THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Structural Relationship Among Mindfulness, Perceived Stress Level, and Psychological Dependence on Smoking

Melike Mercan Baspinar[1], Isıl Kibar Akıllı[2], Sadettin Kamat[3]

[1]Department of Family Medicine, University of Health Sciences, Gaziosmanpaşa Training and Research Hospital, İstanbul, Türkiye
[2]Department of Pulmonary Disease, University of Health Sciences, Bakirkoy Sadi Konuk Training and Research Hospital, İstanbul, Türkiye
[3]Department of Pulmonary Disease, University of Health Sciences, Gaziosmanpaşa Training and Research Hospital, İstanbul, Türkiye

ORCID iDs of the authors: M.M.B. 0000-0003-3183-3438, I.K.A. 0000-0002-4969-4512, S.K. 0000-0002-6449-0892.

Main Points

- Mindfulness mediates the relationship between psychological dependence to smoking and the perceived stress level.
- As mindfulness increases, the psychological addiction of individuals who want to quit smoking may reduce.

Abstract

This study aimed to detect the mediating role of mindfulness in the relationship between psychological dependence on smoking and perceived stress levels. Fagerström Test for Nicotine Dependence, Mindful Attention Awareness Scale, Psychological Dependence to Smoking Scale, and Perceived Stress Level Scale were applied. To evaluate the indirect effects, regression analysis and the Sobel Z test were used. Of the 68 female (45%) and 83 male (55%) participants, Fagerström Test for Nicotine Dependence score (5.75 ± 2.51) was higher in past experiences of quitting for less than 1 month vs. longer quitting periods (p = .02). The mindfulness level was found to be negatively correlated with the Fagerström Test for Nicotine Dependence score (p = .216; r = −.101), perceived stress score (p < .001; r = −.296), and psychological dependence scores (p = .001; r = −.271). Regression analysis revealed that the perceived stress and mindfulness levels were predictors on psychological dependence (B = 0.204; t = 2.548; p = .012, and B = −0.236; t = −3.525; p = .005, respectively). The results of the Sobel test evaluating the mediator role of mindfulness in the relationship between perceived stress and psychological dependence were significant (Z value = 2.337, p = .019). These results highlight the role of mindfulness in smokers toward reducing associated perceived stress with psychological dependence.

Keywords: Addiction, mindfulness, nicotine dependence, smoking, stress

Corresponding Author: Melike Mercan Başpınar
E-mail: drmelikemercan@gmail.com

Received: October 19, 2023
Revision Requested: December 13, 2023
Last Revision Received: December 27, 2023
Accepted: March 29, 2024
Publication Date: July 12, 2024

Introduction

Smoking trends experienced a drastic change in the past few years, with higher-income countries showing a significant decrease and low- and middle-income nations experiencing a rise in smoking rates (Stubbs et al., 2017). Despite the legal regulations introduced in 2008 to control tobacco use, Türkiye is still among the countries with a high rate of smoking (Dağlioğlu et al., 2022). In 2022, the smoking rate has increased to 28.3%, while the rate in 2019 was 28.0%, according to the results of Türkiye's health survey (TUİK, 2023). This situation caused the factors associated with smoking addiction and the fight against tobacco to be even more critical.

Addicts state the stress-reducing, relaxing effect of smoking as one of its benefits; however, the incidence

Cite this article as: Mercan Başpınar, M., Kibar Akıllı, I., & Kamat, S. (2024). Structural relationship among mindfulness, perceived stress level and psychological dependence on smoking. *Addicta: The Turkish Journal on Addictions*, 11(2), 143-149.

of high-stress levels and low mood among smokers is much higher than among nonsmokers and ex-smokers (Hajek et al., 2010). Mindfulness refers to the individual's paying full attention to current experiences, including stress, in a nonjudgmental or accepting way, and as it increases, it allows to rearrange her emotions and stress instead of suppressing it (Peker et al., 2019). The biochemically proven effects of mindfulness-based motivational interviewing in smoking cessation reducing desire to drink and withdrawal have been reported (Yang et al., 2023).

Smoking cessation treatments included a behavioral interview, monotherapy, or combination therapies (nicotine replacement therapy, varenicline, bupropion) (McDonough, 2015). The psychoactive substance in cigarettes, factors such as happiness, joy, accompanying another activity, feeling self-confident, and social status play a crucial role in smoking addiction (Bardakci et al., 2021). Although behavioral smoking cessation programs are an effective tool for smoking cessation, these are underutilized (Hummel et al., 2018). Although not everyone needs expert support to quit smoking, behavioral smoking cessation programs are particularly beneficial for those who need extra help to overcome their tobacco addiction (Rusk et al., 2023).

