

# Investigation of the Effects of Nicotine Dependence Levels on Quality of Life and Depressive Symptoms

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## Abstract

**Objective:** The aim of this study was to investigate the effects of nicotine dependence levels on quality of life and depressive symptoms.

**Material and Method:** The study initially comprised 85 individuals who smoked. Twelve subjects were excluded because of missing data and other reasons, so the study was completed with 73 subjects with a mean age of  $33.55 \pm 11.09$  years. The Fagerström Test for Nicotine Dependence (FTND), Nottingham Health Profile (NHP) and Beck Depression Inventory (BDI) were used to assess the levels of nicotine dependence, quality of life and depression symptoms, respectively. The subjects were divided into three groups according to nicotine dependence levels and were classified as mild, moderate and severe nicotine dependence. The resulting data were analyzed with Kruskal-Wallis test.

**Results:** Three groups were created according to nicotine dependence levels and there were 22 subjects in the mild group, 30 in the moderate group and 21 in the severe group. According to mild, moderate and severe nicotine dependence levels, NHP scores were  $65.75 \pm 50.18$ ,  $101.47 \pm 73.40$ ,  $219.78 \pm 161.43$ , respectively and BDI scores were  $7.64 \pm 6.20$ ,  $9.53 \pm 7.82$ ,  $16.10 \pm 10.46$ , respectively. A statistically significant difference between the groups was determined.

**Conclusion:** The results of the study showed that when the nicotine dependence level increased, there was a negative effect on quality of life and mood of individuals. In addition to the physical problems due to smoking, smoking cessation programs should be extended to prevent depression and provide a better quality of life, and the level of public awareness should be improved, particularly through mediums such as the media.

**Keywords:** Depression; Quality of life; Smoking; Nicotine dependence; Public health

## Introduction

Smoking is a significant public health problem, which requires serious preventative measures. It also increases health costs because of the effects on early disability and mortality [1,2]. As it can lead to dependence even in the short term, cigarette smoking entails economic costs as well as affecting the body negatively through its content, and thereby damaging the health [3]. It is known that smoking habits are sustained through nicotine dependence [4]. It has been emphasized in previous studies that it is a risk factor for many problems such as coronary artery disease, peripheral vascular disease, myocardial infarction, cancer, stroke, and sudden death. Cigarettes contain various harmful chemical substances such as nicotine, tar, and carbon-monoxide. It can be said that cigarette dependence, with the effects of the constituents, is a complex syndrome consisting of physiological, psychological and behavioral processes [5-9]. As a result of this syndrome, the lung capacities of addicts are affected, the oxygen saturation in blood decreases, and an appropriate base for different problems is created. In literature, there are studies indicating that depressive symptoms increase as the level of oxygen in the blood decreases [10].

Depression is a syndrome with indications such as deep sadness, retardation and inertia in thinking, speaking, and movement, a sense of insignificance, unwillingness, and pessimism in emotions and thoughts, and retardation in functions [10]. It can be said that there is a multilateral relationship between cigarettes and depression. There are a limited number of studies indicating that depression triggers cigarette use and, similarly, cigarette use eases the emergence of depressive symptoms, but that complex relationship cannot be clearly revealed [11-13]. This complex image emerging in relation to the level of cigarette use ultimately affects the quality of life of the individual.

The Quality of Life is defined by World Health Organization as "an individual's perceptions about their position in life from the aspects of their objectives, expectations, standards, and anxieties within the scope of the culture and values in which they live". Quality of life has become an important parameter to determine the effects on daily life of the efficiency of treatment and actual health problems, and is affected by gender, socioeconomic status, age, behavioral risk factors, environment, and diseases [14,15]. The determination of quality of life in different age and patient groups has been discussed in many studies. It is noticeable that studies in literature investigating the relationship with smoking have produced conflicting results. While a high level of correlation has been found generally in studies in European countries, a study in Japan emphasized that there is no relationship [16].

