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ARAŞTIRMA / RESEARCH

Mediating effect of disease severity on the relationship between smoking status and quality of life in psoriasis patients

Psoriasis hastalarında sigara içme durumu ile yaşam kalitesi arasındaki ilişkide hastalık şiddetinin aracı etkisi

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Abstract

Purpose: The aim of this study was to examine the relationship between smoking and quality of life and to investigate the mediating role of disease severity on this relationship in psoriasis patients.

Materials and Methods: In the study, 268 psoriasis patients were reached by the convenience sampling method. In the study, patients' quality of life was measured with "dermatology quality of life index (DLQI)" and disease severity was measured with "psoriasis area and severity index (PASI)". The effect of the independent variable (smoking) on the dependent variable (quality of life), both directly and indirectly through the mediating variable (disease severity), was examined by process analysis.

Results: Smoking status shows statistically significant differences according to gender, age, marital status, occupation, and income groups. 17.02% of women and 44.09% of men smoke. 19.74% of single and 33.85% of married smoke. 20% of unemployed and 39.13% of employees smoke. 17.76% of low-income, 50.91% of middle-income, and 40.98% of high-income people smoke. This cross-sectional study revealed that smoking in psoriasis has no direct effect on the quality of life, but that smoking has a full indirect effect on the quality of life through disease severity.

Conclusion: In the study, it was found that smoking negatively affects the quality of life through both disease severity. Accordingly, it is recommended that patients be informed about the effect of smoking on their diseases.

Keywords:. Psoriasis, smoking, quality of life, disease severity

Öz

Amaç: Bu çalışmada, psoriasis hastalarında sigara kullanımı ile yaşam kalitesi arasındaki ilişkinin incelenmesi ve bu ilişkide hastalık şiddetinin aracı rolünün araştırılması amaçlanmıştır.

Gereç ve Yöntem: Çalışmada 268 psoriasis hastasına kolayda örnekleme yöntemi ile ulaşılmıştır. Çalışmada hastaların yaşam kaliteleri "dermatoloji yaşam kalite indeksi (DLQI)" ve hastalık şiddetleri ise "psoriasis alan ve şiddet indeksi (PASI)" ile ölçülmüştür. Ayrıca bağımsız değişkenin (sigara içme) bağımlı değişken (yaşam kalitesi) üzerindeki etkisi, hem doğrudan etkisi hem de aracı değişken (hastalık şiddeti) aracılığıyla dolaylı etkisi süreç analizi ile incelenmiştir.

Bulgular: Sigara kullanma durumu cinsiyete, yaşa, medeni durumuna, mesleğe ve gelir gruplarına göre istatistiksel olarak anlamlı farklılık göstermektedir. Kadınların %17,02'si ve erkeklerin %44,09'u sigara içmektedir. Bekârların %19.74'ü ve evlilerin %33.85'i sigara içmektedir. İşsizlerin %20'si ve çalışanların %39,13'ü sigara içmektedir. Düşük gelirlilerin %17,76'sı, orta gelirlilerin %50,91'i ve yüksek gelirlilerin %40,98'i sigara içmektedir. Çalışmada temel olarak psoriasis hastalığında sigara içmenin yaşam kalitesi üzerinde doğrudan bir etkisinin olmadığı, ancak sigara içmenin hastalık şiddeti aracılığıyla yaşam kalitesi üzerinde dolaylı tam bir etkisinin olduğunu bulunmuştur.

Sonuç: Çalışmada sigara içmenin hem hastalık şiddeti aracılığıyla yaşam kalitesini olumsuz etkilediği bulunmuştur. Buna göre hastalar sigara içmenin hastalıkları üzerindeki etkisi konusunda bilgilendirilmesi önerilmektedir.

