

SPECIAL ARTICLE

Tobacco dependence treatment for special populations: challenges and opportunities

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Although smoking rates have declined in most of the countries in the world, there are population groups within these countries whose smoking rates remain significantly higher than the general population. These “forgotten groups” who have not been receiving the needed attention in tobacco control policies and tobacco cessation efforts include people with serious mental illness, substance use disorders, tuberculosis, people living with human immunodeficiency virus (HIV), lesbian-gay-bisexual-transgender-queer people, and pregnant women. A number of steps are needed at the national level in countries where these disparities exist, including modifications to national smoking cessation treatment guidelines that address the special needs of these populations, as well as targeted smoking cessation research, since these populations are often not included in clinical trials. Because of the higher smoking prevalence in these populations, as well as their lower smoking cessation treatment success rates than the general population, more resources are needed if we are to reduce health disparities in these vulnerable populations. Additionally, we believe that more effort should be focused on integrating smoking cessation treatment in the specialized care settings frequented by these subpopulations.

Keywords: Nicotine; smoking; HIV; tuberculosis; pregnancy

Introduction

Smoking rates have declined significantly in many developed countries over the past several decades, which has been accompanied by a decline in smoking-attributable mortality. Despite the successes of tobacco control efforts across the globe and the resulting decline in smoking rates, significant pockets of high smoking prevalence remain among certain population groups in virtually every country. These include people with serious and persisting mental illness (SMI), other substance use disorders (SUD), and other medical comorbidities such as human immunodeficiency virus (HIV) and tuberculosis (TB). These populations have consistently higher smoking rates than the general population,¹ have several shared vulnerabilities,² and are often more refractory to treatment.³ Continued smoking has important negative impacts on treatment of their primary disease and their prognosis for recovery,⁴

and special care is often needed for successful tobacco dependence treatment.⁵ These “forgotten groups” continue to smoke in significant numbers and experience significant health disparities because they have not been receiving the needed protection from tobacco control policies. Surprisingly, this is a global problem that affects even the most developed countries, which have well-implemented tobacco control policies.^{1,2,6}

There are several special populations who have higher smoking rates than the general population, and/or for whom access to tobacco dependence treatment may be limited, including people with SMI and/or SUD,^{7,8} TB,⁹ people living with HIV/acquired immunodeficiency syndrome (AIDS) (PLWHA),¹⁰ pregnant women,⁶ and lesbian-gay-bisexual-transgender-queer (LGBTQ) people.¹¹ It is estimated that 23% of TB cases in 22 high-burden TB countries are attributable to active smoking.¹² The prevalence of cigarette smoking among PLWHA is higher

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than in the general population across the surveyed countries, varying between 45-65%.^{13,14} The prevalence of tobacco use among LGBTQ ranges from 38-59% among young people and 11-50% among older adults, which is higher than rates in the heterosexual population.^{15,16} Unfortunately, in many of these special populations, smoking can play a negative role in the treatment of the primary medical or psychiatric disease. Smoking contributes to poor outcomes in many of these populations through several different mechanisms. Smoking has been associated with poor medication adherence and prognosis among PLWHA,¹⁶ and a study found that medication adherence was negatively influenced by smoking in an HIV-positive sample of men of color who have sex with men.⁴ The authors of this study point out that smoking prevention and treatment is one of the most important interventions that can be provided to PLWHA, especially among minorities. Smoking may also complicate treatment of many mental health disorders by reducing blood levels of neuroleptics, such as olanzapine, clozapine, haloperidol, chlorpromazine, and fluphenazine,¹⁷ making it likely that smokers will require higher doses to achieve a therapeutic effect, which exposes them to an increased risk of side effects from psychotherapeutic medications.¹⁸ In addition, the higher smoking rates of some subgroups contribute to elevated mortality rates and disability. In the recent Global Burden of Disease Study, 7.8% of the TB burden (deaths and disability-adjusted life years) was considered attributable to the independent effects of smoking.⁹ Premature mortality is also a consequence of continued tobacco use, as demonstrated in a U.S. study showing that people with SMI die 25 years younger than the general population, mainly due to cardiovascular disease and cancer caused by tobacco use.¹⁷

Unfortunately, even among special populations that have achieved some level of success, such as the significant decline of smoking among pregnant women found in a large Australian prospective study, the mechanisms involved in such declines have not been identified.¹⁹ Neither general population antismoking activities, nor a pregnancy-specific campaign appear to have had any effect on this decline.¹⁹ This suggests that public education and public health awareness-raising campaigns alone will not significantly impact smoking rates in many of these special populations.

