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Original research

The Effect of Smoking Duration and Daily Consumption on Anxiety and Sleep Quality in Smokers

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Abstract

Objective: Our aim is to compare the anxiety and sleep quality levels of smokers and non-smokers and to investigate the relationship between smoking duration and daily consumption amounts with anxiety and sleep quality.
Materials and Methods: Eighty individuals, between the ages of 18 and 50, with a mean age of 31.98±10.31 years were participated in the study. Participants were divided into two groups as smokers (n=40) and non-smokers (n=40). The smoker group was divided into two groups as the one smoking less than half a pack (n=20) and the other smoking more than one pack (n=20). Anxiety was evaluated with the Beck Anxiety Inventory (BAI) and sleep quality with the Pittsburg Sleep Quality Index (PSQI).
Results: It was found that the anxiety level of the smoker group was higher and the sleep quality values were lower than the control group ($p<0.001$). There are relationships among the smoking duration, the amount of cigarette consumption ($r = -0.530$, $p<0.001$) and anxiety ($r =0.381$, $p=0.015$), between the amount of cigarette consumption and anxiety ($r = -0.384$, $p=0.014$) and between the sleep quality and the anxiety ($r=0.546$, $p<0.001$).
Conclusion: Smoking causes an increase in the level of anxiety and a decrease in sleep quality. As the smoking duration increases, the anxiety score increases and as the anxiety level increases, the sleep quality decreases.

Key Words: *Anxiety, Cigarette Smoking, Sleep Quality*

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Introduction

The most common form of tobacco use in our country and in the world is cigarettes (Acar, Şaşman & Yararbaş, 2019). Smoking habit is a disease accepted as substance addiction and is one of the most important causes of death and disease worldwide (Çilingir, Hintistan & Öztürk, 2012).

Between 1970 and 2000, cigarette consumption decreased by 0.2% each year in high-developed countries, while it increased by 5% each year in low- and middle-income countries. (Argüder, Hasanoğlu, Karalezli & Kılıç, 2012). Among the developing countries, Turkey ranks second after Greece among European countries in terms of per capita cigarette consumption, while it ranks fifth in world tobacco production (Azak, 2006; Öztürk, 2009).

Consumption of cigarettes not only causes cancer in the lungs, but also in the lips, tongue, trachea, oesophagus, stomach, kidneys and bladder, and it also causes progressive constricting lung disease (COPD), cardiovascular disease, rapid aging and premature death. (Çilingir et al., 2012).

The average nicotine content in cigarettes is 0.5 mg. (Acar et al., 2019). While low levels of nicotine create a calming effect, high amounts of nicotine cause negative effects. In addition, the number of cigarettes consumed, the amount of abstinence, the age of the user, the duration of smoking and the number of daily consumption cause different effects on mental functions (Taşpınar & Pakyürek, 2020).

It has been stated that smoking addiction is also closely related to psychological diseases. Studies have reported that people who are addicted to cigarettes experience more anxiety (Çaykara, Tuna, Sağlam & Pençe, 2019). In a study, it was stated that the acquisition of addiction to nicotine showed a positive correlation for anxiety disorder (Yağcı, Perincek & Kıvrak, 2019). It is stated that cigarette consumption constantly creates an anxiety-producing effect (Cuvaş et al., 2010).

Sleep quality is the state of feeling vigorous, spiritually good and ready for the day when a person wakes up (Kacaroğlu, 2018). It was concluded that being dependent on cigarettes causes a decrease in sleep quality. Due to the stimulating effect of nicotine, it is difficult for a person to start and maintain sleep. Studies show that while the average nighttime sleep time of cigarette addicts decreases, there is an increase in daytime sleepiness. In addition, an increase in the amount of snoring is observed with smoking cigarettes (Yalçın BM, Yalçın E & Karahan, 2021).

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Although there are studies investigating the effects of smoking in the literature, studies investigating the effects of the amount of daily smoked cigarettes and the duration of smoking on anxiety and sleep quality are not sufficient. This study was conducted to compare anxiety and sleep quality levels between smokers and non-smokers and to investigate the relationship between smoking duration and daily consumption amount with anxiety and sleep quality. It has been assumed that the duration of smoking and the amount of daily consumption have an effect on anxiety and sleep quality in smokers.

