

REVIEW ARTICLE

The Mystery behind Smoke and Its Addiction

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ABSTRACT

Smoking has addictive implication primarily due to tobacco. This addiction usually starts in the early teenage years and because of which many manifestations are seen. Nicotine has pervasive effects on brain, difficulty in cognitive processing and so many effects. Combination of the 4,000 or more chemical components of tobacco smoke, including a huge arsenal of toxins and carcinogens, represent the mediators of multiple pathogenic processes. Nicotine has various delivery systems like cigarette, cigar and pipe and smokeless tobacco. At the time of quitting tobacco individual faces many withdrawal symptoms due to craving. These withdrawal symptoms particularly irritability, restlessness, feeling miserable, impaired concentration, and increased appetite begin within hours of the last cigarette and are at maximal intensity for the first week. But social influences greatly influence addiction patterns. These can be used to discourage smoking. Successful interventions need to tackle the interacting constellation of factors—personal, family; socioeconomic, and pharmacological.

Keywords: Addiction, Nicotine, Smoking, Withdrawal.

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INTRODUCTION

For a very long time smoking was regarded as a socially acquired habit. However, now the role of nicotine in sustaining smoking behavior has come in picture.¹ Cigarette smoking is mainly a manifestation of nicotine addiction. Various other factors like social, economic, personal, and political influences play an important part in determining

patterns of smoking prevalence and cessation. Of these the critical factors are family and wider social influences are which are instrumental in determining who starts smoking, who gives up, and who continues.

WHY DO PEOPLE START SMOKING?

Smoking usually occurs in the early teenage years and is driven predominantly by peer pressure and psychosocial motives. For a beginner, smoking a cigarette is a symbolic act conveying messages “such as Philip Morris,” I am no longer my mother’s child, and I am tough.

Teenagers who indulge in it tend to come from backgrounds that favor smoking (e.g., with high levels of smoking in parents, siblings, and peers; relatively deprived neighborhoods; schools where smoking is common). There is a psychological feeling in them of not to be succeeding according to their own or society’s terms (e.g., they have low self-esteem, have impaired psychological well-being, are overweight, or are poor achievers at school).

Again as quoted by Philip Morris, “as the force from the psychosocial symbolism subsides, the pharmacological effect takes over to sustain the habit.”

Consequences of Nicotine on Human Body²

Nicotine is quickly absorbed from the lung and almost completely. Nicotine reaches the brain faster than intravenous injection which is just within 10 to 16 seconds. The half life of nicotine is 15 to 20 minutes which is why regular cigarettes are needed due to the high blood nicotine blood concentrations from each cigarette and overnight blood levels dropping to close to those of non-smokers.

Nicotine has pervasive effects on brain. It induces the release of dopamine. This effect is the thought to be a critical feature of brain addiction mechanisms. In new users nicotine improves performance on tasks of sustained attention.

However, chronic users probably do not continue to obtain absolute improvements in performance, cognitive processing, or mood as tolerance to many of these effects soon develops. It is reported by smokers that cigarettes aid as stress busters and help them to concentrate and work more effectively.

The reason why smokers perceive cigarettes to be relieving is because smokers start to experience impairment of mood and performance within hours of their last

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cigarette, and these symptoms are completely subsided by smoking a cigarette. Smokers go through this process thousands of times over the course of their smoking career, and this may lead them to identify cigarettes as effective self-medication, even if the effect is the negative one of withdrawal relief rather than any absolute improvement.²

Both smoked and smokeless forms of tobacco contain nicotine³, a highly addictive chemical, making it difficult for habituated tobacco users to quit.^{4,5}

In fact, it is as addictive, or even more, than heroin or cocaine. Over time, users become dependent on nicotine and suddenly stopping produces both physical and psychological withdrawal symptoms.^{6,7} Nicotine is readily absorbed from the respiratory tract, buccal mucosa and skin.⁸

There is minimal absorption through the gastrointestinal tract when administered orally. Cigarettes are highly effective mechanism for delivering nicotine. Inhaled nicotine takes about 10 to 19 seconds to reach the brain and its stimulation releases chemicals which ensure feeling of goodness, alertness and energy.

As the person stops tobacco use, these chemicals decrease in the body and withdrawal symptoms start. These can be very distressing for the unprepared tobacco user. Thus, the tobacco user is compelled to continue using tobacco, hence trapped in the vicious cycle.