Addictive behaviors are difficult to change and result in high rates of relapse following change attempts (Bowen et al., 2014; Schwebel et al., 2020). Mindfulness-based interventions have been shown to be as effective as the existing evidence-based treatments for addictive behaviors (Bowen et al., 2014). It is recommended to implement the strategy 5A (Ask, Advise, Assess, Assist, Arrange) to the group who want to quit smoking nicotine addiction and the 5R (Relevance, Risks, Rewards, Roadblocks, Repetition) strategies to the reluctant patients (Chandler & Rennard, 2010). According to this strategy, if patients begin to realize the negative sides of smoking behavior and accept these negativities, the desire to quit smoking will occur. Therefore, mindfulness level is just as important in treatment strategies, not only treatment type preferred.

This study aimed to evaluate the mediator role of mindfulness between perceived stress levels and psychological dependence on smoking. How mindfulness mediates psychological dependence levels has been investigated.

Material and Methods

The observational (cross-sectional) study was carried out between May 30 and June 30, 2021, including 151 cigarette smokers referred from the chest diseases polyclinics to a certificated family medicine specialist of the smoking cessation clinic of a tertiary hospital.

Process

The sample size required 134 participants, according to the 1-month average number of applications, with type 1 error $\alpha = 0.05$, Cohen d (effect size) = 0.3, and a 95% confidence interval. The sample collection was completed when 151 people were reached. Those who use neurologic or psychiatric drugs that may affect their mental health and may be a confounding factor in answering questions, such as the use of antidepressant medication diagnosed and prescribed by a psychiatrist, were excluded from the study.

Ethics Committee Approval and Patient Consent

Ethics committee approval and research permissions were obtained from Gaziosmanpaşa Training and Research Hospital Ethics Committee dated May 11, 2021, and protocol number 74. A written informed consent form was obtained from all volunteer study participants before the interview.

Scales in the Study

Fagerström Test for Nicotine Dependence

The validation of the Turkish version of the six questions Fagerström Test for Nicotine Dependence (FTND), originally developed by Fagerström in 1978 and revised by Heatherton et al. and Pomerleau et al. in 2004, has been adapted in Turkish by Uysal et al. (CS, 1994; Heatherton et al., 1991; Uysal et al., 2004).

Psychological Dependence to Smoking Scale

The test to assess the psychological dependence on smoking developed by Ponciano-Rodríguez et al., who distinguishes the psychological component of smoking addiction as mild, moderate, and high, is a 25-item three-point Likert-type scale. The Turkish validity and reliability study was performed in 2021 by Bardakçı et al. The items in the scale were structured using three gradations (very frequently = 3; sometimes = 2; never = 1) (Bardakci et al., 2021). The Cronbach's alpha coefficient of the scale was 0.93, and it was found to be 0.91 in our study.

Perceived Stress Level Scale

The Turkish adaptation of the 14-item five-point Likert-type scale developed by Cohen et al. in 1983 was made by Eskin et al. The internal consistency coefficient of the Turkish scale was calculated as 0.84, and an increase in the test score indicates an increased perception of stress (Cohen et al., 1983; Eskin et al., 2013). In our study, the scale Cronbach's alpha coefficient was found to be 0.76.

Mindful Attention Awareness Scale

Özyeşil et al. studied the score of a 15-item 6-point Likert-type scale, developed by Brown and Ryan, for Turkish validity and reliability. The lowest score on the scale is 15, while the highest score is 90. As the total score of mindfulness level increases, the general tendency to be aware of and be attentive to instantaneous experiences in daily life is considered to increase (Özyeşil et al., 2011; Taber, 2018). The Cronbach's alpha coefficient of the scale was 0.80, and in our study, it was found to be 0.85.

Data Analysis

Data analysis was performed using the SPSS Statistics Program (v.22; IBM SPSS Corp.; Armonk, NY, USA) software package. Descriptive statistics for continuous variables are expressed as mean and standard deviation, while categorical variables are expressed as numbers and percentages. As scale scores, regression analysis was performed to examine the relationships between perceived stress level, psychological dependence on smoking, and mindfulness level, which is considered as a mediator variable. The Sobel Z test was used to assess indirect effects. All scales used in the study were adapted to Turkish, and Cronbach's alpha coefficients were found to have sufficient level of internal reliability (0.70 and above) (Taber, 2018). The statistical significance limit of the "p" value was considered significant below .05.

Results

Of the 151 smokers, the frequency of never trying to quit smoking before was 14.6%, and the frequency of those who quit smoking for more than 1 year was 16.6%. The median age of cigarette smokers was 37 years, and 55% were male (Table 1).

In Table 2, mindfulness score, psychological dependence to smoking, perceived stress level, and nicotine dependence scores and the correlations between them were evaluated. A negative correlation was found between mindfulness level, FTND score ($p = .216$; $r = -.101$), perceived stress score ($p < .001$; $r = -.296$), and psychological dependence on smoking ($p = .001$; $r = -.271$).

