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Effects of tobacco in mind and body: A public concern

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Abstract

In the threshold of 21st century, consumption of tobacco, by any means, is a way if relaxation for most of the population. Tobacco can be used in many ways like cigarettes, smokeless tobacco, hookah, cigars, pipes, etc. The components of tobacco are associated with affecting almost all the organs of our body and are also related psychologically affecting the mind. Dental health care providers are in a unique position to identify the effects of tobacco on oral health early on, and can provide suggestions and advice to tobacco consumers about the need to prevent or quit tobacco consumption, offering advice and help that is quick, simple and tailored to the patient.

Keywords: effects, tobacco, nicotine, public health

Introduction

In the threshold of 21st century, consumption of tobacco, by any means, is a way of relaxation for most of the population. Tobacco can be used in many ways like cigarettes, smokeless tobacco, hookah, cigars, pipes, etc. According to World Health Organization (WHO), worldwide there are 1.27 billion tobacco users, and consumption of tobacco records for 5.4 million deaths per year. Tobacco mainly consists of Nicotine, an addiction-causing component. German physicians Wilhelm Heinrich Posselt and Karl Ludwig Reimann were the first to extract nicotine from Tobacco ^[1]. Other than nicotine, tobacco smoke consists of hydrogen cyanide, formaldehyde, lead, arsenic, ammonia, carbon monoxide, benzene, tobacco-specific nitrosamines (TSNAs), polycyclic aromatic hydrocarbons (PAHs), and radioactive elements such as polonium 210 ^[2]. These elements are associated with affecting almost all the organs of our body and are also related psychologically affecting the mind.

Effect of tobacco on body

Nicotine, the main component of tobacco is a dibasic compound and its absorption in human body depends upon the pH of the solution. The process of absorption occurs through oral mucosa, lungs, gut or skin. Once nicotine is absorbed and ingested, it is metabolized in liver. This metabolic process takes place in two phases. In first phase, microsomal oxidation of nicotine via multiple pathways takes place, which leads to the formation of metabolites such as cotinine, nornicotine, dimethyl cotinine, etc. In second phase, there is N'- and O'-glucuronidation of the metabolites followed by excretion via urine, sweat, feces, etc.

The three major mechanisms by which nicotine act are- 1) Ganglionic Transmission, 2) Central Nervous System Stimulation of Nicotinic Acetylcholine Receptors (nAChRs) and 3) nAChRs acting on chromaffine cells via catecholamines. Nicotine produces pathological and physiological effects on different organs of the body through these pathways ^[1]. The effects of nicotine on the body can be broadly categorized into three categories, i.e. immediate, intermediate and long-term, which is shown in table 1 ^[3].

Table 1: Effects of tobacco on body

Immediate effects	Intermediate effects	Long-term effects
Depletion of anti-oxidant micronutrients	Increased use of medical services	Precancerous lesions (colorectal adenomatous polyps)
Increased inflammation	Periodontitis	Cancer (lung, colorectal, esophageal, laryngeal, oral, pharynx, etc.)
Oxidative stress	Diabetes	Cardiovascular disease (coronary heart disease, stroke, abdominal aortic aneurysm)
Compromised immune status	Impaired lung function	Respiratory disease (COPD, asthma)
Lower self-rated health status	Exacerbation of asthma	Rheumatoid arthritis
Altered lipid metabolism	Increased risk of lung infection (tuberculosis, pneumonia)	Reduced effectiveness of tumour necrosis
Respiratory symptoms (phlegm, coughing, wheezing, dyspnoea)	Subclinical organ injury	CNS Disorder (increased psychomotor activity, cognitive function etc.)

Apart from the effects that are mentioned above, acute nicotine toxicity occurs due to consumption of green tobacco leaves. The reaction starts after 12 to 24 hours of consumption. The symptoms include nausea, giddiness, vomiting, fatigue, tachyarrhythmia, and loss of appetite [1]. In the current situation of Covid-19, intake of tobacco by any means, smoking or smokeless tobacco, could cause a major health concern. Inhalation of tobacco directly targets epithelial cells of the lung, causing pneumonia and severe acute respiratory distress syndrome (SARS), thus making the lung more susceptible for covid-19 infection. Studies have shown that individuals consuming tobacco already have COPD and asthma, which is a major risk factor for Covid-19 affected patients [4].

Effects of tobacco on mind

Tobacco or Nicotine not only causes harmful effects on body but also affects mind of a person. Consumption of tobacco for several years may make one dependent on it. Nicotine dependency is a complex disorder, and people may find it difficult to overcome, as it is an addictive drug. When an individual intakes nicotine, it reaches to brain in as fast as 10 seconds. Studies have shown relationship between intake of tobacco and personality, and these include mainly in three dimensions, i.e., extroversion, neuroticism and psychoticism. Extroversion consists of assertiveness, sociability, positive emotions and activity level. Extroversion is characterised by low cortical excitation and hence extroverts try to change their external or internal environment by intake of nicotine. The neuroticism consists of anxiety, psychological vulnerability, depression, anger and hostility. Here, the individual presents with increased frequency and intensity of negative affection, and so, intake of tobacco helps them to overcome this feeling. The psychoticism manifests in characteristics like cynicism, anti-social tendency, coldness, impulsivity, reduced agreeableness, reduced inhibition, low conscientiousness, and search of stimulating sensations. Initially when an individual starts to intake nicotine or tobacco, it improves his/her concentration and mood, reduces stress and anger, relaxes muscles and reduces appetite. This makes an individual reinforce the habit of consuming tobacco repeatedly. Intake of nicotine, thus, might acts as a stress buster for the individual. But actually this feeling is temporary and increases craving of consuming more nicotine. According to studies, consuming tobacco in this state of mind acts as sort of self-medication as it relieves the feeling of sadness and depression. This is due to the interference of nicotine with neurochemical systems, affecting the neural circuits, like emphasizing mechanisms associated with mood regulation. Intake of tobacco by any means is related with Attention Deficit Disorder (AAD) as well. One of the studies states that individuals suffering from AAD consume tobacco as self-

medication to relieve the symptoms of this disorder. According to studies, individuals suffering from schizophrenia have been found to have high tenacity for tobacco consumption as it helps them as self-medication that helps them to reduce anxiety. Improve concentration and decrease in unpleasant hyper-stimulation [5].

Conclusion

Tobacco is one of the main reasons for addiction in today's era. It has many adverse effects on different organs of the body and mind as well. Biologically, its effect is diverse including cardiovascular, reproductive, central nervous system, respiratory, renal, etc. Dental Health Care Providers, are in a unique position to identify the effects of smoking or tobacco on oral health early on, and can provide suggestions and advice to tobacco consumers about the need to prevent or quit tobacco consumption, offering advice and help that are quick, simple and tailored to the patient.

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