A street medicine view of tobacco use in patients with schizophrenia

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Throughout my psychiatric clerkship, I (JWF) participated in street medicine, the practice of providing care to patients (typically those who are homeless) at the location they currently reside, such as in a homeless encampment or community shelter. Our clinical team drove to locations that provided housing for patients diagnosed with schizophrenia, where we assisted with medications and blood draws. I remember pulling up the first day and seeing someone outside smoking a cigarette. I soon learned that many people living in such situations were smokers, and that among the substances they used, tobacco was the most common.

One patient said the cigarettes helped him manage the "voices in his head" as well as some of the adverse effects from medication, such as parkinsonism and akathisia. I asked my attending physician about this and she explained that for some patients, using tobacco was a way to mitigate the positive symptoms of schizophrenia and make the adverse effects of their therapy, particularly extrapyramidal symptoms (EPS), more bearable. By the end of my 2-week rotation, I was sure of a trend: our patients with schizophrenia smoked incessantly. Near the end of my rotation, I asked a patient, "Why do you smoke"? The patient looked at me, puzzled, and replied: "I just do." This exchange only piqued my curiosity, and I could not help but wonder: what is the relationship between tobacco use and schizophrenia? How is tobacco use related to the pathophysiology of schizophrenia? Does tobacco use among patients with schizophrenia ameliorate aspects of their psychosis? Street medicine offered me a window into a biomedically intriguing question, and I wanted to learn more.

What smoking does for patients with schizophrenia

The high prevalence of smoking among patients with schizophrenia (50% to 88%) greatly exceeds the rates of smoking among patients with other psychiatric illnesses.[1,2] The role of smoking in relation to schizophrenia and other psychoses is multidimensional, and evidence implicates smoking as a risk factor for schizophrenia.[3,4]

Two mechanisms may help explain tobacco use in patients with schizophrenia: reducing the adverse effects of antipsychotic medications and promoting neural transmission of dopamine. Second-generation antipsychotics (SGAs) are a first-line treatment, but they can produce EPS, metabolic dysregulation, and blood disorders such as hyponatremia and (rarely) agranulocytosis (1% with clozapine).[5] Compared to those who are nonsmokers, patients with schizophrenia who smoke are more likely to experience more severe symptoms (eg, hallucinations and delusions) and less severe EPS.[5,6] Research suggests that exposure to

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Smoking may reduce the adverse effects of antipsychotic medications and promote neural transmission of dopamine

polycyclic aromatic hydrocarbons released during smoking induces cytochrome P450 1A2, an enzyme that metabolizes antipsychotic medications such as haloperidol, clozapine, and olanzapine. Increased metabolism results in lower serum concentrations of antipsychotics, lower efficacy, and more severe positive symptoms.[5,6]

Additionally, tobacco is an activator of nicotinic acetylcholine receptors (nAChR).[6] When these receptors become activated, dopamine is released. Dopamine serves as a mediator of reward for nicotine use. In the context of schizophrenia, tobacco use opposes the mechanism of action of SGAs, which is to block neural transmission of dopamine.[6] The etiology of EPS is related to the blockade of postsynaptic dopamine release in the striatum.[6] By activating nAChR, smoking induces a downstream release of dopamine that can alleviate iatrogenic EPS by restoring neural transmission of dopamine.[6] Nicotine may also modulate alpha-7 nicotinic receptor dysfunction, and improve the ability to filter out irrelevant environmental stimuli (impaired sensory gating), which can be overwhelming for patients with schizophrenia. It also can improve cognitive dysfunction and attention by inducing the release of dopamine in mesocortical pathways.[7] The implications of this neural pathway are significant because smoking is significantly greater in tobacco users who are diagnosed with schizophrenia compared to tobacco users who lack a psychiatric diagnosis.[6,7] Smoking may enhance dopaminergic neural transmission to a far greater extent in tobacco users with schizophrenia compared to tobacco users who do not develop schizophrenia, which suggests intrinsic differences at the neuronal level. Neural differences between tobacco users with or without schizophrenia may synergize with smoking in clinically and biologically meaningful ways. These pathways require further research to support or disprove these hypotheses.

Aside from the dopaminergic system, mechanisms influencing tobacco use among patients with schizophrenia may also be related to nicotine's mild antidepressant effects. Evidence suggests a clinically meaningful association between nicotine dependence and mood disorders, and this association may be due to the antidepressant effects of nicotine.[8-13] Patients with schizophrenia may experience respite from depressive symptoms through their tobacco use, eventually leading to nicotine dependence.

Treatment of schizophrenia involves multimodal management of a patient's life, including reducing maladaptive habits that are harmful to health. Chronic smoking in patients with schizophrenia is associated not only with atherosclerosis and cardiovascular disease, but also with poor neurologic functioning, such as significant impairment in attention, working memory, learning, executive function, reasoning, problem-solving and speed of processing.[14] One study found that in patients with schizophrenia, smoking increased the 20-year cardiovascular mortality risk by 86%.[15]

Despite challenges to abstinence, smoking cessation should be discussed with these patients, especially given the high prevalence of smoking among this vulnerable population. Bupropion and varenicline have been studied in the context of smoking cessation among patients with schizophrenia. Data on varenicline are mixed. Smokers with schizophrenia who received bupropion showed higher rates of abstinence from smoking compared to those who received placebo.[16]

As part of the biopsychosocial model of clinical care, sociodemographic factors must be considered in assessing the relationship between tobacco use and schizophrenia, because a large proportion of patients diagnosed with schizophrenia are members of underrepresented minority groups.[17] A PubMed database search using keywords "African American" or "Black," "tobacco," and "schizophrenia" located only 12 studies, most of which lacked relevance to this question. Han et al[18] is 1 of

the few studies to investigate sociodemographic factors as they relate to tobacco use among adults with psychoses. Social determinants of health and other confounding variables also need defining to truly distinguish causation from correlation, especially regarding tobacco use and its association with other health risk behaviors.[19]

Without the street medicine component of the medical school training I received, the pattern of smoking among patients with schizophrenia may have remained invisible or insignificant to me, as tobacco use is not permitted in the inpatient and outpatient academic settings. This experience not only raised insightful questions, but also emphasized the clinical value of seeing patients within their living environment.

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This experience emphasized the clinical value of seeing patients within their living environment

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