Anahtar kelimeler: Psoriasis, sigara içmek, yaşam kalitesi, hastalık şiddeti

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INTRODUCTION

Psoriasis is a common and chronic papulosquamous skin disease that influences individuals of all ages and lives in all countries and causes a significant burden on society. Psoriasis is a severe global problem impacting at least 100 million people worldwide, and its prevalence varies between 0.09% and 11.43%[1]. Despite its unpredictable symptom course, psoriasis has crucial comorbidities such as psoriatic arthritis, cardiometabolic syndrome, depression, obesity, metabolic syndrome, and inflammatory bowel disease[2]. Psoriasis is thought to be triggered by a combination of genetic, epigenetic, behavioral, and environmental factors[3, 4]. These factors trigger the onset and exacerbation of the disease. Although mutations in HLA-Cw6 and CARD14 are among the genetic risk factors[5], it is stated that T cells are a significant mediator in psoriasis[6]. Environmental and modifiable risk factors, on the other hand, include diet, nutrition, physical activity[7], alcohol use, emotional stress, and smoking[8-10]. It is known that with the effect of these factors, many psoriasis patients have a decreased quality of life due to the disease, their social functioning is impaired, they are exposed to stigma and discrimination, and their psychosocial health is adverse affected[2 11].

Pathophysiological mechanisms are showing the relationship between smoking and psoriasis[12]. By-products from smoking, such as dioxin and nicotine, activate T cells that produce interleukin-23, interleukin-17, and interleukin-12, which are also associated with the pathogenesis of psoriasis. Interleukin-17 is one of the primary cytokines implicated in the pathogenesis of psoriasis. Both inflammatory disease psoriasis and components of cigarette smoke can have proinflammatory effects. Therefore, smoking is considered a significant risk factor for psoriasis[13, 14]. It has been reported that smoking induces overproduction of interleukin 1β (IL-1β) and raises the production of transforming growth factor β (TGF-β), and tumor necrosis factor α (TNF-α), which are associated with the severity of psoriasis[15]. Moreover, smoking is also related to gastrointestinal diseases, chronic obstructive pulmonary disease, and certain types of malignancies and is a significant risk factor for the development of cardiovascular diseases such as cerebrovascular disease, myocardial infarction, and coronary artery disease [12]. Therefore, it is known that smoking hastens the development of comorbidities such as atherosclerotic heart disease, which can accompany psoriasis. Studies demonstrated that smoking, an environmental factor, increases the severity of psoriasis and delays the response to treatment[15]. In addition, smoking or exposure to smoke was found to be an independent risk factor for the development of psoriasis. Some studies reported a positive relationship between smoking and psoriasis area and severity index (PASI)[16-19].

Psoriasis is a multidimensional disease with physical, social, economic, and psychosocial impacts. Numerous studies revealed that it negatively affects the quality of life of patients[20-22]. In addition to routine clinical assessments, health-related quality of life measures is becoming increasingly important in the evaluation and treatment of psoriasis patients by clinicians. When applying a systemic or topical treatment, one of the most frequently used measurements specific to psoriasis in the evaluation of treatment results is PASI, the clinical measurement calculated by the physician. The other is the dermatology quality of life index (DLQI), a scale filled in by the patient and based on the patient's statements[23, 24]. There are studies in the literature analyzing the relationship between patients' quality of life and sociodemographic characteristics such as age and gender[22]. In addition to these variables, many factors like the coexistence and clinical severity of chronic diseases influence the quality of life of psoriasis patients[25, 26]. Some studies determined that psoriasis significantly affects the quality of life in smokers and patients with nail involvement[27].

Considering the above studies in the literature, the major contribution of this study is to determine the effect of the mediator variable by modeling the relationship between smoking and quality of life in psoriasis patients. While previous studies have attempted to directly determine the relationship and effect between these two variables, this study uncovers the mediator effect by adding disease severity to the model. This study, it was aimed to examine the relationship between smoking and quality of life and to investigate the mediating role of disease severity on this relationship in psoriasis patients. For this aim, the direct effect of smoking on the quality of life in psoriasis patients (H_1) and whether the severity of the disease has a mediating role in the relationship between smoking and quality of life will be revealed (H_2).