There are many different studies in literature which have investigated the effects of smoking on quality of life and depression. While there are also studies indicating that the quality of life is affected negatively because of cigarette's known negative effects related to the level of nicotine, there are other studies indicating that there is no relationship [3,11]. Despite the number of studies which have been conducted, the model of the relationship between the quality of life and the level of nicotine dependence has not yet been clearly defined [17]. It has also been suggested that the effects of the amount of smoking on mental health should be taken into account. Therefore, the objective of this study was to investigate the effects of nicotine dependence level on quality of life and depressive symptoms.

**Methods:**

**Subjects**

This definitive study comprised 85 individuals who smoked, lived in the city center, and were aged between 19 and 64 years (mean age, 33.55 ± 11.09 years). The study participants were selected by random sampling. The individuals included were those who were able to

sustain active lives, did not participate in professional sports, were not taking any kind of treatment to quit smoking and had a sedentary lifestyle. Any individuals with orthopedic or neurological problems which affected their activity level or those with a psychological diagnosis were excluded from the study. Due to a lack of follow-up data, 12 subjects were excluded, and the study was completed with 73 subjects. Informed consent was obtained from all the volunteer participants. The study was conducted in accordance with the Helsinki Declaration.

**Assessments**

Age, gender, height, weight, body mass index (BMI), the age of starting smoking, and cigarette pack/years data were recorded on a pre-prepared form. These data are presented in Table 1. The presence of dyspnea due to cigarette use, fatigue, coughing/sputum, and pain complaints were evaluated as YES/NO and these values are presented in Table 2. The subjects were asked to complete a questionnaire in respect of their nicotine dependence levels, quality of life, and depression symptoms. The details of the questionnaire are explained below.

Variables	Nicotine dependence level(n)			
	Mild (22)	Moderate(30)	Severe(21)	Total(73)
Gender (M/F)	12/10	21/9	14/7	47/26
Age (year)	33.32 ± 10.40	32.13 ± 10.02	35.81 ± 13.25	33.55 ± 11.09
Height (cm)	171.64 ± 9.01	172.80 ± 8.56	173.62 ± 8.10	173.04 ± 8.59
Weight (kg)	70.95 ± 9.96	70.80 ± 13.41	70.62 ± 15.88	70.78 ± 13.57
BMI	24.05 ± 2.76	23.64 ± 3.57	23.42 ± 5.19	23.53 ± 5.41
Pack/years	10.77 ± 9.01	12.63 ± 9.44	16.57 ± 12.46	13.21 ± 10.39
Starting to smoke (years)	21.82 ± 4.32	19.10 ± 5.45	18.76 ± 5.06	19.82 ± 5.13

**Table 1:** Demographic characteristics.

M: Male, F: Female, cm: centimeter, kg: kilogram, BMI: body mass index

Variables	Nicotine dependence level (n)		
	Mild(22)	Moderate(30)	Severe(21)
Dyspnea	13.7	13.3	38
Fatigue	27.3	30	52.4
Coughing/Sputum	22.7	26.7	52.4
Pain	13.6	23.3	47.6

**Table 2:** Values % of subjects who indicates presence of symptoms.

**Nicotine Dependence Level**

The nicotine dependence level of the subjects was assessed with the Fagerström Nicotine Dependence Test (FNDDT) [18]. The Fagerström nicotine dependence test is a self-assessment scale, used to assess the risk of the patient's addiction to nicotine from a physical aspect, and to

measure the level and severity. A total of 6 questions are scored between 0 and 1 or 0 and 4, using a 2-point or a 4-point Likert scale. The Turkish version of the form was tested for validity and reliability by M.A. Uysal et al. in 2004 [19] (Table 3).

Variables	Nicotine dependence level (n)			p*
	Mild (22)	Moderate (30)	Severe (21)	
Beck Depression Inventory	7.64 ± 6.20	9.53 ± 7.82	16.10 ± 10.46	0.00*
Nottingham Health Profile				
Pain	2.98 ± 6.06	7.33 ± 16.38	29.09 ± 29.81	0.00*
Physical activity	9.84 ± 13.28	9.08 ± 7.55	27.11 ± 25.60	0.02*
Energy level	12.07 ± 21.58	21.33 ± 26.30	49.40 ± 43.07	0.00*
Sleep	19.03 ± 19.22	24.95 ± 22.62	42.35 ± 30.81	0.02*
Social isolation	10.91 ± 17.03	12.36 ± 23.14	25.56 ± 27.21	0.08
Emotional reaction	12.98 ± 18.27	26.60 ± 28.56	46.24 ± 30.93	0.00*
Total	65.75 ± 50.18	101.47 ± 73.40	219.78 ± 161.43	0.01*

