

A new approach to the diagnosis of tobacco addiction

The DSM-IV diagnosis of tobacco dependence lacks empirical support and can usefully be replaced by reports of recurrent and periodic compulsion to use tobacco

All addicted smokers experience cravings to smoke. Cravings can be triggered by abstinence, or by episodic events such as stressful situations or smoking cues in the environment. This combination of factors can cause craving to manifest in a pattern that may appear to be haphazard. However, through a series of longitudinal studies involving more than 20 000 individual interviews, my colleagues and I believe we have discovered a fundamental order embedded in this disorder. In this editorial, I will argue that recent advances in our understanding of the pathophysiology of tobacco addiction allow doctors to make a reliable diagnosis based on a single characteristic feature, the recurrent and periodic compulsion to use tobacco [1].

All forms of drug addiction are characterized by a compulsion to use the drug. The compulsion to use tobacco is distinguished easily from everyday desires because it is recurrent and periodic. Just as hunger will emerge if one waits long enough after eating, the compulsion to smoke is recurrent because it returns without fail after each cigarette, and periodic because it returns with a predictable timing. Eating does not cure hunger once and for all, and smoking a cigarette does not extinguish the compulsion to smoke; it is merely suppressed for a limited period. There is evidence that one dose of nicotine affects the brain for more than a month [2]. Novice smokers report that when addiction begins, one cigarette can relieve the compulsion to smoke for weeks [1].

The compulsion to use tobacco covers a spectrum of intensity, and we find that smokers commonly use the terms 'wanting', 'craving' and 'needing' to describe their compulsion [1]. We have given definitions to these terms to standardize communication and measurement in our research. 'Wanting' is described as mild, short-lived and easy to ignore. Its periodicity distinguishes addictive wanting from ordinary wanting [1]. 'Craving' is distinguished from wanting by virtue of being more intense, intrusive and persistent. While wanting often waits until the smoker is unoccupied to make itself known, craving interrupts the smoker's concentration. Wanting will go away if ignored, but craving presents a more persistent distraction. Smokers use the word 'needing' to describe their predicament when they are so disrupted by nicotine withdrawal that they will be unable to function normally until they smoke again [1]. Another feature distinguishing the compulsion to smoke from ordinary desires is that

smokers frequently perceive the source of their compulsion as something inside their head telling them to smoke.

We have assembled the first case-series of patients with tobacco addiction [1]. According to one adolescent, 'at first you smoke because you want to, but then you smoke because you need to'. As addiction develops, wanting, craving and needing present in that order. This developmental sequence is recapitulated when addicted smokers are unable to smoke; they will first experience wanting, which in time progresses to craving, and then to needing.

Patients describe their compulsion to use tobacco in terms that suggest a physiological basis: it is like 'being hungry, but instead of your stomach saying it, it's your brain . . . it's just hungry . . . for a cigarette' [1]. In animals, one dose of nicotine changes the brain [3,4]. The largest study of tobacco addiction to date reveals that one-quarter of novice smokers experience a mild compulsion to smoke after smoking two cigarettes, and the incidence increases with each additional cigarette [5]. The predictable periodicity of the compulsion to use tobacco also suggests that, like hunger, it has a physiological basis. The latency is the delay between finishing one cigarette and experiencing wanting, craving or need for another. There is a latency to wanting, a latency to craving and a latency to needing. All addicted smokers can tell you how long they can go without smoking before they experience wanting, how much longer it takes for craving to appear, and how long after that it will be before they need a cigarette [1,6].

When the compulsion to smoke first appears the latencies may be measured in weeks, but the duration of the latency shrinks with repeated use [1]. The shrinking of the latency is the only form of nicotine tolerance that has been linked to addiction [6–8]. The shortening of the latencies drives a relentless progression in tobacco use. A 21-year-old woman described a latency to craving of 2 days at age 16 after smoking for 1–2 months. Her latency shrank to 4 hours by age 16.5 years, to 2 hours by age 17, to 1.5 hours by age 18, to 1 hour by age 19, and to 30–45 minutes by age 21 [1]. When the latency to needing shrinks to less than 8 hours smokers may find they need to smoke within 5 minutes of arising, or that the first cigarette of the day is the one they would most hate to give up.

In novice smokers we have found that the appearance of craving or needing predicted the progression to daily smoking with an odds ratio of 195.8 [9]. When the first symptom of the compulsion to use tobacco appears, young people are smoking an average of only two cigarettes per week [9,10]. In a 12-year prospective study, reaching the threshold of smoking two cigarettes per week

predicted the progression to heavy adult smoking with an odds ratio of 1.74 [11,12]. These data indicate a sensitivity of more than 99% in the ability to predict an ominous trajectory of tobacco use based on symptoms that are reported by a quarter of youth after smoking two cigarettes. Conversely, based on long-term studies we can state with 99% specificity that youths who do not develop symptoms of wanting–craving–needing will not progress to regular daily smoking [13].

The recurrent and periodic compulsion to use tobacco as manifested in the symptoms of wanting, craving and needing is unique to tobacco addiction, as no other condition produces a compulsion to use tobacco. Whenever a patient presents with signs or symptoms that can be explained by only one condition, a physician can make a confident diagnosis even in the absence of additional characteristic signs or symptoms. Although tobacco addiction has additional signs and symptoms, our data suggest that these need not be present to make a diagnosis if the recurrent and periodic compulsion to use tobacco is present. The current DSM criteria include a range of criteria, but these were not drafted based on an understanding of the pathophysiology of nicotine dependence and how it develops [14]. Rather, the DSM criteria were created to match the criteria used for addiction to other drugs, particularly alcohol.

Diagnostic criteria for addiction should, at the very least, be able to differentiate between individuals who are, and are not, able to abstain when they decide they want to do so. DSM-based measures of nicotine addiction have a poor track record in this regard [15–17], whereas time to first cigarette of the day which captures, to some degree, the dimension being proposed here, has a good track record [18]. The model proposed here suggests that reports and behavioural markers of need to smoke will be particularly useful in identifying smokers who will struggle to stop without help.

In sum, I propose that addiction to cigarettes can be diagnosed clinically on the basis of a recurrent and periodic compulsion to smoke, and that appropriate measures of this symptom may prove much more useful than those based on existing DSM criteria.

Declaration of interest

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