

Smoking Cessation a Challenge for Chronic Smokers

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ABSTRACT

This article is on smoking cessation a challenge for chronic smokers. Smoking cessation is the process of discontinuing tobacco smoking. Tobacco smoke contains nicotine, which is addictive and can cause dependence. Nicotine withdrawal often makes the process of quitting difficult. Tobacco smoke contains a deadly mix of more than 7,000 chemicals; hundreds are harmful, and about 70 can cause cancer. Smoking increases the risk for serious health problems, many diseases, and death. People who stop smoking greatly reduce their risk for disease and early death. Although the health benefits are greater for people who stop at earlier ages, there are benefits at any age. You are never too old to quit. There are effective treatments that support tobacco cessation, including both behavioral therapies and FDA-approved medications. FDA-approved pharmacotherapies include various forms of nicotine replacement therapy as well as bupropion and varenicline. The number of people killed each year by tobacco will double over the next few decades unless urgent action is taken. But just as the epidemic of tobacco-caused disease is manmade, people acting through their governments and civil society can reverse the epidemic. Ethnically tailored smoking cessation services are needed for this group of smokers. Training of traditional healers to identify and offer ethnically tailored smoking cessation services may be considered.

Keywords: Smoking, cessation, chronic, smokers.

INTRODUCTION

Smoking cessation is the process of discontinuing tobacco smoking. Tobacco smoke contains nicotine, which is addictive and can cause dependence. Nicotine withdrawal often makes the process of quitting difficult. About 70% of smokers in the world would like to quit smoking, and 50% report having made an attempt to do so in the past year. Smoking is the leading preventable cause of death worldwide. Tobacco cessation significantly reduces the risk of dying from tobacco-related diseases such as coronary heart disease, chronic obstructive pulmonary disease (COPD), and lung cancer. Due to its link to many chronic diseases, cigarette smoking has been restricted in many public areas.

Many strategies can be used for smoking cessation, including abruptly quitting without assistance ("cold turkey"), cutting down then quitting, behavioral counseling, and medications such as bupropion, cytisine, nicotine replacement

therapy, or varenicline. Most smokers who try to quit do so without assistance [1] [2] [3]. However, only 3-6% of quit attempts without assistance are successful long-term. Behavioral counseling and medications each increase the rate of successfully quitting smoking, and a combination of behavioral counseling with a medication such as bupropion is more effective than either intervention alone. A meta-analysis from 2018, conducted on 61 randomized controlled trials, showed among people who quit smoking with a cessation medication (and some behavioral help), approximately 20% were still quit a year later, as compared to 12% who did not take medication. In nicotine-dependent smokers, quitting smoking can lead to symptoms of nicotine withdrawal such as nicotine cravings, anxiety, irritability, depression, and weight gain: 2298 Professional smoking cessation support methods generally attempt to address

nicotine withdrawal symptoms to help the person break free of nicotine addiction [4].

Caffeine, nicotine and ethyl alcohol are the three most widely consumed psychoactive agents in the world. Tobacco, particularly cigarette smoking, has long been recognized as a health threat. Since 1964 successive Surgeon Generals have warned the general public about the dangers of smoking [5]. Nonetheless, tobacco use remains the leading cause of preventable death in the United States, accounting for 430,000 deaths annually. Smoking mortality is a composite of the four leading causes of death: heart disease, cancer, cerebrovascular disease and chronic obstructive pulmonary disease. Tobacco use is estimated to cause 35% of all cancers, 33% of all heart attacks and strokes, and 90% of chronic obstructive pulmonary disease, including emphysema. Smokers who do not quit by age 35 have a 50% chance of dying from a tobacco-related disease. Their life expectancy is 8 years less than those who have never smoked [6] [7]. Annually, tobacco usage is estimated to cost \$53 to \$73 billion in medical costs, plus an additional \$47 billion in lost productivity.⁴The burden on the public through Medicaid and Medicare expenditures varies considerably from state to state, the totals range from \$13 to \$14 billion.

