison of descriptive characteristics according to the Perceived Stress scale

		Insufficient perception of self-efficacy		Perception of stress/discomfort		Total score of Perceived Stress scale	
		Mean ± SD/ median (IQR)	p-value	Mean ± SD/ median (IQR)	p-value	Mean ± SD/ median (IQR)	p-value
Gender	Female	12.00±4.55	[b]**0.312**	15.75±5.27	[b]**0.001****	27.75±8.50	[b]**0.007****
	Male	11.55±4.66		13.94±4.86		25.49±7.74	
BMI	Underweight	12.7 (3)	[c]**0.031***	18 (7)	[d]**0.083**	30.7 (8)	[d]**0.166**
	Normal	11.6 (6)		14.6 (6)		26.2 (10)	
	Overweight	11.6 (5)		14.8 (6)		26.3 (10)	
	Obese	12.8 (5)		14.1 (5)		26.9 (9)	
	Morbidly obese	7.6 (1)		14.8 (7)		23 (8)	
Marital status	Single	11.9 (6)	[c]**0.850**	15.5 (7)	[d]**0.020***	27.3 (10)	[d]**0.118**
	Married	11.6 (6)		14 (6)		25.6 (9)	
	Divorced	11.8 (5)		14.4 (4)		26.2 (4)	
Educational status	Primary school	12.1 (7)	[c]**0.815**	12.7 (3)	[d]**0.003****	24.8 (9)	[d]**0.591**
	Middle school	12.6 (7.5)		12.3 (6)		24.9 (10)	
	High school	11.9 (5)		15.4 (7)		27.3 (9)	
	Associate degree	12.3 (6)		14.4 (7)		26.7 (13)	
	Bachelor's degree	11.4 (4)		15.4 (6)		26.8 (8)	
	Master's degree and above	11 (5)		15.5 (6)		26.4 (9)	
Working status	Never worked	13.6 (6)	[c]**0.259**	16.7 (6)	[c]**0.014***	30.3 (12)	[c]**0.028***
	Housewife	12.1 (7)		14.4 (6)		26.5 (12)	
	Working	11.5 (6)		14.6 (6)		26.1 (10)	
	Quitted the job	12.6 (7)		16.4 (8)		29 (12)	
	Retired	11 (6)		11.1 (6)		22.1 (7)	
	Student	12.8 (4)		16.3 (5)		29.1 (7)	
Child	No	11.67±4.54	[b]**0.823**	15.26±5.05	[b]**0.015***	26.93±8.26	[b]**0.200**
	Yes	11.88±4.73		13.96±5.15		25.84±7.97	
Family income	Below the minimum wage	13.2 (4)	[c]**0.001****	16 (3)	[d]**0.510**	29.2 (4)	[d]**0.076**
	Minimum wage	12.8 (5)		14.3 (8)		27.1 (7)	
	Between the minimum wage and 2 times of the minimum wage	11.9 (5)		14.9 (6)		26.9 (10)	
	2 times of the minimum wage and above	10.6 (7)		14.6 (6)		25.2 (9)	
Chronic diseases	No	11.91±4.62	[b]**0.604**	14.80±5.01	[b]**0.625**	26.70±7.96	[b]**0.756**
	Yes	10.95±4.51		14.48±5.70		25.43±9.10	
	1	12 (5)	[a]**0.604**	15 (6)	[a]**0.880**	27 (10)	[a]**0.727**
	≥2	14 (7)		14.6 (6)		27 (11)	

