Chapter

Smoking and the Association with Mental Health

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Abstract

Tobacco use is the largest single cause of preventable mortality and morbidity worldwide and it is strongly associated with a variety of mental illnesses. Smoking is considered as a modifiable risk factor that has a significant impact on physical health, including lung diseases, cardiovascular disease, peptic ulcer disease, reproductive problems, and diminishment of bone minerals. Additionally, smoking is a major global public health issue and mortality is estimated to be around 6 million people per year. The prevalence of smoking in people with mental illness can range from 50 to 85%, and they are much less likely to quit smoking compared to the general population. Nicotine addiction plays a significant role in the maintenance of smoking in people with mental illnesses. Hence, it is important to encourage smoking cessation to reduce the health risk of smoking. In terms of smoking intervention, international guidelines recommend to treat smoking both pharmacological and with behavioral support in mentally ill patients. Furthermore, prevention strategies are also essential to control the harm of smoking at the public and individual levels. This chapter will highlight the effect of smoking and nicotine dependence among people with mental illness and their therapeutic policies to enhance the understanding of prevention and management of tobacco use as well as nicotine dependence.

Keywords: smoking, tobacco use, cigarette, nicotine addiction or dependence, mental health

1. Introduction

Smoking is the leading cause of preventable morbidity and mortality worldwide, and there are significant health inequalities in terms of morbidity and mortality among individuals with mental illnesses and those without, and the main factor determining this inequality is that of smoking [1, 2]. Smoking is considered a modifiable risk factor that has a significant impact on physical health, including lung diseases, cardiovascular disease, peptic ulcer disease, reproductive problems, and diminishment of bone minerals [3]. Furthermore, smoking is a major global public health issue and mortality is estimated to be around 6 million people per year [4]. Evidence has indicated that individuals with psychiatric illnesses are vulnerable to smoking; thus, smoking is associated with a wide range of psychiatric disorders, such as depression, bipolar disorder (BD), anxiety disorder, and schizophrenia [3–5]. Recent studies suggest that the prevalence of smoking is significantly

higher among people with mental health issues in comparison to the general population, and further that they are more likely to be heavy smokers [6]. Campion et al. stressed that tobacco use is not only related to prevalence but also the first onset of mental disorder. The relationship between mental health disorders and smoking is complex and different for individual disorders [3, 5]. As a result, individuals with mental health issues struggled to quit smoking because they experience high levels of distress [3]

The incidence of tobacco use among people with mental health problems was estimated to be about 60%, compared to 25% in the general population [7]. In addition, the rate of smoking is double that among those with mental illnesses compared to those without. For instance, in Australia, a national mental health survey conducted in 2007 found that 32% of mental health patients were smokers, while 16% of smokers did not have a mental illness [5]. Similarly, a large survey of psychiatric disorders in the UK found that 64% of those with mental illnesses were smokers, compared with 29% without [5]. People with mental health issues are associated with high tobacco use, high nicotine dependency, and more severe withdrawal symptoms when they quit or reduce cigarette use [8]. The purpose of this chapter is to demonstrate and summarize the impact of smoking and the association between smoking and mental health issues. In order to improve the response to quitting smoking, it is important to understand the connection between smoking and mental illness. This should help to prevent other related diseases as well as reduce the mortality rate associated with smoking.

2. Prevalence of smoking in mental illness

Recent literature has noted the significant numbers of smokers suffering from mental illnesses and the relationship between smoking and mental disorders [9]. Furthermore, many studies have reported that the prevalence of smoking is two to three times higher in patients with mental illness than in non-smokers. Consequently, the prevalence of smoking has disproportionately affected people with mental health issues [10, 11]. This prevalence is rising significantly among people with mental health problems, from 18% for people without mental health problems to 61% for people with issues [11]. Besides this, the prevalence of smoking in people with mental illness can range from 50 to 85%, and they are much less likely to quit smoking compared to the general population [1]. The prevalence increases with the severity of mental health issues [12]. In the United Kingdom, an estimated 30% of smokers have a mental disorder and more than 40% of cigarette smokers have a severe mental illness [13]. Likewise, people with mental health and substance abuse issues also have a high prevalence of smoking of approximately 30–35% [14]. A report from the Royal College highlighted that around 30% of smokers or 10% of all smokers have experienced a mental illness that is currently being treated with psychotic medication in the UK [6]. Furthermore, smokers with mental disorders are more vulnerable in low socioeconomic communities; for instance, around 48% of smokers with mental illnesses are low socioeconomic disadvantages while 33% of those mental health conditions are moderate or high socioeconomic class [11].