In 1965, 42.4% of all adults (50.1 million) reported that they were currently smokers, and another 13.6% (16.0 million) reported that they were former smokers. By 1997, 24.7% of adults (48.0 million) were current smokers and 23% were former smokers. Among current smokers in 1997, 41% had stopped smoking for at least 1 day in the preceding year and 70% of all smokers wanted to quit [8]. However, during the 1990s evidence suggested that the rate of decline in smoking had waned. There is some indication that an increasing number of users (60% of all smokers in California) smoke less than 15 cigarettes per day, a 9% increase in the number of "light" smokers between 1996 and 1999. The national prevention agenda set by the

United States Department of Health and Human Services is to achieve a 12% adult smoking prevalence rate and a 75% quit rate by the year 2010 [9].

Smoking intervention programs have been shown to be cost-effective with approximately \$3 saved for every \$1 spent in preventive measures. The addictive nature of nicotine makes tobacco cessation difficult. Long-term tobacco use is maintained by addiction to nicotine. Prolonged use of tobacco products (cigarettes, cigars, pipes, or smokeless tobacco) has now been shown to be associated with increased incidence of stomach cancer. Nicotine (a nicotine metabolite) causes aberrant protein glycation (advanced glycation end-products) that are implicated in diabetes, cancer and Alzheimer's disease. Nicotine may also catalyze the covalent modification of commonly prescribed steroids, such as cortisone and prednisone [10].

While it has been shown that a reduction in exposure of nonsmokers to environmental tobacco smoke may have significant health benefits, reducing the number of cigarettes smoked does not provide any health benefit directly to the smoker. In a study of 19,732 patients, smoking reduction yielded no decrease in mortality from tobacco-related disease. The only known way to reduce cancer risk in smokers is complete cessation, which results in a 35% lower risk of death due to tobacco-related illness and a 64% reduced risk of tobacco-related cancer. The only benefit to the smoker in reducing the number of cigarettes smoked may be greater ease in quitting [11]. In the cohort of 13,415 smokers enrolled in the Community Intervention Trial (COMMIT) of the National Cancer Institute, 40% of those who smoked fewer than 15 cigarettes per day had stopped smoking after 5 years, as compared to, 21% who smoked 15 cigarettes or more.³⁰

Effective tobacco interventions are available but underutilized because nicotine is widely used and culturally accepted. Clinicians do not inquire about tobacco usage, do not use available interventions, are under time constraints and may not believe the effort of tobacco

cessation intervention is worth the benefit to the patient. United States medical schools inadequately teach tobacco intervention skills [12]. There is a lack of integration of tobacco dependence information throughout all four years of medical school curricula. There is also a lack of specific training in smokeless tobacco intervention, tobacco intervention training that addresses cultural issues, and long-term studies showing training is retained. Physician use of clinical practice guidelines is low in the United States [13]. The Public Health Service has issued updated smoking cessation guidelines for patients and physicians, healthcare administrators, insurers and purchasers. Successful guideline implementation is highly dependent on administrative supports from healthcare organizations and insurers.

This article summarizes the current smoking cessation guidelines that can serve as an effective framework for tobacco cessation intervention. Special considerations when treating smokeless tobacco users, cultural and ethnic minorities, adolescents, women, Medicaid recipients and users of multiple forms of tobacco are also presented [14].

Nicotine Dependence

- Most smokers become addicted to nicotine, a drug that is found naturally in tobacco
- More people in the United States are addicted to nicotine than to any other drug. Research suggests that nicotine may be as addictive as heroin, cocaine, or alcohol.
- Quitting smoking is hard and may require several attempts. People who stop smoking often start again because of withdrawal symptoms, stress, and weight gain.
- Nicotine withdrawal symptoms may include:
 - Feeling irritable, angry, or anxious
 - Having trouble thinking
 - Craving tobacco products
 - Feeling hungrier than usual

Health Benefits of Cessation

Tobacco smoke contains a deadly mix of more than 7,000 chemicals; hundreds are harmful, and about 70 can cause cancer. Smoking increases the risk for serious health problems, many diseases, and death [15]. People who stop smoking greatly reduce their risk for disease and early death. Although the health benefits are greater for people who stop at earlier ages, there are benefits at any age. You are never too old to quit.