Considering this challenging situation, we aim to discuss the importance of including special populations in tobacco control policy at global, national, and local levels. We will review barriers and opportunities for future interventions for each population, providing examples of innovative projects that have been carried out in different parts of the world.

Mental health and/or substance use disorders

The high smoking prevalence among individuals with SMI and SUD contributes to much higher rates of morbidity and premature mortality than among the general population.^{3,17} For instance, individuals with alcohol use disorders, schizophrenia, and severe depression have

high mortality rates due to oncological and cardiovascular diseases.^{17,20} Smoking also complicates treatment of some mental disorders due to interactions with psychiatric medications.^{17,21} In addition, progress toward developing tailored cessation interventions for people with SMI and SUD has been slow, in part because smokers with mental disorders are still excluded from most smoking cessation trials.^{22,23} However, a growing body of literature shows that smoking cessation treatment can help smokers with mental disorders quit, and that neither quitting smoking nor tobacco dependence treatment have adverse effects on important health outcomes, such as death or hospitalization.^{24,25} Evidence-based treatment of tobacco dependence for people with SMI and SUD should be integrated into ongoing psychiatric care and should include treatment with a combination of supportive counselling (motivational enhancement interventions) and pharmacotherapy.^{20,21}

Tobacco treatment is effective and retention rates are higher when patients with SMI and SUD are treated for tobacco dependence while they are undergoing psychiatric treatment.^{17,26,27} However, even when patients with these conditions receive integrated care for tobacco dependence, they appear to achieve lower cessation rates than smokers in the general population.^{17,20,26} Few studies have been designed to directly compare the success rates of smokers with and without SMI and SUD.⁷ The largest randomized controlled trial⁷ designed to make this comparison found that treatment with any of the approved medications (varenicline, bupropion, or nicotine replacement treatment) resulted in significantly lower quit rates for individuals with mental health disorders (not including SUD) than the general population.

Most published clinical trials of tobacco cessation treatment have excluded people with active mental health disorders and were implemented under ideal conditions,^{7,26} which may not accurately reflect achievable outcomes in real-world clinical practice.²⁰ Specialized mental health and addiction care units seem to be the ideal locations for implementing smoking cessation treatment for this special population.²¹ Generally, these units employ multidisciplinary teams of professionals specializing in mental health treatment^{20,21} (i.e., psychiatrists and psychologists). However, within mental health care units, the perception that smokers with SMI or SUD do not want to quit, or are unable to quit, is a major barrier to integrating tobacco dependence treatment into mental health treatment.^{22,27} Hence, understanding the impact of smoking cessation treatment in a real-world clinical setting, as well as determining the relative effectiveness of treatment among people with and without comorbid mental illness, should shed light on the extent to which the culture of mental health and substance use treatment centers affects cessation outcomes and may provide clues about how to overcome existing barriers.

Tuberculosis

TB and smoking are two colliding epidemics that independently pose a significant threat to global health.²⁸ The adverse effects of smoking on a wide range of health

conditions have been well documented.²⁹ There is consistent epidemiological evidence demonstrating the association between smoking and TB.³⁰ Active and passive exposure to tobacco smoke are significantly associated with TB infection, disease severity and resistance, recurrent TB and TB mortality.^{31,32} Almost a quarter of TB cases are attributable to active smoking in countries with a high TB burden.³³

The association between smoking and TB highlights the urgency of incorporating evidence-based tobacco control strategies into TB care to curb two of the world's most catastrophic epidemics. Such strategies can significantly improve TB treatment outcomes, decrease the likelihood of recurrent TB, and prevent one in five TB-related deaths.³⁴ The World Health Organization (WHO)/The Union monograph on TB and Tobacco Control recommends considering three main actions: i) providing tobacco dependence treatment to TB patients (including brief routine advice and pharmacotherapy); ii) implementing smoke-free environments in all inpatient and outpatient TB facilities, and iii) making managerial decisions to facilitate the integration of tobacco control measures into TB care.³⁵