Table 2. continued

		Insufficient perception of self-efficacy		Perception of stress/discomfort		Total score of Perceived Stress scale	
		Mean ± SD/ median (IQR)	p-value	Mean ± SD/ median (IQR)	p-value	Mean ± SD/ median (IQR)	p-value
Drug use	No	11.91±4.62	[b]**0.281**	14.80±5.01	[b]**0.649**	26.70±7.96	[b]**0.257**
	Yes	10.95±4.51		14.48±5.70		25.43±9.10	
	1	10.5 (5)	[a]**0.012***	14 (7)	[a]**0.067**	25.5 (10)	[a]**0.014***
	≥2	14 (5)		16 (8)		29 (11)	
Regular exercise	No	12.22±4.65	[b]**0.012***	15.16±5.14	[b]**0.057**	27.38±7.94	[b]**0.008****
	Yes	11.03±4.46		14.10±5.04		25.13±8.31	
	1-2 days a week	11.98±4.44	[c]**0.007****	14.60±5.05	[d]**0.226**	26.57±8.05	[d]**0.055**
	3-4 days a week	9.91±4.61		12.86±5.65		22.77±9.38	
	More than 4 days a week	9.52±3.67		14.10±4.04		23.62±6.95	
Regular sleep	No	12.78±4.93	[b]**0.001****	16.09±5.54	[b]**0.001****	28.88±8.79	[b]**0.001****
	Yes	11.06±4.26		13.85±4.62		24.92±7.31	
	1-2 days a week	11.42±3.91	[d]**0.508**	14.02±4.47	[d]**0.497**	25.44±7.15	[d]**0.391**
	3-4 days a week	11.26±3.94		14.24±4.28		25.50±6.33	
	More than 4 days a week	10.70±4.70		13.44±4.98		24.14±8.09	
Alcohol	No	12.1 (5)	[c]**0.031***	14.5 (7)	[c]**0.155**	26.5 (10)	[c]**0.737**
	Yes	10.8 (6)		15.5 (7)		26.3 (8)	
	Quitted	15.6 (5)		13.6 (6)		29.2 (4)	
Smoking	No	12.42±4.50	[d]**0.009****	14.61±4.80	[d]**0.795**	27.03±7.59	[d]**0.320**
	Yes	10.99±4.68		14.97±5.67		25.96±8.98	
	Quitted	10.54±4.36		14.58±4.54		25.12±7.71	

The variables tested with [a]Mann-Whitney U test, [c]Kruskal-Wallis test and Dunn-Bonferroni test are shown as median (Q1-Q3) in the table. The variables tested with [b]Student t-test, [d]One-Way ANOVA test and Dunn-Bonferroni are shown as mean ± standard deviation (SD), *p<0.05, **p<0.01
IQR: interquartile range

Perceived stress levels and perceptions of stress/discomfort of the participants according to smoking did not show a statistically significant difference (p>0.05). The insufficient self-efficacy perceptions of smokers were found to be significantly lower than those of non-smokers (p=0.022).

A weak, statistically significant relationship was detected between the participants' ages and the PSS-14 total score and stress/discomfort perception sub-dimension score (PSS-14 and stress/discomfort perception scores decreased as age increased) (r=-0.166, p=0.001 and r=-0.213, p<0.001). There was no correlation between the total amount of cigarettes consumed (pack/year) by smoker and ex-smoker participants and total score and sub-dimensions scores of PSS-14 (p>0.05). There was no correlation between the number of cigarettes consumed by smoker participants daily and the total score and sub-dimensions scores of the PSS-14 (p>0.05).

When the FTND scores of the smokers were examined; 38.4% (n=56) had very low score, 32.2% (n=47) low score, 7.5% (n=11) moderate score, 14.4% (n=21) high score and 7.5% (n=11) very high score.

The total scores of the FTND of male participants were found to be statistically significantly higher than female participants (p=0.015). A weak and positive (as age increased, FTND score increased) statistically significant correlation was detected between the participants' ages and their total FTND scores (r=-0.189, p=0.022).

The relationship between the participants' total scores and sub-dimensions scores of the PSS-14 and their age, total cigarette use, number of cigarettes per day and FTND is shown (Table 3).

Backward stepwise logistic regression was evaluated by including age, body mass index (BMI), gender, chronic disease, PSS-14 total score and sub-dimensions scores, which were thought to be effective on smoking, and the model was found to be significant

Table 3. Relationship between Perceived Stress scale and age, total cigarette use, number of cigarettes used per day and Fagerström test for nicotine dependence

		Insufficient perception of self-efficacy	Perception of stress/ discomfort	Total score of Perceived Stress scale
Age	r	-0.061	-0.213	-0.166
	p	**0.230**	**0.001****	**0.001****
Total smoking (packs/years)	r	-0.114	-0.144	-0.147
	p	**0.137**	**0.061**	**0.055**
Daily smoking (pieces)	r	-0.078	-0.018	-0.038
	p	**0.350**	**0.830**	**0.649**
Total score of Fagerström test for nicotine dependence	r	0.024	0.013	0.018
	p	**0.773**	**0.877**	**0.825**

r: Spearman correlation test, **p<0.01

Table 4. Logistic regression analysis of risk factors effective on smoking

		B	SE	p-value	Odds	95% CI for odds	
						Lower	Upper
Step 4	Gender (M)	0.737	0.230	**0.001****	2.091	1.332	3.282
	Insufficient perception of self-efficacy	-0.101	0.029	**0.001****	1.107	1.044	1.172
	Perception of stress/discomfort	0.067	0.026	**0.009****	1.070	1.017	1.126

**p<0.01, B: beta coefficient, SE: standard error, CI: confidence interval

(F=23.438; p<0.001). The explanatory coefficient of the model was 71.5%.