Stopping smoking is associated with the following health benefits

- Lowered risk for lung cancer and many other types of cancer.
- Reduced risk for heart disease, stroke, and peripheral vascular disease (narrowing of the blood vessels outside your heart).
- Reduced heart disease risk within 1 to 2 years of quitting.
- Reduced respiratory symptoms, such as coughing, wheezing, and shortness of breath. While these symptoms may not disappear, they do not continue to progress at the same rate among people who quit compared with those who continue to smoke.
- Reduced risk of developing some lung diseases (such as chronic obstructive pulmonary disease, also known as COPD, one of the leading causes of death in the United States).
- Reduced risk for infertility in women of childbearing age. Women who stop smoking during pregnancy also reduce their risk of having a low birth weight baby.

Ways of Smoking Cessation

Most former smokers quit without using one of the treatments that scientific research has shown can work. However, the following treatments are proven to be effective for smokers who want help to quit:

- Brief help by a doctor (such as when a doctor takes 10 minutes or less to give a patient advice and assistance about quitting)
- Individual, group, or telephone counseling
- Behavioral therapies (such as training in problem solving)

- Treatments with more person-to-person contact and more intensity (such as more or longer counseling sessions)
- Programs to deliver treatments using mobile phones

Medications for quitting that have been found to be effective include the following:

- Nicotine replacement products
 - Over-the-counter (nicotine patch [which is also available by prescription], gum, lozenge)
 - Prescription (nicotine patch, inhaler, nasal spray)
- Prescription non-nicotine medications: bupropion SR (Zyban), varenicline tartrate (Chantix)

Counseling and medication are both effective for treating tobacco dependence, and using them together is more effective than using either one alone.

- More information is needed about quitting for people who smoke cigarettes and also use other types of tobacco.

Treatments for tobacco dependence

There are effective treatments that support tobacco cessation, including both behavioral therapies and FDA-approved medications.

FDA-approved pharmacotherapies include various forms of nicotine replacement therapy as well as bupropion and varenicline. Research indicates that smokers who receive a combination of behavioral treatment and cessation medications quit at higher rates than those who receive minimal intervention. Interventions such as brief advice from a health care worker, telephone helplines, automated text messaging, and printed self-help materials can also facilitate smoking cessation [16]. Cessation interventions utilizing mobile devices and social media also show promise in boosting tobacco cessation [17]. It is important for cessation treatment to be as personalized as possible, as some people smoke to avoid negative effects of withdrawal while others are more driven by the rewarding aspects of smoking.

- **Behavioral Treatments**

Behavioral counseling is typically provided by specialists in smoking cessation for four to eight sessions.⁴⁰ Both in-person and telephone counseling have been found beneficial for patients who are also using cessation medications. A variety of approaches to smoking cessation counseling are available.

Cognitive Behavioral Therapy (CBT): CBT helps patients identify triggers the people, places, and things that spur behavior and teaches them relapse-prevention skills (e.g., relaxation techniques) and effective coping strategies to avoid smoking in the face of stressful situations and triggers. A study that compared CBT and basic health education observed that both interventions reduced nicotine dependence [18]. However, another study found that among smokers trying to quit with the nicotine replacement therapy (NRT) patch, patients who participated in six sessions of intensive group CBT had better quit rates than those who received six sessions of general health education.

Motivational Interviewing (MI): In MI, counselors help patients explore and resolve their ambivalence about quitting smoking and enhance their motivation to make healthy changes. MI is patient-focused and non confrontational, and providers point out discrepancies between patients' goals or values and their current behaviors. They adjust to patients' resistance to change and support self-efficacy and optimism. Studies of MI suggest that this intervention results in higher quit rates than brief advice to stop smoking or usual care [19].

Mindfulness: In mindfulness-based smoking cessation treatments, patients learn to increase awareness of and detachment from sensations, thoughts, and cravings that may lead to relapse. In this therapy, patients purposely attend to the thoughts that trigger cravings and urges for tobacco and cognitively reframe them as expected and tolerable. Patients learn techniques that help them tolerate negative emotions including stress and cravings without returning to tobacco use or other unhealthy behaviors.

