11 - Effects of nicotine on different disorders

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908 The Maudsley® Prescribing Guidelines in Psychiatry CHAPTER 12 Nicotine Nicotine is consumed by vaping or tobacco smoking and causes peripheral vasoconstriction, tachycardia and increased blood pressure.1 People with schizophrenia who smoke are more likely to develop the metabolic syndrome compared with those who do not smoke.2 Alongside nicotine, cigarettes also contain tar (a complex mixture of organic molecules, many carcinogenic), a cause of cancers of the respiratory tract, chronic bronchitis and emphysema.3 Electronic cigarettes and vaping devices contain only nicotine (along with some necessary excipients), which has very limited toxicity and is not thought to be carcinogenic. Vaping is thus preferred for all smokers, albeit with some reservations in regard to quality control of content and the so-called re-normalisation of smoking. Vaping is not without risk but this is a complex area beyond the scope of this book. Nicotine is highly addictive and vulnerability to nicotine addiction may be genetically determined.4 People with mental illness are 2–3 times more likely than the general population to develop and maintain a nicotine addiction.5 Chronic smoking contributes to the increased morbidity and mortality from respiratory and cardiovascular disease that is seen in this patient group. Nicotine also has psychotropic effects. Smoking can affect the metabolism (and therefore the efficacy and toxicity) of drugs prescribed to treat psychiatric illness6 (see ‘Smoking and psychotropic drugs’ in Chapter 11). Nicotine use may be a gateway drug to experimenting with other psychoactive substances. Psychotropic effects Nicotine is highly lipid-soluble and rapidly enters the brain after inhalation. Nicotine receptors are found on dopaminergic cell bodies and stimulation of these receptors leads to dopamine release.5 Nicotine may be used by people with mental health problems as a form of ‘self-medication’ (e.g. to alleviate the negative symptoms of schizophrenia or antipsychotic-induced dysphoria or for its anxiolytic effect7). Drugs that increase the release of dopamine reduce craving for nicotine. They may also, of course, worsen psychotic illness. Nicotine improves concentration and vigilance,5 probably by enhancing the effects of glutamate, acetylcholine and serotonin.7 Effects of nicotine on different disorders Schizophrenia Before the introduction of vaping, 70–80% of people with schizophrenia regularly smoked cigarettes.8 Now both tobacco use and vaping are more common among people with psychosis.9,10 A 2024 study in the USA11 found that 28% of people with a first episode of psychosis used nicotine in one form or

another – roughly double the rate of age-matched controls. In people with longer-standing psychosis in 2023, tobacco use was seen in just over 40% but use of any nicotine product was reported in around 70–80% (i.e. a prevalence no different from before the availability of vaping devices).12

Other substances CHAPTER 12 This increased tendency to use nicotine predates the onset of psychiatric symptoms13 and smoking might actually be a causal factor in schizophrenia.14 Possible explanations are as follows:15 (i) smoking causes dopamine release, leading to feelings of well-being and a reduction in negative symptoms;7 (ii) smoking alleviates some of the adverse effects of antipsychotics such as drowsiness and extrapyramidal side effects (EPSEs)5 and cognitive slowing;16,17 (iii) smoking serves as a means of structuring the day (a behavioural filler); (iv) smoking arises as a result of a familial vulnerability;18 or (v) smoking may be used as a means of alleviating the deficit in auditory gaiting that is found in schizophrenia.19 Nicotine may also improve working memory and attentional deficits.20–22 Nicotinic receptor agonists may have beneficial effects on neurocognition,23,24 although none is licensed for this purpose. Note though that cholinergic agonists may exacerbate nicotine dependence.25 Interestingly, the greater the occupancy of striatal D2 receptors by antipsychotic drugs, the more likely the patient is to smoke.26 This may partly explain the clinical observation that smoking cessation may be more achievable when clozapine (a weak dopamine antagonist) is prescribed in place of a conventional antipsychotic. It has been suggested that people with schizophrenia find it particularly difficult to tolerate nicotine withdrawal symptoms6 (although some certainly can stop27). Switching to nicotine replacement therapy or vaping may thus be the preferred option.28,29 A switch from tobacco smoking to vaping has been shown to be well tolerated even in severe mental illness.30 Depression and anxiety Moderate consumption of nicotine is associated with pleasure and a decrease in anxiety and feelings of anger.31 The mechanism of this anxiolytic effect is not understood. People who suffer from anxiety and/or depression are more likely to smoke32 and find it more difficult to stop.31,33 Nicotine itself might have antidepressant activity.34 Nicotine withdrawal can precipitate or exacerbate depression in those with a history of the illness,31 but cigarette smoking may directly increase the risk of depression.35 A 2020 study suggested nicotine addiction and depression are independently linked.36 Some studies suggest that stopping smoking ultimately improves depression and anxiety.37,38 A 2020 Cochrane review39 suggests smoking cessation is achievable in depressed smokers, but a later twin study found that depression made smoking cessation much less likely.40 Patients with depression are at increased risk of cardiovascular disease. By directly causing tachycardia and hypertension,1 nicotine may, in theory, exacerbate this problem. More importantly, smoking tobacco is a well-known independent risk factor for cardiovascular disease, probably because it hastens atherosclerosis. Vaping, while not carcinogenic, increases risk of cardiovascular disease.41 Attention deficit hyperactivity disorder (ADHD) People with ADHD are relatively more likely to use nicotine products.42 Tobacco smoke contains monoamine oxidase inhibitors which may benefit ADHD symptoms.43 There is ample evidence of complex pharmacodynamic interactions between nicotine and stimulant drugs.44

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