In the evaluation made with the Backward stepwise method, at the end of the 4th step, gender, insufficient self-efficacy perception and stress/discomfort perception measurements were included in the model (p<0.01) (Table 4). When female gender was taken as reference, the risk of smoking in men was higher [odds ratio (OR): 2.091, 95% confidence interval (CI): 1.33-3.28]. The OR of the effect of a unit decrease in the perception of insufficient self-efficacy in smokers was 1.107 (95% CI: 1.044-1.172). The OR of the effect of a unit increase in the perception of stress/discomfort on smoking was 1.070 (95% CI: 1.017-1.126).

While the univariate effects of age, BMI, chronic disease and PSS-14 total score were significant, their effects on smoking were not found to be significant in the multivariate evaluation (p>0.05).

DISCUSSION

In our study, no statistically significant relationship was found between smokers' total and subdimensions scores of the PSS-14 and FTND score. In the study by Warner et al. (13), the mean total score of the smokers with a high or higher addiction level was found to be significantly higher than those with a medium or lower addiction level. In a study conducted by Banazadeh et al. (14) among students of Kerman University of Medical Sciences in Iran, it was found that there was a positive and significant correlation between perceived stress and nicotine addiction level. In Białożyt's (15) thesis study, which included 216 participants, no significant relationship was found between perceived stress and nicotine addiction level, and this result was attributed to the limitations of the study. People with high perceived stress have high nicotine addiction levels in the literature. We think that it is effective for people to see smoking as a tool that suppresses the perception of stress and to associate the feeling of happiness and relaxation that comes with the effect of dopamine secreted as a result of nicotine's activation of the reward pathway, with its stress-reducing effect.

In our study, no statistically significant relationship was found between the total amount of cigarettes consumed (pack/year) and the PSS-14 total subdimensions scores in smokers and ex-smokers. In addition, no statistically significant relationship was found between the number of cigarettes consumed per day and the PSS-14 total and subdimensions scores in smokers. In the study of Stubbs et al. (16) which included 217, 561 participants from 41 countries, increased perceived stress level was associated with heavy smoking (≥30 cigarettes per day) among daily smokers.

In Ng and Jeffery's (17) study, which included 12,110 participants in 26 workplaces, the number of cigarettes consumed per day among smokers was not found to be related to perceived stress. There is no one-to-one relationship between high perceived stress and the amount of cigarette consumption in the literature. The main reason why cigarettes are consumed in increasing amounts over time can be explained by the physiological addiction it creates in the person.

In our study, while there was no statistically significant relationship between the smoking status of the participants and their

PSS-14 mean total score and stress/discomfort perceptions; the perception of insufficient self-efficacy of smokers was found to be significantly lower than that of non-smokers. In Tüfekçi and Türktemiz's (18) study, which included 443 participants between the ages of 18-65 in Konya, no statistically significant difference was found between smoking status, PSS-14 mean total score and stress/discomfort perceptions, consistent with our study. In the same study, contrary to our study, the perception of insufficient self-efficacy of smokers was found to be significantly higher than that of non-smokers (18). In Koçak's (19) study conducted with students of the school of physical education and sports, no significant difference was found in the PSS-14 total score and its subdimensions scores according to smoking status. In the study conducted by Naquin and Gilbert (20) on university students, the PSS-14 mean total score of current smokers was found to be significantly higher than that of those who had never smoked. These different results in various studies can be explained by the fact that perceived stress alone is not effective in smoking status, but various factors such as age, gender, and working status may also be effective.

Study Limitations

The most important limitation of our study was that it was a single-center study. Our results may not be valid for the whole population. Therefore, studies with larger populations are needed.

CONCLUSION

In our study, no significant relationship was found between high perceived stress and nicotine addiction level, cigarette consumption amount and smoking status. However, various factors such as age, gender, and regular exercise were found to be significantly related to perceived stress. Additionally, gender, insufficient self-efficacy perception and perception of stress/discomfort were found to be effective on smoking.

Perceived stress may be a facilitating factor in starting to smoke. It is predicted that one of the important reasons why cigarettes are consumed in increasing amounts over time may be the physiological addiction it creates in the person as a result of the increased number of nicotine receptors due to smoking. In conclusion, in addition to motivational interviews in smoking cessation clinics, treatments aimed at reducing physiological addiction, especially nicotine replacement therapy, should also be planned for suitable patients.

Ethics Committee Approval: This study was approved by the Non-Interventional Clinical Research Ethics Committee of İstanbul Medipol University (decision no: 1297, date: 23.12.2021).

Informed Consent: From those who participated in the research informed written consent was obtained.

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