Many countries have made remarkable progress in tobacco control and have implemented a variety of policy measures to control smoking habits which have resulted in a reduction in the prevalence of smoking over the last few decades,

particularly in the European Countries and the United States [15]. However, the smoking rates in Asian countries did not reveal any sign of improvement [10]. Some of these developed countries have identified that individuals with mental illness have a substantial rate of smoking [16]. Despite the decrease in the prevalence of smoking in the general population in Western Nations, it is insignificant in people with good mental health, hence there has been an increase in the difference in the prevalence of smoking among people with mental illnesses and the general population [15]. A number of studies have revealed that the proportion of smokers without mental illness declined from about 20% to around 15%, while the smoking rate of adults with a mental health condition remains stable at around 29% [11, 15]. In the US, one in five people has a mental illness and half of this population is cigarette smokers which results in 40% of the annual deaths among those with mental illnesses are related to tobacco use [17]. Similarly, a high smoking rate in people with mental health problems has a major toll on death and health status in the US, whereas around 200,000 of the annual 443,000 premature deaths are estimated to occur in these populations [14]. Recent evidence also highlighted that an individual with chronic mental illness dies on average 25 years earlier than members of the general population [14]. This vulnerable population consumes 44% of all cigarettes, which reflects the high prevalence and heavy smoking habits in the United States; likewise, a similar estimate of consumption has been projected for in the UK, Australia, and New Zealand [11, 14].

Unfortunately, recent evidence indicates that smokers are more likely to be diagnosed with mental health conditions, including schizophrenia, bipolar disorder, psychosis, depression, and anxiety disorder than non-smokers and the highest rate of tobacco use are among patients in psychiatric departments where up to 70 and 50% of these patients are heavy smokers [3, 5]. Some studies indicated that tobacco use is significantly more prevalent in people with schizophrenia than the general population and smokers with schizophrenia tend to have a heavy habit, as well as shorter life expectancies [3, 11, 18]. The prevalence of smoking in patients with schizophrenia accounts for around 70 to 80%, whilst different studies have demonstrated that the current prevalence of smoking in individuals with schizophrenia is from 64 to 72% versus 19 to 29% in people who are mentally healthy respectively [19, 20].

Likewise, the prevalence of current smoking among people with bipolar disorder (BD) is estimated to be in the region of 30 to 70% [3]. Although some data can be attributed to small and non-representative groups with regard to smoking prevalence, other studies with larger sample sizes produce different findings; For instance, data taken earlier by the National Comorbidity Survey (NCS) indicated that smoking prevalence in BD was 69%, whereas recent data from the National Health Interview Survey (NHIS) revealed a smoking rate of 46% [3]. Despite the difference in this prevalence depending on countries, clinical studies and populations have consistently indicated that the smoking prevalence is approximately two to three times higher in people with BD than in the general population [3, 19, 21]. However, higher smoking prevalence in people with bipolar disorder contributes to both early onset of smoking and a reduced success rate in smoking cessation.

Furthermore, a recent strong epidemiological study has revealed the relationship between smoking and depression, hence tobacco-smoking individuals with depression have a higher prevalence than the normal population [22]. The estimated smoking prevalence among patients with major depression or those with clinically remarkable depressive symptoms ranges from 40 to 60%, thus the smoking rate is

Title	Schizophrenia (%)	Bipolar disorder (%)	Major depression (%)
Daily smokers	74	66	57
Heavy smokers	42	32	34
Smoking cessation	9	8	20

Table 1.
This table illustrates the prevalence of smoking both daily smoking and heavy smokers as well as the rate of smoking cessation in mental illness patients.

double among individuals with depression [22]. Similarly, many studies have pointed out the link between smoking and depression and the prevalence of major depression have been noted to be from 22 to 60% among smokers [23]. Other studies with different sample sizes demonstrated that the smoking prevalence in those with severe mental illness were observed to be around 74% for schizophrenics, 66% for BD, and 57% for major depression (**Table 1**) [12, 24, 25].