The prevalence of TB and smoking is consistently higher in disadvantaged groups with low socioeconomic status in all regions worldwide.³⁶⁻³⁸ People with low socioeconomic status typically have more frequent contact with people with active disease, a higher likelihood of crowded, and poorly ventilated living and working conditions, greater food insecurity, lower levels of health awareness or less power to act on existing knowledge concerning healthy behavior, and less access to quality health care than those from higher socioeconomic groups.³⁸⁻⁴⁰ These underlying social determinants create substantial barriers to implementing smoking cessation interventions for TB patients.

TB healthcare providers are in a unique position to help smoking TB patients quit.³⁴ They embody various roles in tobacco control processes: they are role models for their TB patients, clinicians, educators, scientists, and opinion leaders.⁴¹ Patients undergoing TB treatment under the directly observed therapy short-course are typically in regular contact with their TB healthcare providers for a minimum of 6 months.³⁴ In every encounter with their patients, TB healthcare providers have a unique opportunity to deliver tobacco cessation interventions.³⁴ During TB treatment, patients assume a new role as a sick person and are more likely to be emotionally affected and attentive to information about actions that can improve their health. Therefore, the diagnosis of TB itself creates a teachable moment in which smoking cessation intervention can be initiated with patients and, when applied effectively, results in higher rates of continuous abstinence.⁴²

Combining TB and tobacco control efforts requires minimal resources: no complex training, additional equipment, or structural changes are required.⁴³ In fact, integrating smoking cessation services within TB care provides several benefits, including resource sharing, improved coverage of disadvantaged populations, and linkage between different programs within health systems.⁴³ Such joint interventions could serve as a model

for other smoking cessation interventions in other special population groups (i.e., PLWHA, SM/SUD).

People living with HIV/AIDS

Almost 1% of the world's population has HIV or AIDS. The prevalence of PLWHA differs across WHO regions, with the highest rate in Africa (4.1%).⁴⁴ In other countries, e.g., Poland, the prevalence is lower, but it may be underestimated due to reduced screening.⁴⁵ Modern highly active antiretroviral treatment (HAART) is effective and has few side effects, resulting in good quality of life for PLWHA and a life expectancy that is almost equal to that of the general population.⁴⁶ Comorbidities, including hepatitis C virus and hepatitis B virus coinfections, negatively affect PLWHA who are adhering to HAART, although noncommunicable diseases, including those related to tobacco smoking, are increasing.⁴⁷

Approximately half of PLWHA are smokers, a rate considerably higher than that of the general population.^{12,13} Tobacco use is a leading cause of premature mortality among PLWHA, leading to an average of 7 years of life lost,^{12,46,48} which virtually cancels the benefits of HAART. In addition, smoking may compromise the immune system of PLWHA, lower the effectiveness of HAART, and heighten the risk of cancer and cardiovascular disease in this population.⁴⁹ Providing tobacco dependence treatment for PLWHA would have significant clinical benefits by reducing premature disability and death.

Many challenges to effective tobacco dependence treatment among PLWHA are also common to other special populations. These include limited smoking cessation treatment expertise, limited access to effective smoking cessation pharmacotherapy, limited access to cessation programs, and other barriers faced by healthcare professionals in any setting.^{45,50,51} Some research also suggests that there is poor engagement with substance use treatment among PLWHA.⁵² Moreover, PLWHA tend to have greater nicotine addiction and codependencies, poorer mental health, and come from lower socioeconomic status or other vulnerable groups (e.g., LGBTQ),^{49,52} all of which may negatively affect cessation efforts. Indeed, there is limited evidence for the effectiveness of current cessation treatment among PLWHA, including tailored and more intensive programs. More research is needed to design appropriate cessation support for this group.⁴⁹