Materials and Methods

This study is an observational study using an online questionnaire between January 2022 - February 2022. Permission for the study was obtained from the Ethics Committee of KTO Karatay University Faculty of Medicine, Non-Pharmaceutical and Medical Device Research, with the decision dated 20.12.2021 and numbered 2021/008. Informed consent of the participants was obtained online.

The study universe of the research; A total of 80 individuals were smokers (n=40) between the ages of 18-50 and non-smokers (n=40) as the control group. Smokers were divided into two groups as those who smoke less than half a pack of cigarettes per day (n=20) and those who smoke more than one pack (n=20).

Volunteers over the age of 18 who smoke and do not smoke were included in this study. COPD-asthma patients, people who smoked for a while but now quit, those with psychological and chronic diseases, those who use electronic cigarettes and cigarette filters were excluded from the study. Individuals who smoke between half a pack and one pack per day were not included in the study, since sufficient numbers could not be reached to form a group.

In the study, 24-item Pittsburgh Sleep Quality Index (PSQI) was used to evaluate sleep quality, and 21-item Beck Anxiety Inventory (BAI) was used to evaluate anxiety symptoms. PSQI scale developed by Buysse et al. has been adapted into Turkish by Ağargün et al. and consists of 24 questions. Nineteen of these questions are self-evaluated, and 5 are questions that the spouse or friend of the person should answer (Erdoğan, Karabel, Tok, Güzel & Ekerbiçer, 2018). These five questions are used for clinical information purposes only and are not added while scoring. After the 19 items used in scoring are classified as 7 separate component scores, and the scores of the individual components are added together, the actual PSQI score is reached. These components include subjective sleep quality, delayed sleep, duration of sleep, efficiency of habitual sleep, presence of irritating factors during sleep, use

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of sleeping pills, and daytime dysfunction. Each of the components is rated with a number from 0 to 3. The score obtained after adding the components is the total score of the PSQI and is between 0 and 21. That the total score is 5 or less indicates that the person's sleep quality is "good". The score above 5 indicates that the sleep quality is “poor” (Yalçın et al., 2021).

BAI is a scale developed by Beck et al. This scale is a self-assessment scale used to determine the frequency of anxiety symptoms experienced by individuals. It consists of 21 questions in total. Each item is scored between 0 and 3. The person is asked to answer the questions by ticking one of the alternatives "Never" (0), "Mild"(1), "Moderate"(2), "Severe"(3). The total score ranges from 0 to 63. The higher the total score, the higher the level of anxiety experienced by the person (Ulusoy, Sahin & Erkmen, 1998). Total score; If it is less than 21, it means mild, if it is between 22-35, it is moderate, if it is greater than 36, there is severe anxiety.

Statistical Analysis

The data were analyzed with the IBM SPSS Statistics 26.0 package program. Whether the variables were suitable for normal distribution was examined using the Q-Q plot and Kolmogorov-Smirnov/Shapiro-Wilk tests. In descriptive analyses, median values were used for variables that did not fit normally. The results were evaluated at the 95% confidence interval, and the significance was evaluated at the $p<0.05$ level. Numbers, percentages, mean, standard deviation, median and quartile values were used while evaluating the data. When comparing the data of a certain variable of two non-dependent groups, the Mann-Whitney U test was used for data that did not fit the normal distribution. Spearman's rho correlation test was used to determine the relationship between numerical variables. The correlation coefficient (r); 0.00 - 0.25 very weak; 0.26 - 0.49 weak; medium from 0.50 to 0.69; high from 0.70 to 0.89; Between 0.90 and 1.0 was considered as a very high relationship and $p<0.05$ was taken as the significance level (Çalik Kütükcü et al., 2021)

The sample size was calculated based on the PSQI and BAI values in the study by Rujnan et al. (2019). After GPower 3.1.9.2. program analysis, for 95% statistical power (alpha: 0.05, beta: 0.05), the maximum number of participants was calculated as 76 people based on BAI data, and a total of 80 people were included in the study (Rujnan, Çaykara, Sağlam & Pençe, 2019).