MATERIALS AND METHODS

Participants

The population of the study consists of psoriasis patients who applied to Cumhuriyet University Dermatology outpatient clinic between November 2021 and February 2022. In the study, the sample size was decided by power analysis through the G.Power 3.1.9.4 program. Accordingly, the sample size of the study was calculated to be 268, with 95% (1-β) power, 95% confidence level (α=0.05), and an effect size of 0.30. In the study, 268 patients were reached by the convenience sampling method, which is one of the non-probability sampling methods. Being on psoriasis treatment for at least one year was determined as the inclusion criterion in the sample.

Measures

In the study, socio-demographic characteristics of the patients such as age, gender, and marital status were determined with 8 questions. The disease severity of the participants was measured by the PASI, and their quality of life was measured by the DLQI.

Disease Severity: PASI

PASI was developed by Fredriksson and Pettersson in 1978[28]. PASI is a clinical measurement method in which the severity and percent of the disease are evaluated together. In PASI, the body is divided into four regions: head, lower extremities, upper extremities, and trunk. Symptoms and signs in each region are evaluated between 0 and 4 points. Accordingly, 0 indicates that there is no severity, and 4 indicates that there is very severity. The final PASI value is calculated by adding the scores of these four body regions. The total PASI score ranges from 0 (lowest severity) to 72 (highest severity). PASI values of patients are calculated by physicians. In this study, the PASI values of the patients were obtained from the patient files.

Quality of Life: DLQI

The patients' quality of life was measured with the DLQI developed by Finlay and Khan[29]. The index is simple, practical, and applicable to all dermatological diseases. The index includes 10 questions to determine the impact of patients' illness on their health, and each question can take a value between 0 and 3. Accordingly, a value of 0 means "not at all" and a value of 3 means "very much". The lowest score that can be taken from the index is 0, while the highest score is 30. A low score indicates a high quality of life, and a high score indicates a low quality of life. The Turkish validity and reliability of this index were performed by Öztürkcan et al.[30] and the Cronbach's alpha value was found to be 0.87.

Data collection

Firstly, ethics committee approval was obtained from Cumhuriyet University Non-Interventional Clinical Research Ethics Committee (Date: 20 October 2021; Decision No: 2021-10/27) for data collection. Then, institutional permission for the study was obtained from the Chief Physician of Cumhuriyet University Faculty of Medicine. All stages of the study were carried out by the Declaration of Helsinki.

After obtaining all the necessary permissions for the field study, the data were collected using a survey. The survey was collected by the researcher through face-to-face interviews with psoriasis patients. Before starting the survey, the consent form was obtained from each patient and the patient was informed about the study subject. The survey application was made when the patient came for clinical examination. Since each survey form was marked and filled by the researcher, care was taken not to leave any unanswered questions.

Statistical analysis

Sociodemographic characteristics of the patients were analyzed with descriptive statistics such as numbers and percentages. Whether the socio-demographic (gender, age, marital status, education, occupation, income, psoriasis duration, and co-morbidity) characteristics of the participants differ according to their smoking status was analyzed with Pearson Chi-square, one of the hypothesis tests in SPSS 22. Process analysis (mediation model) was used to test the effect of the independent variable (smoking) on the dependent variable (DLQI) both directly and indirectly through the mediating variable (PASI). Hayes' PROCESS macro[31] was used in the analysis of this mediation model.

RESULTS

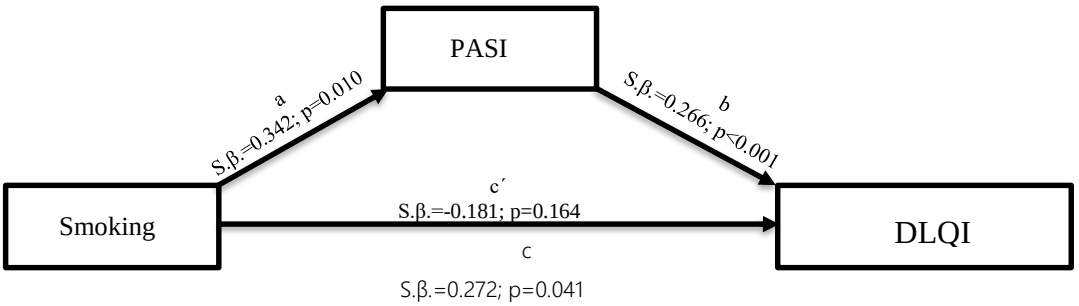
The distribution of the socio-demographic characteristics of the patients according to their smoking and the results of the chi-square analysis are given in Table 1. Of the participants, 80 (29.9%) responded that they had been smoking. There is a