Table 1.
Sociodemographic Characteristics of the Participants

Continuous Variables		**$X \pm$ SD (median)**
Age (years)		37.21 ± 9.54 (37)
Cigarette pack starting age (years)		19.68 ± 6.65 (18)
Smoking duration (years)		17.55 ± 10.31 (17)
Categorical variables		***n*** **(%)**
Sex	Female	68 (45.0)
	Male	83 (55.0)
Marital status	Married	100 (66.2)
	Single/widowed/divorced	51 (33.8)
Education	Primary/secondary school	47 (31.1)
	High school	49 (32.5)
	University	55 (36.4)
Income level	Low	37 (24.5)
	Moderate	91 (60.3)
	High	23 (15.2)
Working area	Private sector	46 (30.5)
	State	54 (35.8)
	Self-employment	14 (9.3)
	Not working (Housewife, student, retired, unemployed)	37 (24.5)
Number of attempts to quit smoking	Never tried	22 (14.6)
	1 time trying	35 (23.2)
	Tried 2 times	27 (17.9)
	Tried 3 times	22 (14.6)
	Hard-try (4 or more)	45 (29.8)
Longest smoking cessation time	1 day – 1 month	79 (52.3)
	1 – 6 months	29 (19.2)
	6 months to 1 year	18 (11.9)
	More than 1 year	25 (16.6)

Note: *n* = number; %, percent; SD = standard deviation; *X* = mean.

As shown in Table 3, no significant difference was found between the measured mindfulness, perceived stress, FTND score, and psychological addiction of males and females in the study ($p = .127$; $p = .942$; $p = .423$; $p = .446$, respectively). Fagerström Test for Nicotine Dependence scores of the married smokers were higher than the singles, and those working in the private sector and those who could not work (housewife, student, etc.) were higher than the others ($p < .001$). No significant difference was observed in mindfulness ($p = .733$) and stress level ($p = .671$) between previous quit times attempts. However, the perceived stress levels of those who quit longer than 1 year before were found to be significantly lower than those who quit between 1 and 6 months and those who quit between 6 months and 1 year ($p = .017$; $p = .014$, respectively). The FTND score was found to be higher in those who experienced quitting for less than 1 month vs. longer quitting periods ($p = .002$). A higher FTND score ($p < .001$) was found in smokers with a low education level than those with high school and university.

Regression analysis was used to examine the relationship between perceived stress and psychological dependence on smoking based on the mediating role of mindfulness. Additionally, the Sobel Z test was used to evaluate the indirect effects. Figure 1 shows the models showing the mediator role of mindfulness in the relationship.

The regression analysis results showed that the perceived stress level predicted the level of psychological dependence on cigarettes positively ($B_{Sh} = 0.204_{0.107}$; $t = 2.667$, $p = .012$) and negatively predicts the level of mindfulness ($B_{Sh} = -0.580_{0.135}$; $t = -3.789$; $p < .001$). The level of mindfulness was observed as a negative predictor of psychological dependence on smoking ($B_{Sh} = -0.236_{0.061}$; $t = -3.525$, $p = .005$).

After determining the significant relationship ($p = .012$) between the perceived stress levels and psychological dependence on smoking, a model was established in which the mindfulness variable was evaluated as a mediator variable. In the established model, the significant relationship between stress level and mindfulness ($p < .001$) and mindfulness and psychological addiction to smoking ($p = .005$) enables it to be used as a mediator parameter. However, the fact that the relationship between perceived stress and psychological dependence on cigarettes ($p = .043$) is still significant shows us that mindfulness is a partial mediator variable. The indirect effect in the total effect is at the level of 36.55% (0.106/0.290), while the remaining 63.45% is defined as the direct effect. Sobel test results were significant with a *Z* value of −2.337, a standard error of 0.045, and a *p*-value of .019.

Discussion

This observational study has explored the mediating role of mindfulness in nicotine dependence based on a structural model of the indirect effect of mindfulness on the relationship between perceived stress levels and psychological dependence. Mindfulness was found to reduce the psychological dependence level on smoking by reducing the effect of perceived stress levels.

Unfortunately, most smokers failed in their attempt to quit even if they receive the best psychosocial and/or pharmacological

Table 2.
Relationships Between Mindfulness, Psychological Dependence on Smoking, Perceived Stress Level, and Nicotine Addiction and Descriptive Statistics