3. Impacts of smoking in mental health conditions

The high prevalence of cigarette smoking and mental health issues are a major public health concern and the association between smoking and mental illness is considered to contribute to reduced life expectancy, which results in premature death in patients with severe mental health conditions [13, 26]. Smoking is associated with an increased risk of mental illness and early onset of mental health conditions and also increases hospitalization among those with schizophrenia, bipolar disorder, depression, and anxiety [15, 27]. Smoking contributes significantly to the increased risk of tobacco-related diseases and excess death among individuals with mental health conditions, thus this has been connected to one of the main reasons for early death in patients with mental health issues [28]. However, the evidence that suggests cigarette smoking is associated with mental illness has potentially important public health implications; to illustrate this, individuals with mental health disorders might have difficulty quitting smoking and may face a high risk of physical problems due to smoking [29]. Therefore, this population might need a strong intervention to support their efforts to stop smoking and to ensure their conditions are not exacerbating due to quitting. Understanding smoking patterns in mental illness is also critical to developing effective treatment for smoking cessation and reducing negative outcomes.

3.1 Schizophrenia

Schizophrenia is a serious mental health condition that affects feelings, thoughts, and behavior. This is a chronic and serious mental illness that affects approximately one percent of the general population. Smoking is very common in patients with schizophrenia, which indicates a high rate of smoking compared with the healthy population [30]. Smoking is more likely to be involved in the development of schizophrenia at a younger age, increasing the severity of this condition as well as increasing the number of associated hospitalizations [31]. In addition, schizophrenic patients smoke for a long time, and inhaled tobacco smoke extensively, leading to the concomitant inhalation of a large number of toxic tobacco elements [21]. Consequently, heavy tobacco usage can also contribute to excessive mortality in schizophrenic

patients [32]. Notably, as smoking is harmful, heavy smoking might result in a more detrimental impact on health; for instance, schizophrenic patients might experience an increase of positive symptoms and decreased severity of negative symptoms versus non-smokers or light smokers [11, 21, 33]. Similarly, a recent study suggests that tobacco use can reduce the intensity of the extrapyramidal side effects of antipsychotic medication and diminish the cognitive deficits in patients with schizophrenia [21, 32]. Another important association between tobacco use and patients with schizophrenia can be linked to behavioral changes such as poor lifestyle [31].

Although the basic factors driving the high prevalence of smoking in people with schizophrenia remain ambiguous; however, there are different etiologies for high smoking rate and heavy smoking in schizophrenic patients [32]. Firstly, the self–medication hypothesis may provide an explanation, which points out that patients with schizophrenia often smoke to ameliorate the negative symptoms, cognitive impairment, and extrapyramidal side effects of antipsychotic treatment (**Figure 1**) [33]. This hypothesis suggests that neurotransmitter dysfunction such as dopamine, serotonin, glutamine, gamma-aminobutyric acid, and acetylcholine, which is a key pathological factor of schizophrenia, is improved, as smoking stimulates the activities of these neurotransmitters via various mechanisms [32, 33]. Nicotine binds to the central nicotinic cholinergic receptors, triggering the release of neurotransmitters to normalize their dysfunction and improve symptoms that lead to patients continuing smoking. Another mechanism reveals that smoking reduces the amount of the monoamine oxidase (MAO) that normally deactivates dopamine, thus smoking increases dopamine concentration in the brain, which could provide an antidepressant effect [21, 32].

Secondly, the presence of polycyclic aromatic hydrocarbons in tobacco enhances the metabolism of antipsychotic medications leading to reduce the drug concentration in the blood, resulting in some side effects and increasing the requirement for a higher dose [33]. Cigarette smoking has been revealed to lead to an increase in the activity of cytochrome P450 (CYP) enzymes, which are a group of enzymes present in