statistically significant difference between men and women according to smoking status (p<0.001). 17.02% of women and 44.09% of men smoke. There is a statistically significant difference according to age in terms of smoking status (p=0.024). There is a statistically significant difference between single and married according to smoking status (p=0.023). 19.74% of single and 33.85% of married smoke. There is a statistically significant difference between employees and unemployed according to smoking status (p=0.001). 20% of unemployed and 39.13% of employees smoke. There is a statistically significant difference according to income in terms of smoking status (p<0.001).

The model for the process analysis describing the effect of smoking status on quality of life (DLQI) in psoriasis patients is shown in Figure 1. Smoking is the independent variable of the model; DLQI is the dependent variable of the model; disease severity (PASI) is the mediator variable of the model. According to Figure 1, the model was found to be statistically significant (F=4.207; p<0.,041) and the explanatory coefficient (R^2) was 1.6%.

Table 1. Participants' smoking status by socio-demographic characteristics (n=268)

Variables	Smoking				X^2	p
	Not using		Active smoker			
	n	%	n	%		
Gender						
Female	117	82.98	24	17.02	23.388	<0.001
Male	71	55.91	56	44.09		
Age						
25 and below	47	85.45	8	14.55	11.211	0.024
26-35	28	66.67	14	33.33		
36-45	31	60.78	20	39.22		
46-55	35	61.40	22	38.60		
56 and above	47	74.60	16	25.40		
Marital status						
Single	61	80.26	15	19.74	5.182	0.023
Married	127	66.15	65	33.85		
Education						
Secondary school or lower	98	73.13	36	26.87	1.14	0.286
High school or higher	90	67.16	44	32.84		
Occupation						
No	104	80.00	26	20.00	11.699	0.001
Yes	84	60.87	54	39.13		
Income						
Below minimum wage	125	82.24	27	17.76	25.864	<0.001
Minimum wage	27	49.09	28	50.91		
Above minimum wage	36	59.02	25	40.98		
Psoriasis duration						
10 years and below	87	70.73	36	29.27	0.037	0.848
11 years and above	101	69.66	44	30.34		
Co-morbidity						
No	117	69.23	52	30.77	0.184	0.668
Yes	71	71.72	28	28.28		



F= 4.207; R^2=0.016
S.β.= Standardized coefficient
PASI: Psoriasis Area and Severity Index
DLQI: Dermatology Quality of Life Index

Figure 1. Mediation model of PASI in the relationship between smoking and DLQI

Table 2. Direct and indirect (mediation) effects of smoking status on DLQI

Total, Direct, and Indirect Effects	Pathway	Beta	SE	95% Confidence Interval	
				Lower Bound	Upper Bound
Direct Effect	c´	1.121	0.803	-0.460	2.703
Indirect Effect					
Smoking → PASI → DLQI	ab	0.563	0.249	0.107	1.100
Total (Direct + Indirect) Effect	c	1.684	0.821	0.068	3.302