Results

Eighty individuals between the ages of 18-50, with a mean age of 31.98±10.31 years, participated in the study. The duration of smoking of individuals varies between 1 and 35 years

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for those who smoke less than half a pack of cigarettes per day, and between 3 and 35 years for those who smoke more than one pack per day. The sociodemographic characteristics of the participants are given in Table 1.

Table 1. Sociodemographic characteristics of the participants.

	N	%	Minimum	Maximum	Mean	Standard Deviation
Total Age of Participants	80		18	50	31.98	10.31
Female	50	62.5	18	50	30.58	9.83
Male	30	37.5	18	50	34.30	10.84
Age of Smoking Participants						
Female	26	65.0	18	50	31.15	10.19
Male	14	35.0	18	50	36.50	10.18
Age of Non-Smoker Participants						
Female	24	60.0	18	50	29.96	9.59
Male	16	40.0	18	50	32.38	11.34
Smoking duration (years)						
Less than Half Pack	20	50.0	1	35	7.70	8.49
More than One Package	20	50.0	3	35	17.30	10.21

N: The number of participants, %: Percent

When the mean scores of smokers and non-smokers on BAI and PSQI were compared, it was found that smokers had higher anxiety levels and lower sleep quality levels ($p<0.05$) (Table 2).

When the mean scores of smoker and non-smoker females and males on BAI and PSQI were compared, it was determined that there was no significant difference in anxiety and sleep quality levels between smokers and non-smokers ($p>0.05$) (Table 3).

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Table 2. Comparison of Beck Anxiety Inventory and Pittsburgh Sleep Quality Index scores in smokers and non-smokers

	Smokers (N=40) **Mean ± SD** **Medyan (Q1-Q3)**	**Non-smokers (N=40)** **Mean ± SD** **Medyan (Q1-Q3)**	**p**
BAI	14.95 ± 11.97 12.5 (7-21)	4.85 ± 5.43 3 (1-6)	**<,001[a]**
PSQI	7.48 ± 3.11 7 (6-9.75)	4.22 ± 3.09 3.5 (2-5)	**<,001[a]**

p<0,05 Statistical significance, BAI: Beck Anxiety Inventory, PSQI: Pittsburgh Sleep Quality Index, N: The Number of Participants, SD: Standard Deviation, Q1: First Quarter, Q3: Third Quarter, [a:] Mann-Whitney U test

Table 3. Comparison of Beck Anxiety Inventory and Pittsburgh Sleep Quality Index values of smokers and non-smokers female and male gender.

			Female (N=26)	**Male (N=14)**	**p**
Smokers	BAI	Mean. ± SD Medyan (Q1-Q3)	14.96 ± 13.48 12 (4.75-21.25)	14.93 ± 8.95 13.5 (10-18.25)	0.705[a]
	PSQI	Mean ± SD Medyan (Q1-Q3)	7.15 ± 3.54 7 (5-8.25)	8.07 ± 2.09 8 (6.75-10)	0.162[a]
			Female (N=24)	**Male (N=16)**	**p**
Non-smokers	BAI	Mean ± SD Medyan (Q1-Q3)	4.96 ± 5.33 3.5 (1-6.75)	4.69 ± 5.75 3 (1.25-5.50)	0.754[a]
	PSQI	Mean. ± SD Medyan (Q1-Q3)	3.92 ± 3.02 3 (2-5)	4.69 ± 3.24 4.5 (2.25-6)	0.359[a]

p<0,05: Statistical significance, BAI: Beck Anxiety Inventory, PSQI: Pittsburgh Sleep Quality Index, N: The number of participants, SD: Standart Deviation. Q1: First quarter, Q3: Third Quarter, [a]: Mann-Whitney U test.

It was determined that the duration of smoking had a moderate negative correlation with the amount of cigarette consumption ($r = -0.530$, $p<0.001$) and a weak positive correlation with anxiety ($r =0.381$, $p=0.015$). It was determined that there was a weak negative ($r =-0.384$, $p=0.014$) relationship between the amount of cigarette consumption and anxiety, and a moderately positive ($r =0.546$, $p<0.001$) relationship between sleep quality and anxiety (Table 4).

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Table 4. The relationship between anxiety and sleep quality of smoking duration and daily cigarette consumption in smokers.