	Correlations				Descriptive Statistics			
Variables	**Mindfulness**	**Psychological Dependence on Smoking**	**Perceived Stress Level**	**FTND Score**	**$X \pm$ SD (Median)**	**Skewness**	**Kurtosis**	**Cronbach Alpha**
Mindfulness score	-	$r = -.271$ $p = .001$	$r = -.296$ $p < .001$	$r = -.101$ $p = .216$	59.07 ± 13.28 (59)	−0.016	− 0.659	0.851
Psychological dependence on smoking	$r = -.271$ $p = .001$	-	$r = .213$ $p = .009$	$r = .312$ $p < .001$	49.94 ± 10.26 (48)	0.207	− 0.658	0.914
Perceived stress level	$r = -.296$ $p < .001$	$r = .213$ $p = .009$	-	$r = .144$ $p = .077$	28.49 ± 7.22 (28)	0.624	3.014	0.763
FTND score	$r = -.101$ $p = .216$	$r = .312$ $p < .001$	$r = .130$ $p = .111$	–	5.75 ± 2.51 (6)	−0.162	− 0.935	0.728

Note: FTND = Fagerström Test for Nicotine Dependence; SD = standard deviation; X = mean.

treatments available (Serfaty et al., 2018). Mindful smoking is hypothesized to increase the salience of the sensations involved in the experience (Yang et al., 2022). Min-Jeong et al. reported a heightened awareness of automatic behavior accompanied by noticing unpleasant aspects of cigarettes by mindful smoking exercise (Yang et al., 2022). Black et al. showed that mindfulness had an indirect effect on past 30-day smoking frequency through depressive affect, anger affect, and perceived stress mediators (Black et al., 2012). In Baer et al.'s intervention study, the mindfulness-based stress reduction program improved mindfulness skills and predicted change in perceived stress levels (Baer et al., 2012). At the beginning of treatment, we measured worse mindfulness levels that were related to a higher perceived stress and psychological dependence.

Smoking Cessation Outpatient Clinics In Türkiye deliver pharmacotherapy free of charge by the Ministry Of Health. Using pharmacological treatments and behavioral counseling together has been found more effective than alone (Zeren et al., 2023). However, techniques such as motivational interviews, cognitive behavioral therapy, and mindfulness become more critical in reducing the number of cigarettes and relapse prevention (Marlatt & Witkiewitz, 2005). A search by Vidrin et al. indicated that mindfulness was negatively associated with a level of nicotine dependence and withdrawal severity. Moreover, the study suggests that a lower mindfulness may be a predictor of relapse among adult smokers preparing to quit; thus, mindfulness-based interventions may enhance cessation (Vidrine et al., 2009).

Research suggests that perceived stress may pose a challenge to smokers attempting to quit, but information regarding the correlation between perceived stress and smoking in low-income countries is limited (Stubbs et al., 2017). In a study examining associations between perceived stress and relationships, high perceived stress was associated with recent increases in smoking, less self-efficacy to quit smoking, and less self-efficacy not to smoke when stressed (Ng & Jeffery, 2003). Higher nicotine dependence was correlated with higher perceived stress in a study by Fatani et al. (Fatani et al., 2022). The frequency of smoking in high-stress occupations like police and health worker groups is determined to be higher than that in the general population. This situation was thought to be explained by the following reasons: excessive daily working hours, the shift system, and working discipline (Kutlu et al., 2021). In our study, smokers were compared according to institutions, not occupations. In the private sector, employees' nicotine addiction was found to be significantly higher than those working in the government. This may be due to the stress level in private sector working conditions because the stress levels of private sector employees are observed to be higher even if it is not statistically significant. In light of stress's effect on nicotine addiction and negative correlation with mindfulness, mindfulness programs may be necessary for private sector workers. The negative relationship between perceived stress and mindfulness has been shown among nurses in the study of Wu et al. (Wu et al., 2022). Similarly, mindfulness-based intervention found to be a valuable approach to successfully alleviate stress in a highly stressed population by impacting mindfulness and perceived stress in accordance with the study results of Dark-Freudeman et al. (Dark-Freudeman et al., 2022).

Hajek et al. reported that smoking cessation is associated with the lowering of stress among highly dependent smokers who report that smoking helps them cope with stress (Hajek et al., 2010). In our study, perceived stress level had no relationship with FTND score despite of significant relationship with psychological dependence. This finding draws attention to the psychological role of perceived stress, rather than the amount smoked, in cigarette addiction. In our results, the indirect effect of mindfulness on the relationship between perceived stress and psychological dependence on cigarettes was significant and had a reducing role in both scores. So, it was thought that mindfulness may be an important way related to a psychological link with addiction.