Smoking has a statistically significant effect on disease severity (S.β=0.342; p=0.010) and disease severity is higher in smokers. In addition, it was found that the disease severity had a statistically significant effect on the quality of life (S.β=0.266; p<0.001), and as the disease increased, the quality of life decreased (a higher score indicates the low quality of life). Finally, the relationship between smoking and quality of life was examined and it was found that smoking did not have a direct effect on the quality of life (S. β=-0.181; p=0.164), but smoking had an indirect effect on the quality of life through disease severity. In other words, since the lower and upper limits of the confidence interval of the c´ path in Table 2 (CI(c´)= between -0.460 and 2.703) contain a zero (0) value, it was found that smoking did not have a direct effect on the quality of life. However, since the lower and upper limits of the confidence interval of the ab path (CI(ab)= between 0.107 and 1.100) did not contain the zero (0) value, it was found that smoking had an indirect effect on the quality of life. Therefore, quality of life has a fully mediating role in the relationship between disease severity and cost.According to Table 2, while the H_2 hypothesis, which was established regarding the mediating role of disease severity on the relationship between smoking and quality of life, was accepted; the H_1 hypothesis about the direct effect of smoking on quality of life was rejected.

DISCUSSION

The most important finding of this study is that there is no statistically direct relationship between smoking and quality of life in psoriasis patients; however, the disease severity has a full mediating effect on this relationship in the modeling. In other words, while smoking has no direct effect on the quality of life in psoriasis sufferers, it does have an indirect impact on the disease severity. Although the etiopathogenesis of psoriasis, which is a chronic inflammatory disease, has not been fully clarified, it is known that various environmental and genetic factors play a role in the development of the disease[32]. It is considered that the effect of smoking on the formation and course of psoriasis occurs through many different mechanisms. Smoking causes a rise in inflammation by boosting the release of chemotactic factors and pro-inflammatory cytokines such as TNF-α, IL-12, IL-6, and IL-1 and the rise in inflammation increases the severity of psoriasis disease[15,33]. The current study concluded that smoking has a statistically significant effect on disease severity and that disease severity is

higher in smokers. Studies have shown that the production of TNF alpha, IL-1beta, and TGF, which are known to be related to the severity of psoriasis, rises with smoking[34]. It was found that smoking is an independent risk factor for the pathogenesis of psoriasis and that psoriasis patients are more likely to smoke than patients without psoriasis. In line with the present study finding, some studies found a relationship between smoking and disease severity (PASI)[31,35,36]. Contrary to these studies, Neimann et al.[37] and Wolk et al.[38] did not find a correlation between smoking and disease severity in psoriasis patients. The different results in the studies can be explained by the different severity of cigarette consumption and the different definitions of cigarette smoking.

According to another finding of this study, the disease severity has a statistically significant impact on the quality of life, and the quality of life declines as the disease severity increases. Mattei et al.[24] determined that in patients with chronic moderate-to-severe plaque psoriasis treated with biologic agents, PASI and DLQI are correlated with each other and that a reduction in PASI of at least 75% results in a significant improvement in the quality of life of patients treated with these agents. In the literature, some studies found that the quality of life is negatively affected as the disease severity rises[39, 40]. Çakmur and Derviş found that quality of life was severely reduced in psoriasis patients and the DLQI was reduced in nail psoriasis smokers[41]. In contrast to the results of our study, some studies have found no relationship between PASI and the quality of life of patients with psoriasis[42,43].

According to the results of the study, smoking has a full mediator effect on the quality of life through disease severity. Therefore, education and support should be given to smokers to quit smoking. Quit smoking smokers play an important role in both reducing the severity of the disease and increasing their quality of life. Since psoriasis affects the physical and psychological health of individuals negatively, it is thought that the results of this study will provide important clues in reducing the severity of the disease and increasing the quality of life in patients. The results of this study are also important in understanding the relationship between psoriasis and smoking. Therefore, smoking in psoriasis patients should be questioned and patients should be encouraged to give up these habits. Future studies may examine the effect of years of smoking on disease severity and quality of life among smokers.

This study has some limitations. These are the fact that the data were collected from a single center and in a specific period and were not analyzed in the long term. Another limitation of the study is the inclusion of inpatients. It is recommended that future studies investigate the hospitalization processes of inpatients by including them. In future studies, it may be recommended to examine patients' diet, nutrition, BMI, physical activity, alcohol consumption, and emotional stress.

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