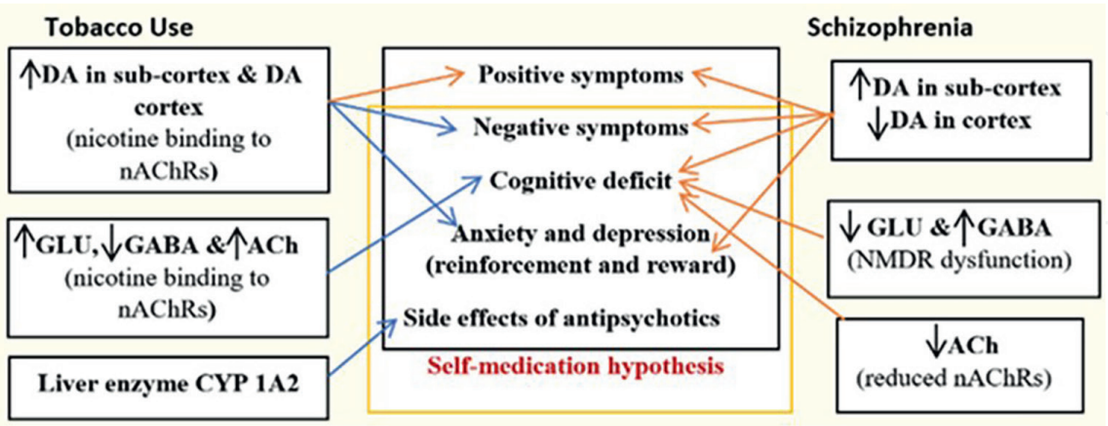

Figure 1: *The mechanism of the self-medication hypothesis. Neurotransmitter impairmet is an essential underlying mechanism of schizophrenia. Nicotine binds nAChRs, which releases neurotransmitters in the brain to normalize the dysfunction and improve disease. Brown arrows indicate detrimental effects, whilst blue arrows indicate beneficial effects. (Ach, acetylcholine; DA, dopamine; GABA , gamma-aminobutyric acid; GLU, glutamic acid [33]*

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The mechanism of the self-medication hypothesis. Neurotransmitter impairment is an essential underlying mechanism of schizophrenia. Nicotine binds nAChRs, which release neurotransmitters in the brain to normalize the dysfunction and improve disease. Brown arrows indicate detrimental effects, whilst blue arrows indicate beneficial effects. (Ach, acetylcholine; DA, dopamine; GABA, gamma-aminobutyric acid; GLU, glutamic acid.

the liver that are involved in drug metabolisms such as clozapine and olanzapine [31]. This is clinically important because it could reduce the efficacy of the drug and lead to poisoning after quitting smoking [21, 31]. In particular, the increase in CYP1A2 plays a significant role in the degradation of these drugs; likewise, smoking also considerably boosts CYP2E1 activity, and both CYP1A2 and CYP2E1 are also responsible for the activation of certain procarcinogenic substances [32].

3.2 Bipolar disorder

Bipolar disorder is a chronic, episodic mental disorder that has a distinct characteristic of mania, including mood changes, energy, activity, and concentration [34]. There are two types of bipolar disorder: bipolar I, defined as mania alternating with depression, and bipolar II, described as mild mania or hypomania alternating with major depression [34]. Smoking is also frequently prevalent among people with bipolar disorder, who show a higher prevalence of smoking and a lower rate of smoking cessation than the general population and which leads to poor health-related outcomes; for example, the patients with BD can die up to three decades earlier in comparison to the general population [35]. Despite the high rate of comorbidity and related mortality, a recent study focused on smoking individuals with bipolar disorder and examined the relationship between clinical symptoms and public health consequences: including mood symptoms, quality of life, suicidal behavior, and pharmacological implications as well as biological interaction [36]. Tobacco smoking in people with BD is also associated with higher severity of mania and depression, rapid cycling illness, active illness, higher risk of suicidal behavior, and high rate of substance abuse as well as poor outcomes of pharmacological treatment in patients with BD [34, 36].

Furthermore, it was examined whether these patients could be associated with a poor quality of life, which results in a longer duration of illness and early onset of disease as well as a high rate of hospitalization [36]. The quality of life was lower in BD patients physically, mentally, ecologically, and socially compared with non-smokers. In addition, a number of studies have demonstrated that patients with BD have a higher suicide rate than the general population [37]. Although tobacco use is a strong predictor of suicidal behavior after a major depressive episode in BD, it is not definitely the reason that smokers with BD are potentially more likely to attempt suicide attempts; however, it is possible the aggression and impulsive features may cause particular people with BD to display suicidal behavior [36, 37]. Despite the evidence, tobacco use can be independently related to suicidal behavior in BD patients. There is no full understanding of the relationship between smoking individuals with BD and suicide attempts [36].

The relationship between smoking and BD is complex and multifactorial, potentially resulting from biological interaction, genetic and environmental factors. In addition, the association between smoking and BD can be regarded as bidirectional [35]. Therefore, a possible explanation for the high prevalence of smoking in BD patients is that the clinical symptoms of bipolar disorder increase the risk of early initiation and continuation of smoking. The link between smoking and BD may relate to the reduction of serotonin levels in the brain, which results in impulsive and novelty-seeking behavior; similarly, maintenance and recurrence of addictive behavior have been associated with dopamine and glutamine dysfunction [35, 36]. For example, releases of neurotransmitters in the brain have implicated the pathophysiology of BD and are also considered to play a significant role in nicotine dependence [38]. Moreover, tobacco smoking inhibits monoamine oxidase, which is a potential therapeutic effect

of smoking because it enhances the function of neurotransmitters which improves mood and induces feelings of pleasure [35, 36].