**Table 3:** Depression and quality of life scores of subjects according to nicotine dependence level.

\*Kruskal Wallis

### Quality of Life

To evaluate quality of life, the Turkish version of the Nottingham Health Profile (NHP) was used [20]. This questionnaire consists of a total of 38 statements, such as “I’m tired all the time”, “I feel lonely” and “I sleep badly at night”, which are grouped under 6 sub-headings of pain, physical activity, energy level, sleep, social isolation, and emotional reaction. All the questions are answered by yes or no. Each section is scored between 0 and 100, with 0 indicating the best health status and 100 the worst [21].

### Depressive Symptoms

To assess the depressive symptoms, the Turkish version of the Beck Depression Inventory (BDI) was used [22,23]. BDI was developed by observing frequently exhibited symptoms of individuals and depression-specific attitudes, which were then combined with frequently observed behaviors. These observations were combined systematically under 21 symptoms, and attitudes are rated between 0 and 3 depending on the intensity. This inventory includes statements such as “I feel sad”, “I do not feel like a failure”, “I hate myself” and “I would like to kill myself” [24].

### Statistical Analysis

The information entered into forms was entered into SPSS 20 package software, and the definitive information was expressed as means, standard deviations, and percentage values. The Kolmogorov-Smirnov test was used to evaluate whether data distributions were normal. When the obtained difference values were not distributed normally, the Kruskal Wallis test was used to compare the groups. A p value of <0.05 was considered significant.

### Results

According to the data obtained from the results of the study, the 73 subjects with a mean age of 33.55 ± 11.09 years were evaluated and grouped as mild, moderate and severe nicotine dependence groups according to the nicotine dependence levels. There mild dependence group comprised 22 subjects, the moderate dependence group 30 and

the severe dependence group comprised 21. The mean duration of smoking of the subjects was 13.21 ± 10.39 pack/years. It was observed that as the cigarette consumption of the subjects increased, so the dependence level increased. The mean age of starting smoking was determined as 19.82 ± 5.13 years. A higher age of starting smoking was observed in individuals with a mild level of dependence and an earlier age of starting smoking was determined in the severe dependence group.

The BDI scores of the subjects in the mild, moderate, and severe dependence groups were 7.64 ± 6.20, 9.53 ± 7.82 and 16.10 ± 10.46, respectively. NHP scores were calculated as 65.75 ± 50.18, 101.47 ± 73.40 and 219.78 ± 161.43 respectively. Statistically significant differences were determined between the groups. The sub-classifications of NHP of pain, physical activity, energy level, sleep, social isolation, and emotional reaction were observed to be affected negatively in proportion to the cigarette dependence levels. When the differences between the groups were evaluated statistically, all except social isolation showed significant differences.

### Discussion

Individuals who smoked were examined in this study by separating them into groups of mild, moderate, and severe nicotine dependence level. The results obtained showed that an increase in nicotine dependence negatively affects the quality of life and depressive symptoms.

The mean age of starting smoking of the total participants was determined to be 19.82 years. Many studies have shown that individuals start smoking at an early age. Şen et al. (2008) found the mean age of starting smoking to be 17.03 ± 2.23 years [3]. Burt and Peterson (1998) reported that 71% of smokers between ages of 30 and 39 started smoking at the age of 18 or younger [25]. In parallel with literature, the age of starting smoking was also determined in the current study, and higher nicotine dependence levels were observed in individuals who started smoking at an early age. Therefore, it can be considered that the prevention of starting smoking or ensuring cessation of smoking at those ages is the most effective way of dealing with cigarettes. There would seem to be a need to increase social activity fields and sporting activities to keep young people away from cigarettes.