In the study of Gilpin et al., among those who quit during 3 – 6 months at baseline, continuous abstinence more than doubled to 52%, and the group that had abstained for 1 but less than 2 years showed another large increase in continuous abstinence to 76%

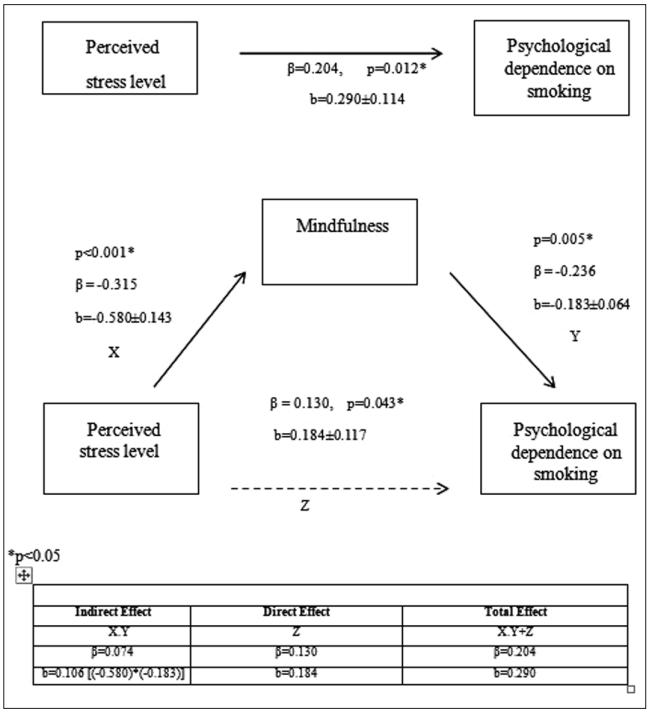
Table 3.
Relationships Between Mindfulness, Psychological Dependence on Smoking, Perceived Stress Level, and Nicotine Addiction and Descriptive Statistics

		Mindfulness		Psychological Dependence on Smoking		Perceived Stress Level		FTND Score	
		X ± SD	*p*	X ± SD	*p*	X ± SD	p	X ± SD	*p*
Sex	Female	60.87 ± 12.11	.127	49.24 ± 9.86	.446	28.54 ± 6.96	.942	5.57 ± 2.49	.423
	Male	57.60 ± 14.05		50.52 ± 10.60		28.46 ± 7.46		5.90 ± 2.53	
Marriage	Married	59.79 ± 13.35	.352	49.54 ± 10.21	.507	28.91 ± 6.98	.342	5.76 ± 2.54	<.001
	Single	57.67 ± 13.14		50.73 ± 10.41		27.67 ± 7.67		5.74 ± 2.47	
Education	Primary/ secondary school	57.85 ± 14.19	.461	50.41 ± 11.27	.647	29.75 ± 5.94	p = .021* p^{ab} = .061 p^{ac} <.008* p^{bc} = .504	6.87 ± 9.91	<.001* p^{ab} = .061 p^{ac} <.001* p^{bc} = .014
	High school	60.55 ± 11.19		50.37 ± 9.78		29.39 ± 7.87		5.89 ± 2.36	
	University	58.80 ± 14.25		49.16 ± 9.91		26.64 ± 7.35		4.67 ± 2.38	
Income	Low	57.89 ± 12.66	.719	51.08 ± 10.72	.595	29.95 ± 8.78	.428	6.16 ± 2.66	.082
	Moderate	59.88 ± 13.23		49.93 ± 10.60		27.98 ± 6.27		5.85 ± 2.45	
	High	57.78 ± 14.71		48.13 ± 7.99		28.22 ± 7.99		4.74 ± 2.32	
Working area	[a]Private sector	58.61 ± 15.17	.818	49.19 ± 10.07	.418	28.76 ± 7.82	.222	6.41 ± 2.57	.005* p^{ab} = .001* p^{ac} = .643 p^{ad} = .821 p^{bc} = .092 p^{bd} = .005* p^{cd} = .770
	[b]State	59.65 ± 12.63		49.05 ± 9.95		26.85 ± 6.93		4.76 ± 2.73	
	[c]Self-employment	55.86 ± 13.38		49.36 ± 10.57		28.5 ± 4.72		6.07 ± 2.43	
	[d]Not working	60.02 ± 11.88		49.38 ± 10.57		30.57 ± 7.30		6.27 ± 2.42	
Number of attempts to quit smoking	Never tried	60.41 ± 6.45	.733	47.09 ± 8.09	.319	27.40 ± 10.99	.671	5.64 ± 2.79	.892
	1 time trying	57.23 ± 13.47		48.26 ± 11.66		27.34 ± 5.72		5.83 ± 2.54	
	Tried 2 times	60.11 ± 10.97		53.11 ± 11.08		28.85 ± 7.17		5.78 ± 2.44	
	Tried 3 times	61.77 ± 13.22		50.41 ± 10.23		29.27 ± 6.45		6.18 ± 2.36	
	Hard-try (4 or more)	57.91 ± 13.12		50.51 ± 9.33		29.33 ± 6.45		5.53 ± 2.58	
Longest smoking cessation time before	[a]1 day – 1 month	58.62 ± 13.50	.635	51.09 ± 10.75	.035* p^{ab} = .574 p^{ac} = .150 p^{ad} = .017* p^{bc} = .097 p^{bd} = .014* p^{cd} = .576	29.03 ± 7.43	.793	6.37 ± 2.50	.02* p^{ab} = .258 p^{ac} = .032* p^{ad} <.001* p^{bc} = .293 p^{bd} = .040* p^{cd} = .425
	[b]1 – 6 months	58.86 ± 14.58		52.38 ± 10.73		27.55 ± 5.30		5.76 ± 2.23	
	[c]6 months to 1 year	62.39 ± 13.55		47.22 ± 8.54		29.06 ± 10.33		4.94 ± 2.51	
	[d]More than 1 year	58.36 ± 11.01		45.44 ± 7.62		27.52 ± 5.87		4.40 ± 2.25	