In terms of pharmacological impact, smoking harms medication for mental disorders, including schizophrenia, bipolar disorder, and major depression. Consequently, smoking increases the metabolism of many antipsychotic medications through action on cytochrome P450, particularly the CYP1A2 enzyme [35, 36, 38]. This enzyme lowers the concentration of psychotropic medications, including olanzapine, clozapine, haloperidol, and fluvoxamine [35, 39]. Tobacco smoking may reduce the therapeutic benefit of these medications; hence smokers with BD may require an increased dose of these medications to achieve a given level of symptomatic relief [32, 35, 36]. Nevertheless, the side effect of smoking in people who live with BD is considerable, but the negative effect of smoking on such individuals is entirely preventable.

3.3 Depression

Depression is a common mental health disorder that presents with a wide variety of symptoms, including feeling sadness, loss of pleasure, feeling guilty, fatigue, poor concentration, and difficulty sleeping or oversleeping [40, 41]. Numerous studies have shown a positive relationship between smoking and depression, where smoking seems to increase the severity of the illness [39]. Despite the robust empirical association between smoking and depression, the actual nature of this link is not widely understood. However, the relationship between depression and tobacco smoking is considered to be bidirectional, in which depression may either cause people to smoke or smoking may lead to an increased risk of developing depression [42, 43]. For instance, some studies have also reported that depression is associated with early-onset smoking, while others have suggested that smoking may contribute to the progression of depressive symptoms [6, 22, 43]. In addition, people suffering from depression may smoke excessively and have a low smoking cessation rate relative to the general population [22, 39]. Despite the incentive for people with depression to quit smoking, they are more likely to return to smoking than the general population [44]. Therefore, it is essential to understand the relationship between smoking and depression and to examine the underlying mechanisms of high smoking rates in patients with depression.

There are a number of hypotheses that have been suggested to describe the high rates of smoking in patients with depression and the reason for continuing to do so, as well as a low rate of successful cessation. The self-medication hypothesis states that people with depression smoke to alleviate their symptoms, thus it is reported that symptoms of this condition may lead to increase smoking [39, 44]. Because nicotine may reduce the symptoms of depression in the short-term, long-term nicotine abstinence can lead to the development of withdrawal symptoms such as a depressed mood [44]; similarly, nicotine addiction may be an important factor for the maintenance of mental balance and elucidate why depression may lead the patient to continue smoking for a long time to mitigate their symptoms [45]. Additionally, tobacco smoking tends to have a pharmacological effect on the brain which is similar to that of antidepressant medications, and also helps the person with depression to relax as a stimulant drug [45]. Importantly, the cognitive dysfunction associated with depression is similar to that noted during nicotine withdrawal; therefore, the depressed smoker is exposed to experiencing much greater cognitive impairment than withdrawal-induced impairment, which considers the overlap of cognitive dysfunction due to depression with the cognitive deficit caused by smoking cessation [46]. This means that patients with depression might well continue to smoke to avoid cognitive impairment.

4. Nicotine dependence and challenge of smoking cessation

Tobacco smoke contains more than 4000 distinct chemicals species, and nicotine is one of the thousands of chemicals present in tobacco which is considered to be mainly responsible for tobacco dependence [3, 47]. When smoking tobacco, nicotine rapidly diffuses onto the pulmonary veins and enters arterial circulation, where it moves quickly from the lungs to the brain [47]. In the brain, nicotine interaction with the nicotine acetylcholine receptor (nAChRs) triggers the release of different neurotransmitters, particularly dopamine in the mesolimbic system [48]. This pathway is believed to be crucial to the development of nicotine dependence and other drugs of abuse because stimulation of dopamine induces feelings of pleasure, reward, and positive reinforcement [47, 48]. Such effects begin nicotine-seeking behavior that can cause continuous repetition of nicotine exposure for a long time, resulting in tolerance of some pharmacological effects due to upregulation of the nicotine acetylcholine receptor [3]. Another function of nicotine is to reinforce the release of glutamine from the amygdala, which enhances the release of dopamine, and GABA release, which inhibits dopamine release; hence some nAChRs become desensitized

