



PERCEIVED STRESS AND NICOTINE DEPENDENCE – A REVIEW ARTICLE

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ABSTRACT

Background: Nicotine dependence is a major public health problem worldwide, contributing substantially to tobacco-related morbidity and mortality. Psychological factors, particularly perceived stress, play a significant role in influencing smoking initiation, maintenance, and relapse. Perceived stress reflects an individual's appraisal of life situations as unpredictable, uncontrollable, or overwhelming. **Objective:** To review and summarise existing evidence on the association between perceived stress and nicotine dependence, including measurement approaches, underlying mechanisms, and clinical implications. **Methods:** This narrative review synthesises findings from longitudinal, cross-sectional, and experimental studies examining the relationship between perceived stress and smoking behaviour. Standardised instruments such as the Perceived Stress Scale (PSS) and the Fagerström Test for Nicotine Dependence (FTND) were commonly used across studies to assess stress perception and dependence severity. **Results:** Evidence consistently demonstrates a positive association between higher levels of perceived stress and increased smoking initiation, greater nicotine dependence, and lower cessation success rates. Neurobiological mechanisms involve activation of the hypothalamic-pituitary-adrenal (HPA) axis and dopaminergic reward pathways, with nicotine temporarily reducing stress responses and reinforcing continued use. Psychologically, smoking often functions as a maladaptive coping strategy for managing negative emotions. Social and environmental stressors further strengthen this association. **Conclusion:** Perceived stress is strongly linked to nicotine dependence through interconnected biological, psychological, and social pathways. Integrating stress management and emotional regulation strategies into smoking cessation programs may improve outcomes. Future research should emphasise longitudinal designs and objective stress biomarkers to clarify causal relationships and enhance intervention effectiveness.

KEYWORDS : Perceived stress; Nicotine dependence; Smoking behaviour; Stress regulation; Coping strategies; Smoking cessation.

INTRODUCTION

Nicotine dependence continues to be a significant public health issue worldwide, leading to substantial illness and death due to tobacco use and related products. Smoking behaviour and nicotine consumption are not driven solely by biological factors; they are strongly influenced by psychological aspects, with perceived stress consistently identified as an important factor in both the initiation and continuation of smoking. Perceived stress refers to how individuals interpret and feel about the pressures in their lives, particularly when they believe these demands exceed their ability to cope. This perception can differ greatly among individuals, even when they face similar life situations. Evidence from multiple studies indicates that people experiencing higher levels of perceived stress are more likely to start smoking, struggle more with quitting, and develop stronger nicotine dependence. This review aims to summarise existing research on the association between perceived stress and nicotine dependence, while also examining underlying mechanisms, challenges in measurement, and the implications for prevention and intervention strategies¹.

Perceived stress and Smoking behaviour

A substantial body of evidence indicates a clear positive relationship between perceived stress and smoking behaviour. Longitudinal and prospective cohort studies have shown that individuals who report higher levels of perceived stress are more likely to initiate smoking and are less successful in quitting over time. For example, Cohen and colleagues found that elevated perceived stress predicted

increased smoking frequency and reduced cessation success among adults in the Midlife in the United States (MIDUS) study². Similar findings have been reported in adolescent populations, where perceived stress predicted both smoking initiation and progression to regular use³.

It is suggested that perceived stress encourages smoking through negative reinforcement mechanisms, as nicotine temporarily reduces feelings of stress by influencing brain pathways involved in reward processing and stress regulation. Experimental studies using stress-induction methods have reported that exposure to stress leads to heightened cravings and more severe withdrawal symptoms among smokers, resulting in stronger urges to smoke and increased consumption. These findings support the self-medication hypothesis, which proposes that individuals may rely on nicotine as a means of coping with stress and managing negative emotional states⁴.

Measurement of Perceived Stress and Nicotine Dependence

In research settings, perceived stress is most commonly measured using validated self-report instruments, such as the Perceived Stress Scale (PSS), which consists of 10 questions and assesses the degree to which situations in one's life are appraised as stressful during the previous month⁵.

Nicotine dependence is frequently operationalised using tools like the Fagerström Test for Nicotine Dependence (FTND) (for both smoked/smokeless forms) or the Nicotine Dependence Syndrome Scale (NDSS). Studies employing these measures consistently find moderate positive correlations between PSS

scores and nicotine dependence indices, indicating that individuals with higher stress perceptions tend to exhibit more severe dependence⁶.

Biological and Psychological Mechanisms

Several explanations have been suggested to account for the relationship between perceived stress and nicotine dependence.

Neurobiological mechanisms: Exposure to stress activates the hypothalamic-pituitary-adrenal (HPA) axis, leading to increased cortisol secretion. Nicotine interacts with brain reward pathways, particularly the dopaminergic system, and can temporarily reduce stress responses, thereby reinforcing continued smoking⁷. Prolonged stress exposure may also increase the number and sensitivity of nicotinic acetylcholine receptors in the brain, which can further strengthen nicotine dependence.

Coping and emotional regulation: Individuals who lack effective coping skills may turn to nicotine as an unhealthy coping strategy to deal with stress and negative emotions. Consistent with affect-regulation models of addiction, this perspective suggests that smoking is employed to manage negative emotional states, even though its soothing effects are fleeting⁸.

Social and environmental influences:

High levels of perceived stress often coexist with adverse social and environmental conditions such as low socioeconomic status, job-related stress, and unstable living situations, all of which are independently associated with smoking behaviour. In such contexts, stress may interact with these external factors, increasing vulnerability to persistent nicotine use.

Clinical and Public Health Implications

Gaining a better understanding of how perceived stress contributes to nicotine dependence has important implications for both prevention and treatment strategies. Smoking cessation programs that include components such as stress management techniques, cognitive-behavioural coping strategies, and training in emotional regulation tend to be more effective, particularly for individuals experiencing high levels of stress. Mindfulness-based approaches, in particular, have shown encouraging results in lowering perceived stress and reducing the likelihood of smoking relapse⁹.

In addition, public health initiatives should focus on addressing broader sources of stress, including financial instability, occupational pressures, and social isolation, which increase susceptibility to smoking. Policies that aim to reduce stress at the community and population level—such as workplace wellness initiatives and improved access to mental health services—may help decrease smoking rates indirectly by reducing overall perceived stress.

CONCLUSION

Overall, existing evidence clearly shows a strong link between perceived stress and nicotine dependence. Higher levels of perceived stress are associated with an increased risk of starting smoking, greater severity of nicotine dependence, and lower chances of successfully quitting. This relationship appears to be maintained through the combined influence of biological, psychological, and social factors. Future studies should focus on longitudinal research designs, the use of objective stress biomarkers, and the evaluation of interventions specifically aimed at reducing stress, in order to develop more effective smoking cessation strategies¹⁰.

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