Note: FTND = Fagerström Test for Nicotine Dependence; SD = standard deviation; X = mean.
*$p < .05$.

(Gilpin et al., 1997). In terms of cigarette smoking, greater levels of mindfulness have been associated with improved cessation outcomes, including less severe nicotine dependence and greater self-efficacy for smoking abstinence (Vidrine, 2009). Our study showed that the nicotine dependence (FTND) score was higher in those who experienced quitting for less than 1 month vs. those who had longer quitting periods, and the rates of quitting for less than 6 months and more than 1 year were 19.2% and 16.6%, respectively. However, no significant difference in the mindfulness score was found in the groups of quitting time duration or number of attempts.

Mindfulness levels may be different for some demographic characteristics. Older age and female gender differences for some aspects of mindfulness in the sample of the Bosnian general population were found significant (Alispahic & Hasanbegovic-Anic, 2017). Similarly, gender responses to a mindfulness training intervention may differ, too (Kang et al., 2018). Both males and females progress in addiction, but in females, estradiol is hypothesized to facilitate this transition by enhancing dopamine in the dorsal striatum. So, the female gender may be at risk of being linked to nicotine addiction (Becker et al., 2017). On the other hand, no significant difference was found between the measured



Indirect Effect	Direct Effect	Total Effect
XY	Z	XY+Z
β=0.074	β=0.130	β=0.204
b=0.106 [(-0.580)*(-0.183)]	b=0.184	b=0.290

Figure 1. Evaluation of the mediating role of mindfulness in the relationship between psychological dependence and stress with regression analysis chart and Sobel test table.

mindfulness, perceived stress, FTND score, and psychological addiction of males and females in our study.

Mindfulness is believed to help people better control their thoughts and feelings rather than be controlled by them. Currently, no clear evidence shows that mindfulness-based treatments help people stop smoking or improve their mental health and well-being. However, in a review by Jackson et al., low evidence was reported. Stopping smoking gives rise to distressing urges to smoke and low mood, so mindfulness-based treatments could improve people's ability to cope with these (Jackson et al., 2022).

Limitations

In this study, the initial state of mindfulness, stress and addiction levels, and past quit attempts of the smokers who want to quit smoking again were measured at the beginning of the study, but quit success was not dedicated. This study did not investigate the role of mindfulness as regards smoking cessation success but investigated the relationship between pretreatment stress, mindfulness, and psychological dependence in the decision to quit smoking. Although this seems like a limitation, it is thought to be useful to improve future studies about mindfulness.

In light of our results, mindfulness plays a role in breaking the effect of perceived stress on psychological addiction and reducing psychological dependence on cigarettes. This situation has drawn attention to how mindfulness-based interview technique as a part of behavioral treatment in smoking cessation treatments may lead to a better stress and dependence management.

Ethics Committee Approval: This study was approved by the Ethics Committee of Ethics committee approval and research permissions were obtained from Gaziosmanpaşa Training and Research Hospital (approval no: 74, date: May 11, 2021).

Informed Consent: Written informed consent was obtained from the participants who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Acknowledgments: The authors would like to thank all participants of this study.

Author Contributions: Concept – M.M.B.; Design – M.M.B., I.K.A., S.K.; Supervision – M.M.B., I.K.A., S.K.; Resources – M.M.B., I.K.A., S.K.; Data Collection and/or Processing – M.M.B.; Analysis and/or Interpretation – M.M.B.; Literature Search – M.M.B., I.K.A., S.K.; Writing – M.M.B., I.K.A., S.K.; Critical Review – M.M.B., I.K.A., S.K.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

References

Alispahic, S., & Hasanbegovic-Anic, E. (2017). Mindfulness: Age and gender differences on a Bosnian sample. *Psychological Thought*, *10*(1), 155 – 166. [CrossRef]

Baer, R. A., Carmody, J., & Hunsinger, M. (2012). Weekly change in mindfulness and perceived stress in a mindfulness-based stress reduction program. *Journal of Clinical Psychology*, *68*(7), 755 – 765. [CrossRef]

Bardakci, M., Oztora, S., & Dagdeviren, H. N. (2021). The reliability and validity analysis of the Turkish version of the test to assess the psychological dependence on smoking. *Eurasian Journal of Family Medicine*, *10*(2), 100 – 106. [CrossRef]

Becker, J. B., McClellan, M. L., & Reed, B. G. (2017). Sex differences, gender and addiction. *Journal of Neuroscience Research*, *95*(1 – 2), 136 – 147. [CrossRef]

CS, P. (1994). *Relaiability of Fagerstrom Test for Nicotine Dependence.* Beha, A., 33 – 39.