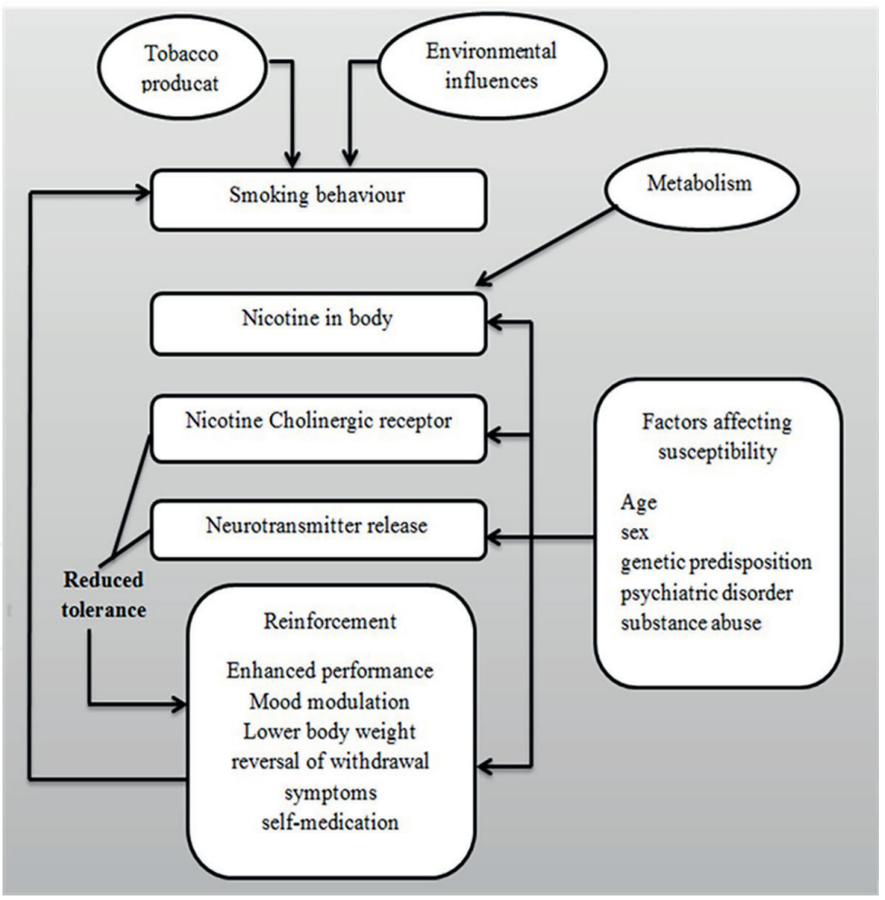

Figure 2.
Nicotine addiction. Nicotine binds nAChRs, activating to release neurotransmitters producing psychoactive effects that are rewarding. Repeated exposure with nicotine results in tolerance in the effect of nicotine, therefore, decreasing its primary reinforcement and inducing physical dependence. Smoking habit is affected by pharmacologic feedback, environmental facators, including smoking cues, friends who smoke, stress, and product advertising. The level of nicotine in the body associated with a particular level of nicotine intake from smoking is regulated by the rate of nicotine metabolism, which occurs in the liver by the enzyme of CYP2A6. Other factors that influence smoking behavior, include age, sex, genetics, mental illness, and substance abuse.

after long term exposure to nicotine because GABA diminishes their inhibitory effect on dopamine while glutamine activation persists (**Figure 2**) [47, 48]. Thereby, this increases the activation of dopaminergic neurons and enhances the addictive effect associated with nicotine.

Although nicotine is the major psychoactive substance in tobacco use, other chemicals in tobacco constituents, such as the MAO enzyme tend to play a significant role in facilitating and potentiating the rewarding action of nicotine [22]. The MAO enzymes, which inhibit the degradation of dopamine, serotonin, and norepinephrine. Evidence suggests that MAO inhibition plays a significant role in addiction to smoking by enhancing dopamine levels [47, 48]. Moreover, neuroadaptation is a consequence of repeated exposure to nicotine that can lead to the desensitization of nAChRs. The amount of tobacco use also results in almost complete saturation or desensitization of nicotine cholinergic receptors [47]. Therefore, smokers need to maintain a desensitized state to avoid withdrawal symptoms such as anxiety, stress, irritability, loss of motivation, dysphoria, and motivational pain [47, 48]. These negative symptoms and lack of MAO are powerful incentives to relapse; however, nicotine dependence is a combination of different factors, including positive reinforcement and avoidance of negative symptoms [48].