However, among PLWHA there are opportunities for cessation interventions. First, PLWHA express an interest in smoking cessation.⁵⁰ Second, PLWHA are often under long-term clinical observation and treatment, which involves regular contact with healthcare providers to assess treatment adherence and dispense medications. This can result in a lasting rapport between healthcare professionals and their patients, which can be leveraged to provide tobacco cessation interventions. Third, particularly in developed countries, adherence to HAART is relatively high (over 60%^{53,54}) and leads to good clinical outcomes, which means that regular visits with healthcare professionals no longer must focus solely on HIV/AIDS treatment, freeing up time for other interventions. Fourth,

a significant minority of PLWHA use other substances, and some may already be receiving treatment for addiction. Such patients, as well as their clinicians, may be familiar with the chronic disease model of addictions and treatment approaches, which also apply to tobacco dependence. Finally, while there are important differences across countries in the HIV/AIDS epidemic and treatment, there exist international treatment standards for PLWHA.⁵⁵ This provides opportunities for incrementally developing smoking cessation treatments that could be integrated with routine patient care in many contexts.

Pregnant women

Smoking among young women has significant detrimental effects on pregnancy outcomes and infant health.⁵⁶ Tobacco exposure has been associated with a lower conception rate, placenta previa, ectopic pregnancy, lower infant birth weight, and increased risk of adverse respiratory, cognitive, and behavioral outcomes.⁵⁷⁻⁵⁹ Unfortunately, recruiting pregnant women to smoking cessation programs is challenging.⁶⁰ Technically, there is a very short window of opportunity for treatment, and pharmaceutical support is seldom used.⁶¹ Pregnant women are ambivalent about continuing to smoke, since they are already aware of the risks to their baby and feel guilty about it, but they continue smoking to cope with this physically and emotionally challenging time.^{62,63}

There are several barriers to the recruitment of pregnant women to smoking cessation programs:

1. Obstetricians and other caregivers focus on the pregnancy itself, and use standard guidelines that do not emphasize smoking cessation as an important aspect of prenatal care.⁶⁴
2. Obstetrical caregivers often do not have the skills and experience required for the non-judgmental motivational treatment approaches used in smoking cessation.⁶⁵
3. The existing smoking cessation services are not designed to meet technical and emotional needs of this population.⁶⁰
4. Pharmaceutical support is underutilized due to lack of awareness and knowledge about the safety of smoking cessation medication during pregnancy.⁶⁶
5. Systematic identification of tobacco use status among pregnant women is often not part of routine obstetrical care.⁵⁶

The perinatal period creates an ideal opportunity for health behavior change.⁶⁷ Parents are extremely sensitive to the effects of their lifestyle and behavior on their child's health and actively seek out information and support.⁶⁷ In addition, interactions with healthcare staff increase significantly, and there are opportunities for creating a trusting relationship.⁶⁸ Since most are relatively young women, severe addiction is less established,⁶⁹ and cessation may be easier.

Smoking cessation programs should be tailored to meet the needs of pregnant women who smoke.⁷⁰ Information technology should be used to address smoking cessation barriers by routinely identifying tobacco use status during pregnancy care.⁷¹ In smoking cessation

programs, obstetricians, maternal health nurses, and maternal ultrasound technicians should be educated and empowered to actively recruit women to and support their decision to quit.⁷¹ Smoking cessation specialists should undergo tailored education to provide personalized cessation support (through face-to-face and telephone sessions) that is adapted to each woman's needs.⁷¹ In smoking cessation programs that have included such characteristics, the knowledge and self-efficacy of health care teams have significantly increased.⁷¹

Lesbian, gay, bisexual, transgender, and queer

The LGBTQ population is a diverse group of people defined by sexual orientation.⁷² LGBTQ people are often culturally, ethnically, and racially diverse and exhibit wide variations in other social demographics. One commonality among this group is social stigma and stressors such as homophobia, racism, and sexism,⁷³ which make them a vulnerable population.

