

Information Sheet - Institute of Welfare

Nicotine and Its Misuse

Properties of nicotine

Nicotine is a stimulant drug, but paradoxically effects of both stimulation and relaxation may be felt. The mental and physical state of the smoker, and the situation in which smoking occurs, can influence the way in which a particular cigarette will affect psychological perceptions. The addictive effect of nicotine is linked to its capacity to trigger the release of dopamine - a chemical in the brain that is associated with feelings of pleasure. However, recent research has suggested that in the long term, nicotine depresses the ability of the brain to experience pleasure. Thus, smokers need greater amounts of the drug to achieve the same levels of satisfaction. Smoking is therefore a form of self-medication: further smoking alleviates the withdrawal symptoms which set in soon after the effects of nicotine wear off.

Is nicotine addictive?

In February 2000, the Royal College of Physicians published a report on nicotine addiction which concluded that "Cigarettes are highly efficient nicotine delivery devices and are as addictive as drugs such as heroin or cocaine." Two years earlier, the report of the Government's Scientific Committee on Tobacco and Health stated that: "Over the past decade there has been increasing recognition that underlying smoking behaviour and its remarkable intractability to change is addiction to the drug nicotine. Nicotine has been shown to have effects on brain dopamine systems similar to those of drugs such as heroin and cocaine".

Despite authoritative reviews, there has been some debate about the extent to which the smoking habit is controlled by physiological addiction. The debate has arisen because there is no universally accepted definition of addiction although the World Health Organization has defined addiction as: "*A state, psychic and sometimes also physical, resulting in the interaction between a living organism and a drug, characterised by behavioural and other responses that always include a compulsion to take the drug on a continuous or periodic basis in order to experience its psychic effects, and sometimes to avoid the discomfort of its absences. Tolerance may or may not be present.*" On the basis of this definition, it is possible to demonstrate a scientific basis for defining nicotine as an addictive substance.

Difficulty in quitting

Possibly one of the strongest indicators of the effect of nicotine is the discrepancy between the desire to quit and quitting success rates. Surveys have shown that the majority of smokers (around 70%) want to stop smoking yet the

successful quit rate remains very low. 20% or less of those who embark on a course of treatment succeed in abstaining for as long as a year, while only around 3% succeed in quitting using willpower alone. Most smokers take several attempts to quit before they finally succeed. The power of addiction is also demonstrated by the fact that some smokers are reluctant to stop smoking even after undergoing surgery for smoking-induced diseases. Around 40% of those who have had a laryngectomy try smoking soon afterwards, while about 50% of lung cancer patients resume smoking after undergoing surgery.

Nicotine withdrawal symptoms

Another marker for addiction is the occurrence of withdrawal symptoms following cessation of drug use. For smokers, typical physical symptoms following cessation or reduction of nicotine intake include craving for nicotine, irritability, anxiety, difficulty concentrating, restlessness, sleep disturbances, decreased heart rate, and increased appetite or weight gain. The fact that these symptoms can be attributed to nicotine, rather than behavioural aspects of tobacco use is shown by the finding that withdrawal symptoms are relieved by nicotine replacement therapy (gum, patches, etc.) but not by a placebo (i.e. products that do not contain nicotine).

Other measures of dependence

There are a number of markers which can measure dependence on a substance. A key factor is the degree of compulsion to take the drug experienced by the user. Most smokers smoke on a daily basis. In Britain, the average self-reported consumption of cigarettes is 14 per day. Fewer than 1 in 20 smokers smoke less frequently than daily. Other indicators of dependence include the time from waking to first cigarette. Among smokers of all ages, 15% light up within 5 minutes of waking, while almost half of all smokers, smoke within the first ½ hour of the day. Few smokers believe that they could manage to go without smoking for a whole day. 81% of smokers who smoke 20 or more cigarettes a day say that they would find it difficult to go a whole day without smoking

Genetic Influence

Recent research suggests that certain smokers may be predisposed to nicotine addiction through the effects of a gene responsible for metabolising nicotine. Scientists have found that non-smokers are twice as likely to carry a mutation in a gene that helps to rid the body of nicotine. In addition, smokers who carry mutations in the gene, are likely to smoke less because nicotine is not rapidly removed from the brain and bloodstream. By contrast, smokers with the efficient version of the gene will tend to smoke more heavily to compensate for nicotine being removed more rapidly.

Further information and support in helping you 'quit' can be found at the following:

www.ash.org.uk

www.smokefreeaction.org.uk

www.smokefree.nhs.uk

www.quit.org.uk

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