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Telephone support and quitlines: As part of tobacco control efforts, all states offer toll-free telephone numbers (or quitlines) with smoking cessation counselors who provide information and support. Studies of quitline interventions indicate that smokers who call quitlines benefit from these services, particularly when a counselor calls them back for multiple sessions.

Text messaging, web-based services, and social media support: Technology, including mobile phones, internet, and social media platforms can be used to provide smoking cessation interventions. These technologies have the power to increase access to care by extending the work of counselors and overcoming the geographical barriers that may deter people from entering treatment.

A review of the literature on technology-based smoking cessation interventions (internet, personal computer, and mobile telephone) found that these supports can increase the likelihood of adults quitting, compared with no intervention or self-help information, and they can be a cost-effective adjunct to other treatments. A technology does not necessarily have to be recent or highly sophisticated to help boost cessation rates. For example, studies suggest that adults who receive encouragement, advice, and quitting tips via text-message a capability on even the most basic mobile devices show improved quit rates compared with control programs.

Among adult tobacco users who called a state quitline, most selected an integrated phone/web cessation program in favor of a web-only intervention. Participants who chose the web-only option tended to be younger and healthier smokers, with a higher socioeconomic status. These participants tended to interact intensely with the site once, but did not re-engage as much as those who opted for the phone/web combination. A review of internet-based smoking cessation programs for adults suggested that interactive internet-based interventions that are tailored to individual needs can help people quit for 6 months or longer. Future research should determine the effectiveness of different technologies for

smoking cessation support among populations that may be hard to reach, including those of low socioeconomic status and adults older than age 50.

Technology-based cessation interventions are particularly relevant to young adults aged 18 to 25 about 3.2 million of whom smoked daily in 2016. A systematic review and meta-analysis of published randomized trials of technology-based interventions—including computer programs, internet, telephone, and text messaging for smoking cessation among this population found that they increased abstinence by 1.5 times that of comparison subjects. Researchers recommend embedding cessation interventions in commonly used social networking platforms, and there has been some exploratory work in this area. Results of a trial with a relatively small number of participants suggested that Facebook was an accessible, low-cost platform for engaging young adults considering cessation. However, the study pointed to challenges in maintaining participation, retaining young people in the program, and the need for gender-specific features.¹⁸⁹ A randomized controlled trial has been designed to test a stage-based smoking cessation intervention on Facebook tailored for smokers aged 18 to 25. Participants will be recruited online, randomly assigned to a Facebook group according to their readiness to quit, and will receive tailored daily messages and weekly counseling. The study will assess the intervention's impact on abstinence from smoking 3, 6, and 12 months after treatment, number of cigarettes smoked, quit attempts lasting 24 hours or more, and commitment to abstinence.

- **Medications**

Nicotine Replacement Therapy (NRT): A variety of formulations of nicotine NRTs are available over the counter including the transdermal patch, spray, gum, and lozenges and are equally effective for cessation. NRTs stimulate the brain receptors targeted by nicotine, helping relieve nicotine withdrawal symptoms and cravings that lead to relapse [20]. Many people use NRT to help them get

through the early stages of cessation, and those with more severe nicotine addiction can benefit from longer-term treatment. Use of NRT improves smoking cessation outcomes, and adding behavioral therapies further increases quit rates.

Bupropion: Bupropion (immediate-release and extended-release) was originally approved as an antidepressant. It works by inhibiting the reuptake of the brain chemicals norepinephrine and dopamine as well as stimulating their release. Bupropion has been found to increase quit rates compared with placebo in both short- and long-term follow-up studies, and is indicated for smoking cessation. It is equally effective to NRT.