5. Methods of treating tobacco use

People with mental illness experience a high prevalence of smoking and they require intervention in their use of tobacco as part of their psychiatric treatment. However, mental health providers have failed to tackle smoking among people with mental health issues because they have previously believed that such patients will not be able to successfully quit smoking. Because there is little evidence on the effectiveness of these interventions to help people with mental illness quit smoking, which is further exacerbated by people with mental health issues being difficult to recruit or retain in clinical trials [6]. Regarding international guidelines of smoking cessation, there are two strategies, supported by strong evidence that comprise pharmacological intervention and behavioral support, that are effective for smokers in the general population [49]. Nevertheless, recent guidelines for a smoker with mental health problems suggest that combination treatment and prolongation of the therapeutic approach may reduce the relapse rate and withdrawal symptoms and it is possible to be effective in people with mental illness [22]. Thereby, cessation intervention with mentally ill patients is considered a combination of pharmacological treatment and behavioral counseling.

5.1 Pharmacological treatments

Pharmacological interventions are recommended for all smokers trying to stop smoking unless they are contraindicated such as during pregnancy. A medication approved for smoking cessation can be classified as one of two groups: the first-line treatment is nicotine replacement therapy (NRT), bupropion, and varenicline, which are safe and effective and have been approved by the US Food and Drug Administration for the treatment of tobacco addiction; and the second line medication is nortriptyline and clonidine though there is only weak evidence for the associated efficacy and safety [22, 50]. NRT has different forms, including the nicotine patch, gum, inhaler, nasal spray, lozenge, and others; however, all forms of NRT

reduce plasma nicotine concentrations as well as decrease the behavioral reinforcement impact of smoking [11]. Additionally, a single NRT can increase the rate of smoking cessation; for instance, the transdermal patch delivers continuous protection against cravings, whilst the oral forms such as mouth spray, inhalator, and oral strips provide faster relief for cravings [12]. Therefore, the combination of the patch and oral forms of NRT is substantially more effective than the patch alone, and also the combination of slower and longer-acting forms of NRT are more effective than a single form, which are more helpful for smoking cessation, particularly people with mental illnesses. Thereby, the effectiveness of NRT in patients with mental illness is requiring a higher dose and longer duration with more intensive behavioral support [6]. These medications work by alleviating craving and nicotine withdrawal symptoms; hence a patient with a mental disorder should be offered this intervention as with the general population, though with additional close monitoring [12].

Furthermore, bupropion blocks dopamine and minimal norepinephrine reuptake as well as has a degree of nicotine receptor blocking activity [11]. Many clinical trials have demonstrated the effectiveness of bupropion for smoking treatment compared to a placebo; likewise, the Cochrane review also indicated the efficacy of bupropion for individuals who smoke who have schizophrenia, despite the presence of adverse effects such as headache, dry mouth, and insomnia [6, 11, 50]. However, the combination of NRT and bupropion is more effective for the treatment of smoking in patients with schizophrenia, but the abstinence rate was not substantially higher than the rate produced by bupropion alone in patients with depression [6, 22]. Varenicline is a partial nicotine receptor agonist whose 2008 guidelines recommended it as a first-line treatment. It has been reported to enhance the odds of long-term abstinence by about three-fold compared to a placebo [3, 49]. Varenicline works to decrease craving from negative symptoms of nicotine addiction as well as minimize the pleasure of smoking [14]. Although very few studies have evaluated the use of varenicline for smokers with depression, recent evidence has compared the efficacy and safety of varenicline with that of NRT among individuals with mental illness. This indicates that varenicline is more effective for patients with mental illness, resulting in fewer symptoms or worsening a depressed mood in comparison to NRT [22]. However, a further study of varenicline administration in people with mental health problems is required, therefore due to the presence of side effects, it is essential to use it carefully as well as closely monitor use [6, 49].

5.2 Counselling approach

This approach is a self-help program involving telephone counseling or intensive Cognitive Behavioral Therapy (CBT), which is designed to enhance motivation and increase willingness to quit smoking, manage negative symptoms as well as prevent relapse in smoking [49]. However, CBT integrates cognitive therapy, behavioral therapy, and motivational therapy. This approach is a behavioral skill that includes support to deal with the embedded smoking habit that may be delivered by a therapist or trained health care specialist [11, 49]. The pharmacological treatment acts primarily to prevent withdrawal symptoms without affecting the positive symptoms and pleasure effect of smoking, and thus behavioral support should aid smokers to deal with the condition [50]. There is also a strong positive relationship between counseling and the extent of abstinence from smoking; similarly, the combination of CBT and medication are important to enhance the outcome of smoking cessation [49, 50].