PATHOGENIC EFFECTS OF NICOTINE

Some combination of the 4,000 or more chemical components of tobacco smoke, including a huge arsenal of toxins and carcinogens, represent the mediators of multiple pathogenic processes. Nicotine, a tertiary amine, should by no means be considered an inert molecule. For example, it can cause vasoconstriction in specific vascular beds but dilatation in others.^{9,10}

Nicotine can increase the heart rate (by 10–15 beats/min) and the blood pressure (by 5–10 mm Hg) and can induce pathogenic changes to the endothelium that are associated with the atherosclerotic process.^{11,12}

Although smoking is implicated in the development of cancer, nicotine itself is not carcinogenic, unless it undergoes nitrosation to form nitrosamines (a process known to occur during tobacco curing and combustion).⁹

The Damage Potential of Various Nicotine Delivery Systems

Cigarettes

The danger of the modern cigarette is potentially increased because it is highly sophisticated and addictive. The cigarette is the most dangerous form of nicotine delivery device.¹³ Although cigarette composition varies

between countries, 8 to 10 over time the mortality outcome per pack year has varied little.¹⁴ The development of the modern cigarette is well-chronicled by industry documents.^{15,16} Suggesting that its addictive properties may have been enhanced over recent decades. Furthermore the widespread use of ventilated filters facilitates compensatory smoking.¹⁷

Cigars and Pipes

Cigar causes lower mortality ratios for chronic obstructive lung disease, coronary heart disease, and lung cancer than do cigarette smokers. The lower risks associated with primary cigar smoking probably reflect the fact that many such smokers are satisfied by buccally absorbed nicotine and do not develop the habit of inhaling the smoke into the lungs. The risk of laryngeal cancer are just half, whereas those of oral and esophageal cancer are similar. An inhaling smoker of five cigars daily experiences the same lung cancer risk as a one pack per day cigarette smoker.¹⁸ Less information is available for pipe smokers, who often are classified with cigar smokers and may have mixed habits,¹⁹ but the mortality outcomes are substantially less than those associated with cigarettes.²⁰⁻²²

Smokeless Tobacco

Smokeless tobacco use is associated with increased risk of cancers of the oropharyngeal area.²³ A review of US studies concluded that snuff use increases risk of oropharyngeal cancers.²⁴ However, risks vary greatly according to the dose and form of tobacco mix used. Another study reported increased risk of oral cancer and high relative risks for cancer of the buccal mucosa and gums among snuff users.²⁵

Use of Swedish snus has not been associated with increased risk of oropharyngeal cancer.²⁶ The reason for the same may be related to lower levels of tobacco specific nitrosamines in Swedish snus compared to many US smokeless tobacco products.

SYMPTOMS OF NICOTINE WITHDRAWAL

Much of the inability to quit tobacco is due to problems of withdrawal symptoms and cravings. These withdrawal symptoms particularly irritability, restlessness, feeling miserable, impaired concentration, and increased appetite begin within hours of the last cigarette and are at maximal intensity for the first week.

SOCIAL AND BEHAVIORAL ASPECTS

Social influences greatly influence addiction patterns. These can be used to discourage smoking—as, e.g., with the cultural disapproval of smoking in some

communities, non-use of tobacco in professional groups, or the effects of smoke-free policies in workplaces.

The primary reinforcing properties of nicotine ultimately sustain smoking behavior. For a 20 a day smoker, "puff by puff" delivery of nicotine to the brain is linked to the sight of the packet, the smell of the smoke, and the scratch in the throat some 70,000 times each year. This no doubt accounts for smokers' widespread concern that if they stopped smoking they would not know what to do with their hands, and for the ability of smoking related cues to evoke strong cravings.

Other factors encourage smoking, such as being married to a smoker or being part of social networks in socially disadvantaged groups, among whom prevalence is so high as to constitute a norm.

REGULATION OF NICOTINE INTAKE

Within individuals, nicotine preferences emerge early in the smoking career and seem to be stable over time. Smokers show a strong tendency to regulate their nicotine intakes from cigarettes within quite narrow limits. They avoid intakes that are either too low (provoking withdrawal) or too high (leading to unpleasant effects of nicotine overdose). Compensatory puffing and inhalation, operating at a subconscious level, ensure that nicotine intakes are maintained. As nicotine and tar delivery in smoke are closely coupled, compensatory smoking likewise maintains tar intake and defeats any potential health gain from lower tar cigarettes. Similar compensatory behavior occurs after cutting down on the number of cigarettes smoked each day; hence, this popular strategy fails to deliver any meaningful health benefits.

SOCIOECONOMIC STATUS AND NICOTINE ADDICTION

It is alarming to note that an emerging phenomenon of the utmost has been the increasing association of chronic smoking with markers of social disadvantage which can partly be attributed to the fact that poorer smokers tend to have higher levels of nicotine intake and are substantially more dependent on nicotine.

It is evident that future progress in reducing smoking is increasingly going to have to tackle the problems posed by poverty.

Cigarette dependence is a chronic relapsing condition that for many users entails a struggle to achieve long-term abstinence that extends over years or decades. Successful interventions need to tackle the interacting constellation of factors—personal, family, socioeconomic, and pharmacological—that sustain use and can act as major barriers to cessation.

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