Varenicline: Varenicline helps reduce nicotine cravings by stimulating the alpha-4 beta-2 nicotinic receptor but to a lesser degree than nicotine. Varenicline boosts the odds of successfully quitting, compared with unassisted attempts. Varenicline increased the likelihood of quitting compared with placebo, and some studies find that it is more effective than single forms of NRT and bupropion. In a primary care setting, 44 percent of patients on varenicline, either alone or combined with counseling, were abstinent at the 2-year follow-up. Patients who participated in group therapy and adhered to the medication were more likely to remain abstinent. Research also suggests that this medication may be more effective than bupropion.

Medication combinations: Some studies suggest that combining NRT with other medications may facilitate cessation. For example, a meta-analysis found that a combination of varenicline and NRT (especially, providing a nicotine patch prior to cessation) was more effective than varenicline alone.

Other antidepressants: In addition to bupropion, some other antidepressant medications have also been found effective for smoking cessation, independent of their antidepressant effects, and are considered second-line treatments. A few small studies suggest that nortriptyline is equally effective as NRT. Although nortriptyline may have side effects in some patients, the small studies for its use in smoking cessation

have not reported any. Researchers have not observed any impact of selective serotonin reuptake inhibitors (SSRIs) (e.g., fluoxetine, paroxetine, and sertraline) on smoking, either alone or in combination with NRT.

Precision Medicine: Researchers have been examining ways to personalize treatment based on important individual biological differences, including genetic differences. The field of pharmacogenetics examines how genes influence therapeutic response to medications, providing critical information to help tailor pharmacotherapies to the individual for maximum benefit. For example, people metabolize nicotine at different rates because of variations in several genes. Individuals who metabolize nicotine quickly smoke more, show greater dependence, and have more difficulty quitting [21].

Promising medications and ongoing research: NIDA supports research to develop new and improve current treatment options for smoking cessation based on a growing understanding of the neurobiology of addiction. In the area of medications, research is focusing on the receptors targeted by nicotine and the brain circuits and regions known to influence nicotine consumption. 208 Newer brain targets including the orexin and glutamate signaling systems—have also shown promise for medication treatment.

- **Transcranial Magnetic Stimulation**

Transcranial magnetic stimulation (TMS) is a relatively new approach being tested to treat addiction. It is a physiological intervention that noninvasively stimulates neural activity in targeted areas of the brain using magnetic fields. Multiple TMS pulses given consecutively are referred to as repetitive TMS (rTMS) [22]. The FDA has approved two rTMS devices for depression treatment in adults. Research on rTMS as a treatment for smoking cessation is in early stages but has shown promise. Among adult smokers who had not been able to quit using other treatments, high-frequency TMS treatment

significantly reduced the number of cigarettes smoked. Combining high-frequency TMS with exposure to smoking cues improved effectiveness and boosted the overall abstinence rate to 44 percent at the end of the treatment. Six months

In conclusion, the number of people killed each year by tobacco will double over the next few decades unless urgent action is taken. But just as the epidemic of tobacco-caused disease is manmade, people acting through their governments and civil society can reverse the epidemic. Ethnically tailored smoking cessation services are needed for this group of smokers. Training of traditional healers to identify and offer ethnically tailored smoking cessation services may be considered. The deleterious effects of tobacco use are well known by both patients and clinicians. However, that knowledge does not presently translate effectively into patients quitting [2]. A concerted, office-wide effort that includes office nursing and receptionist staff must be made to identify, educate and treat patients who use tobacco. Proven, brief,

after treatment, 33 percent of participants remained abstinent from cigarettes. Future randomized controlled clinical trials with large numbers of patients will be needed to establish its efficacy for smoking cessation [23] [24].

CONCLUSION

repetitive, directed interventions tailored to the needs of the patient and behavioral stage, can increase successful cessation attempts. Pharmacotherapy is available to help patients struggling with nicotine addiction and dependence, and to give them tools to move through the behavioral stages. All healthcare providers are obliged to use these proven techniques to advocate for the patient's better health. Ultimately, systemwide changes are needed to fully achieve the goals of Healthy People 2010 [11]. Benefits stand to be gained not only by the tobacco user, but also non-users, health insurers, healthcare organizations and society as a whole. The clinician must play a front line role because. If tobacco cessation is not made a priority with every patient, who else will intervene for smokers.

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