		Smoking Period	Cigarette Consumption Amount	PSQI	BAI
Smoking Period	r	1.000	-0.530**	-0.033	0.381*
	p		<0.001	0.841	0.015
Cigarette Consumption Amount	r	-0.530**	1.000	0.046	-0.384*
	p	<0.001		0.779	0.014
PSQI	r	-0.033	0.046	1.000	0.546**
	p	0.841	0.779		<0.001
BAI	r	0.381*	-0.384*	0.546**	1.000
	p	0.015	0.014	<0.001	

r: correlation coefficient, *: poor relationship, **: moderate relationship, BAI: Beck Anxiety Inventory, PSQI: Pittsburgh Sleep Quality Index.

Discussion and Conclusion

In this study, the anxiety and sleep quality scores between smokers and non-smokers, and the effects of smoking duration and daily consumption amounts of smokers on anxiety and sleep quality were evaluated. According to the data we obtained, smoking causes an increase in the level of anxiety and poor sleep quality. In addition, the increase in the duration of smoking causes an increase in anxiety and this increase causes a worsening in sleep quality. In a study, when the average scores of cigarette addicts from the scales were evaluated; The mean score they got from BAI was 8.77±8.77 (mild anxiety) and the mean score they got from PSQI was 5.83±2.95 (poor sleep quality) (Rujnan et al., 2019). In our study, when the average score of smokers from the scales was evaluated; The mean score they got from BAI was 14.95±11.97 (mild anxiety) and the mean score they got from PSQI was 7.48±3.11 (poor sleep quality). The parallelism of the results of these two studies shows that smoking causes anxiety and poor sleep quality.

Rujnan et al. (2019) in their study with 109 people, examined the relationship between anxiety and sleep quality levels of smokers and concluded that there is a very high positive correlation between anxiety level and sleep quality. In our study, we determined that there is a moderate positive correlation between sleep quality and anxiety level in smokers. The

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difference in the relationship levels in these two studies may be due to the difference in the number of participants in the studies.

In the literature, there are no studies investigating the relationship between the amount of cigarette consumption and anxiety and sleep quality, between the duration of smoking and anxiety and sleep quality, and between the duration of smoking and the amount of cigarette consumption.

In our study, it was determined that there was a weak negative correlation between the amount of cigarette consumption and anxiety. As the amount of daily cigarette consumption increases, the anxiety score decreases. As the amount of cigarettes consumed daily by people who have a habit of smoking increases, the dopamine secretion produced by the nicotine in cigarettes also increases, and thus, a state of relaxation may occur due to the pleasure that dopamine gives to the smoker.

In our study, we determined that there is a weak positive correlation between the duration of smoking and anxiety. As the duration of smoking (years) increases, the anxiety score also increases. The fact that the negative effects of smoking and the health problems it causes increase over the years may increase the level of anxiety in individuals. In addition, as a result of smoking for many years, the nicotine in cigarettes may not be enough for people anymore, and this may cause an increase in anxiety levels. The substances in the cigarette may be causing an anxiety-increasing situation in the long run.

In our study, we concluded that there is a moderate negative correlation between the duration of smoking and the amount of cigarette consumption. Both the feeling of abstinence and the desire to consume against cigarettes may decrease over the years.

In our study, we could not find a relationship between the amount of cigarette consumption and sleep quality, and between the duration of smoking and sleep quality. The body may become addicted to nicotine over time and become desensitized to more nicotine.

In our study, it was determined that there was no significant difference in anxiety and sleep quality levels between smokers and non-smokers. Smoking status and gender did not significantly interact with anxiety and sleep quality.

Our study had some limitations. The amount of daily cigarette consumption of individuals is a situation that varies. It can increase or decrease depending on many factors. Since it is very difficult to give an exact number, the average consumption amounts were questioned in our study. However, the nicotine values of cigarettes sold in the market also vary,

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and therefore, the addiction levels of people can also be affected. In order to eliminate this situation, the nicotine addiction levels of smokers could also be questioned.

As a result, besides many known negative effects of smoking, it has been observed that by increasing the level of anxiety, it impairs the psychological health of people and reduces their sleep quality. In addition, it was determined that as the duration of smoking increased, the anxiety score increased and the sleep quality decreased as the anxiety level increased.

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Conflict of İnterest

The authors declare that there is no conflict of interest in this study.

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