By affecting the human organism, the substances in cigarette smoke may lead to many other diseases and disorders besides cancer [26]. Cigarettes consist of thousands of chemical materials, and when smoking, these are inhaled into the lungs. These toxic substances lead to weakness, fatigue, muscular symptoms or psychological problems. For example, nicotine leads to tachycardia and peripheral vasoconstriction, affecting the metabolism and tissue performance by decreasing the peripheral blood circulation. It results in increased carbon-monoxide, which damages the tissue oxygenation. These situations lead to a decrease in maximum oxygen intake and influence cardiorespiratory variables during exercise [27]. Therefore, these mechanisms negatively affect the quality of life of individuals.

Some researchers have investigated the differences between smokers and ex-smokers in terms of quality of life. Tillmann (1997) determined few differences between the groups in terms of quality of life, whereas in a study on nicotine dependence [28], Wilson et al. (1999) emphasized that the quality of life of mild-level or moderate-level smokers was low, but that of severe smokers was lower. It was also stated that individuals must participate in smoking cessation programs or they must decrease their cigarette consumption in order to improve their quality of life [29]. In another study, it was determined that the mental and physical health of mild-level or moderate-level smokers, even if they have smoked for a short time, was affected compared to non-smoker individuals [30]. In the current study, cigarette consumption was also observed to negatively affect the quality of life. This negative effect was observed even in mild-level smokers, and it increased depending on the level of addiction. As many chronic diseases also decrease quality of life, subjects with chronic diseases were not included in the study. Therefore, the negative effects of cigarettes on quality of life can be considered to be clearly presented.

In many studies, cigarette usage has been presented as a risk factor for mental disorders [31,32]. Reports have stated that the relationship between cigarettes and depression may be two-way and positive, and that cigarettes increase the risk of depressive symptoms in the future [33-36]. Wilson stated that the frequency of affected mental health among a mild-level smoker population was 30% [37]. Depressive symptoms have been shown to be related with smoking prevalence [38] and infrequency of smoking cessation [39,40]. Therefore, the relationship between cigarettes and depressive symptoms is complex [41], and the National Mental Health Institute has issued a call for longitudinal studies on this topic [42].

Although there is a two-way mechanism between cigarettes and depression, the presence of depressive symptoms among smokers has been stated in almost every study. In a study by Breslau et al. of 3000 young adult smokers, it was reported that it is possible that the individuals meeting the nicotine dependence criteria can also meet the criteria of major depression [43]. Duncan and Reese determined that there is little evidence to indicate that the intensity of cigarette usage is related with depression in smokers [44]. In another study, it was stated that the status of smoking and the amount of cigarettes smoked change with various indicators of depression [45]. Similarly, in the results of the current study, it was observed that depressive symptoms increased as the nicotine dependence level increased. Wisebeck et al. found that individuals who had quit smoking had a significantly lower risk of depression than individuals who continued to smoke, but a higher risk than those who had never smoked [46]. Thus, contrary to common belief, cigarettes increase depressive symptoms rather than decreasing them. In the current study, depressive symptoms were

observed in the sample group in their thirties, and quality of life was determined to be affected. At the same time, even if individuals had had mild-level or moderate-level nicotine addiction in their youth or early adulthood, were also carrying these symptoms. It should never be forgotten that these symptoms emerging in the early period may end with mortality.

In literature, there is a limited number of studies comparing quality of life with depression in terms of nicotine dependence. In the current study, the subjects were grouped in terms of nicotine dependence. Moreover, the depressive symptoms were evaluated together with quality of life. The low number of subjects is a limitation of this study, although inter-group differences were seen. Another limitation of the study is the lack of longitudinal studies as the effects of cigarette may vary. Therefore, future studies should be planned as longitudinal with a higher number of subjects to more clearly show the changes in quality of life and depression of cigarette smokers and those who have quit smoking.

## Conclusion

The results of this study showed that quality of life and the mood of individuals were affected negatively as the level of nicotine dependence increased. Therefore, in addition to the physical problems arising from smoking, it is thought for individuals to raise their quality of life and avoid depression, smoking cessation programs should be extended and the level of public awareness should be increased through tools such as the media.

## Conflict of Interest and Funding

The authors have no conflict of interest or funding to declare.

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