6. Prevention and public health

Various factors influence the uptake of smoking at the population level as well as individual. Therefore, it is important to set preventive strategies to control the harm of smoking on a public level as well as an individual because the motivation of people to quit smoking is different from smokers with mental illnesses. Public health strategies for decreasing smoking among people with mental illness should start to integrate population-based strategies to lower the onset of smoking because most tobacco users initiate smoking at younger ages [51]. Many of these tobacco control strategies at the population level may contribute to smoking prevention at a national level as well as a particular population or individual level [6, 51]. Although serviced-based smoking cessation tends to be ineffective for a high rate of people with mental illness due to lack of contact with the service, the effort to improve smoking cessation in patients with mental illness is significant [8]. However, population-based strategies are successful for smoking control, including, smoking-free policy, media campaigns, age, smoking prevalence among friends, the price of tobacco, and others.

6.1 Smoking free policy

Despite the possible barriers to delivering a smoking-free policy in mental health patients, it is considered to have strong evidence for decreasing the early onset of smoking in adolescence, enhancing smoking cessation, lowering the harmful of secondhand smoking as well as reducing smoking-related morbidity and mortality [52]. Thus, psychiatric departments have implemented as they increasingly accepted smoking bans, although these policies appear to have no clear impact on behavioral indicators or compliance; furthermore, it has had little effect on smoking cessation [51]. Nevertheless, the smoke-free policy is required to be implemented as part of public programs that support smoking cessation interventions. Additionally, it is essential to approve smoking-free legislation to attain a high level of compliance, to enhance air quality and reduce secondhand smoke as well as improve health outcomes [6]. This legislation may also alter smoking behavior, increase the attempts of smoking cessation and contribute a long-term effect on smoking prevalence [6].

6.2 Media campaign

This is an important component of the comprehensive smoking control program, including a mass media education campaign, expanding healthcare coverage of smoking treatment, increasing the risk of smoking in the general population and particularly people with mental health issues [52]. Many pieces of evidence have shown that media campaigns are an effective way of improving smoking cessation and decreasing smoking prevalence; moreover, media campaigns of anti-smoking have revealed an effective reduction in tobacco use among the general population [6, 51]. Recently, the UK government has invested in an anti-smoking campaign focused on the health risk of smoking and the hazard of passive smoking because tobacco industries and pubic-related activities are a source of misinformation [6, 15]. Therefore, governments are responsible for informing the public about the health risk of smoking and providing the right information about abstinence from smoking; similarly, the governments have a key role in the delivering of smoking prevention in relation to morbidity and mortality and implement a campaign focusing on the younger generation [15, 51].

An effective media campaign also promotes smoking cessation, reduces smoking prevalence, and supports policies of tobacco control programs.

6.3 Increase tobacco taxation

Taxation of tobacco products is an effective way for smoking cessation and it also has been demonstrated to have an impact on behavioral smoking in the general population [51]. Tax increase on tobacco has induced the desired effect to deter adolescents from initiating to smoke and to encourage smokers to quit [52]; likewise, the efficacy of tobacco taxation depends on the accessible income of smokers, hence the tax increase might have a substantial effect on smoking people with mental illness [15]. Furthermore, tax increase tends to raise the price of tobacco resulting in reducing short-term tobacco use as well as decreasing smoking-related inequalities. Tobacco taxation is more likely to be effective in influencing the behavior of people with mental health issues [6].

7. Conclusion

Patients with mental illnesses are more associated with high rates of smoking than the general population and are the main consumers of tobacco products. People with mental health conditions smoke substantially and thus they are more at risk of smoking-related morbidity and mortality. However, some hypotheses illustrate the relationship between smoking and mental health, and underlying factors driving the high prevalence of smoking in this group, including self-medications, shared genetic vulnerability in smoking. And also smoking may play role in the development of mental illness because smoking has an elevating effect on negative symptoms. Moreover, nicotine addiction appears when smokers depend on the effect of smoking to improve mood and mitigate withdrawal symptoms. Despite the benefit of smoking in mental health patients, smoking tends to harm patients' physical and mental health. Therefore, it is important to examine the underlying mechanism in order to understand the link between smoking and mental illness. It is also crucial to encourage smoking cessation because it can lead to significant improvement in mental health and physical health. Smoking intervention that combines pharmacological and behavioral support is more effective in the general population in comparison to people with mental health conditions. It is also essential to develop a program that promotes a healthy lifestyle as well as improves mental health among people with mental illnesses. Nevertheless, further research is required to examine the effectiveness of smoking treatment in a patient with a mental disorder.

Conflict of interest

There is no conflict of interest in this chapter book.

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