Black, D. S., Milam, J., Sussman, S., & Johnson, C. A. (2012). Testing the indirect effect of trait mindfulness on adolescent cigarette smoking through negative affect and perceived stress mediators. *Journal of Substance Use*, *17*(5 – 6), 417 – 429. [CrossRef]

Bowen, S., Chawla, N., & Witkiewitz, K. (2014). Mindfulness-based relapse prevention for addictive behaviors. In *Mindfulness-based treatment approaches* (pp. 141 – 157). Elsevier.

Chandler, M. A., & Rennard, S. I. (2010). Smoking cessation. *Chest*, *137*(2), 428 – 435. [CrossRef]

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385 – 396. [CrossRef]

Dağlioğlu, C., Özkubat, G., Demİroglari, S., & Üçdoğruk, Ş. (2022). Türkiye'de hanelerin sigara tüketim harcamalarında yasal düzenlemelerin etkileri: 2007 ve 2019 yılları Oaxaca - Blinder ayrıştırması. *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *24*(3), 961 – 982. [CrossRef]

Dark-Freudeman, A., Jones, C., & Terry, C. (2022). Mindfulness, anxiety, and perceived stress in university students: Comparing a mindfulness-based intervention (MBI) against active and traditional control conditions. *Journal of American College Health: J of ACH*, *70*(7), 2116 – 2125. [CrossRef]

Eskin, M., Harlak, H., Demirkıran, F., & Dereboy, Ç. (2013). Algılanan stres ölçeğinin Türkçeye uyarlanması: Güvenirlik ve geçerlik analizi. *New/Yeni Symposium* [Journal],

Fatani, B. Z., Al-Yahyawi, H., Raggam, A., Al-Ahdal, M., Alzyoud, S., & Hassan, A. N. (2022). Perceived stress and willingness to quit smoking among patients with depressive and anxiety disorders seeking treatment. *Health Science Reports*, *5*(2), e503. [CrossRef]

Gilpin, E. A., Pierce, J. P., Farkas, A. J., & Farkas, A. J. (1997). Duration of smoking abstinence and success in quitting. *Journal of the National Cancer Institute*, *89*(8), 572 – 576. [CrossRef]

Hajek, P., Taylor, T., & McRobbie, H. (2010). The effect of stopping smoking on perceived stress levels. *Addiction*, *105*(8), 1466 – 1471. [CrossRef]

Heatherton, T. F., Kozlowski, L. T., Frecker, R. C., & Fagerström, K. O. (1991). The Fagerström Test for Nicotine Dependence: A revision of the Fagerstrom Tolerance Questionnaire. *British Journal of Addiction*, *86*(9), 1119 – 1127. [CrossRef]

Hummel, K., Nagelhout, G. E., Fong, G. T., Vardavas, C. I., Papadakis, S., Herbeć, A., Mons, U., Van den Putte, B., Borland, R., Fernández, E., de Vries, H., McNeill, A., Gravely, S., Przewoźniak, K., Kovacs, P., Trofor, A. C., & Willemsen, M. C. (2018). Quitting activity and use of cessation assistance reported by smokers in eight European countries: Findings from the EUREST-PLUS ITC Europe Surveys. *Tobacco Induced Diseases*, *16*, Suppl. 2. [CrossRef]

Jackson, S., Brown, J., Norris, E., Livingstone-Banks, J., Hayes, E., & Lindson, N. (2022). Mindfulness for smoking cessation. *Cochrane Database of Systematic Reviews*, *4*(4), CD013696. [CrossRef]

Kang, Y., Rahrig, H., Eichel, K., Niles, H. F., Rocha, T., Lepp, N. E., Gold, J., & Britton, W. B. (2018). Gender differences in response to a school-based mindfulness training intervention for early adolescents. *Journal of School Psychology*, *68*, 163 – 176. [CrossRef]

Kutlu, R., Marakoğlu, K., Demirbaş, N., Yeşildağ, K., & Çavdarcı, F. (2021). Use of tobacco and tobacco products by public employees in Konya Province and the support status of the tobacco control law. *ADDICTA: The Turkish Journal on Addictions*, *8*(1), 1 – 7. [CrossRef]

Marlatt, G. A., & Witkiewitz, K. (2005). Relapse prevention for alcohol and drug problems. *Relapse Prevention*, *2*, 1 – 44.

McDonough, M. (2015). Update on medicines for smoking cessation. *Australian Prescriber*, *38*(4), 106 – 111. [CrossRef]

Ng, D. M., & Jeffery, R. W. (2003). Relationships between perceived stress and health behaviors in a sample of working adults. *Health Psychology*, *22*(6), 638 – 642. [CrossRef]

Özyeşil, Z., Arslan, C., Kesici, Ş., & Deniz, M. E. (2011). Bilinçli farkındalık ölçeği'ni Türkçeye uyarlama çalışması. *Eğitim ve Bilim*, *36*(160).

Peker, A., Nebioğlu, M., & Ödemiş, M. H. (2019). Sanal ortamda bağımlılık: Bilinçli farkındalığın aracı rolüne ilişkin bir model sınaması. *Anatolian Journal of Psychiatry/Anadolu Psikiyatri Dergisi*, *20*(2).

Rusk, A. M., Kanj, A. N., Murad, M. H., Hassett, L. C., & Kennedy, C. C. (2023). Smoking cessation interventions in indigenous North Americans: A meta-narrative systematic review. *Nicotine and Tobacco Research*, *25*(1), 3 – 11. [CrossRef]

Schwebel, F. J., Korecki, J. R., & Witkiewitz, K. (2020). Addictive behavior change and mindfulness-based interventions: Current research and future directions. *Current Addiction Reports*, *7*(2), 117 – 124. [CrossRef]

Serfaty, S., Gale, G., Beadman, M., Froeliger, B., & Kamboj, S. K. (2018). Mindfulness, acceptance and defusion strategies in smokers: A systematic review of laboratory studies. *Mindfulness*, *9*(1), 44 – 58. [CrossRef]

Stubbs, B., Veronese, N., Vancampfort, D., Prina, A. M., Lin, P. Y., Tseng, P. T., Evangelou, E., Solmi, M., Kohler, C., Carvalho, A. F., & Koyanagi, A. (2017). Perceived stress and smoking across 41 countries: A global perspective across Europe, Africa, Asia and the Americas. *Scientific Reports*, *7*(1), 7597. [CrossRef]

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, *48*(6), 1273 – 1296. [CrossRef]

TUİK (2023). Türkiye sağlık Araştırması, 2022. *15%2C5%20oldu%C4%9Fu%20tespit%20edildi*. Retrieved from https://data.tuik.gov.tr/Bulten/Index?p=Turkiye-Saglik-Arastirmasi-2022-49747#:~:text=28%2C3%20oldu-,Her%20g%C3%BCn%20t%C3%BCt%C3%BCn%20mamul%C3%BC%20kullanan%2015%20ya%C5%9F%20ve%20%C3%BCst%C3%BC%20bireylerin

Uysal, M. A., Kadakal, F., Karşidağ, C., Bayram, N. G., Uysal, O., & Yilmaz, V. J. T. T. (2004). Fagerstrom Test for Nicotine Dependence: Reliability in a Turkish sample and factor analysis. *Tuberkuloz ve Toraks*, *52*(2), 115 – 121.

Vidrine, D. J. (2009). Cigarette smoking and HIV/AIDS: Health implications, smoker characteristics and cessation strategies. *AIDS Education and Prevention*, *21*(3), Suppl., 3 – 13. [CrossRef]

Vidrine, J. I., Businelle, M. S., Cinciripini, P., Li, Y., Marcus, M. T., Waters, A. J., Reitzel, L. R., & Wetter, D. W. (2009). Associations of mindfulness with nicotine dependence, withdrawal, and agency. *Substance Abuse*, *30*(4), 318 – 327. [CrossRef]

Wu, Y. P., Ahorsu, D. K., Chen, J. S., Lee, C. H., Lin, C. Y., & Griffiths, M. D. (2022). The role of demographic factors, mindfulness and perceived stress in resilience among nurses: A cross sectional study. *Journal of Nursing Management*, *30*(7), 3093 – 3101. [CrossRef]

Yang, M. J., Ketcher, D., Witkiewitz, K., Unrod, M., Baban, S., Wetter, D. W., & Vinci, C. (2022). What happens when you smoke a cigarette mindfully? A deductive qualitative study. *Mindfulness*, *13*(10), 2628 – 2640. [CrossRef]

Yang, M. J., Sutton, S. K., Hernandez, L. M., Jones, S. R., Wetter, D. W., Kumar, S., & Vinci, C. (2023). A Just-In-Time Adaptive intervention (JITAI) for smoking cessation: Feasibility and acceptability findings. *Addictive Behaviors*, *136*, 107467. [CrossRef]

Zeren, O. G., Ilknur, D., Rumeysa, D. H., & Gunher, A. S. (2023). The evaluation of smoking cessation treatment success and related factors in adults age 65 years and older. *Clinical Gerontologist*, *46*(3), 424 – 432. [CrossRef]