Although the prevalence of tobacco use varies in the LGBTQ subpopulation (i.e., 38-59% among young people and 11-50% among older adults), it is generally twice that of heterosexuals.^{14,15,74} LGBTQ people are more likely to be depressed or lonely, to attempt suicide, and to be physically and verbally victimized, all factors that likely contribute to increased substance use.⁷⁵ The potential lack of support from parents, other family members and peers, feelings of isolation and loneliness, and anti-gay harassment or victimization are other reasons why smoking may be higher among this group. LGBTQ bars often provide a safe haven where these individuals can socialize without prejudice, but socializing in these locations increases exposure to smoking.⁷⁶ Tobacco use is encouraged among LGBTQ people through support from tobacco companies in the form of sponsorships and promotions.⁷³

In the general population, tobacco cessation is affected by individual factors, such as the perceived benefits and barriers, self-efficacy, motivation to quit, adherence to pharmacotherapy, and environmental factors.⁷⁷ However, the LGBTQ community faces unique challenges, which may further hinder cessation. These challenges, such as stress from discrimination and experiences of victimization, lack of deterrents to smoking, poor mental health, alcohol use, and inadequate access to quality health care services, often reinforce their higher smoking rates.^{76,78} In addition, the fear of revealing their sexual orientation to healthcare providers, previous poor experiences with health professionals, and the absence of health insurance coverage may create barriers to health services for these individuals.⁷⁹ Furthermore, few tobacco cessation services have been specifically tailored to the unique needs of the LGBTQ community.⁸⁰ In a scoping review to assess the current state of tobacco prevention and cessation interventions for LGBTQ people, Baskerville et al. found a lack of literature and evidence to guide smoking cessation programs for LGBTQ youth.⁷⁸ Matthews et al. highlighted the need for culturally-tailored cessation programs for LGBTQ people,⁷⁷ Lee et al.,⁸¹ however, suggested that since such programs often have limited access,

nontailored programs may be as beneficial to both LGBTQ people and heterosexuals, particularly in situations where only nontailored programs exist.

In developing approaches for the prevention and control of tobacco use among the LGBTQ community, a few key themes have been highlighted, which include the involvement of the target population in the design and implementation of interventions. In addition, programs should be supportive and interactive, address pertinent psychosocial and cultural factors, and use evidence-based pharmacotherapy in tobacco cessation.⁸²

Future research could improve outcomes by encouraging treatment attendance, promoting the use of effective smoking cessation pharmacotherapy and integrating smoking cessation treatments for LGBTQ people as part of routine clinical services.⁷⁶ There is definitely a need for more research on tobacco cessation interventions, especially among LGBTQ youth, since most studies have been conducted in adult LGBTQ populations, and their relevance cannot be assumed for other age groups.⁷⁸ More rigorous research, such as longitudinal and experimental studies is also needed, since most published studies are descriptive in nature. Evaluation of mass media campaigns, the use of SMS-based interventions (text messaging), cost-effectiveness studies, and implementation science are key areas that require additional research. In addition, further research is needed about the effect of policy-based interventions, such as smoke-free spaces and increased tobacco taxes, on the smoking behaviors of the LGBTQ population.

Discussion

Table 1 presents the main evidence regarding smoking behaviors and smoking cessation in special populations. Addressing smoking in special populations is a growing global challenge. Despite the marked decrease in daily smoking among the general population, some subgroups continue to have high smoking rates and experience a disparate adverse health burden due to smoking.^{3,12,28,52,74} Considering the special needs identified for each subpopulation, we call for the development of tailored interventions for special populations in tobacco control programs. Both prevention and intervention efforts are lacking. Unfortunately, such groups have been routinely left out of anti-smoking campaigns and the smoking cessation care network globally.^{20,21,43,52,66,70,78}

Where smoking cessation is concerned, even small modifications to traditional guidelines targeting the general population are welcome, especially for pregnant women and individuals with SMI and SUD.^{20,21,66,70} Special populations also require more targeted clinical research on smoking cessation, since most of these special population groups are systematically excluded from clinical trials.^{21,43,52,66,78} Among these populations, long-term smoking abstinence rates after cessation treatment are lower than those of the general population,^{20,21,43,52,66,70,78} indicating that more resources should be made available for such groups. Great efforts have been expended to integrate smoking cessation in primary care settings, but little effort has been given to integrate smoking cessation treatment in specialized care settings, where these underserved subpopulations obtain much of their health care.^{17,20,26,35,50,51,60,76,80} Efforts should also be made to build smoking cessation capacity among both specialized and primary healthcare providers to these special populations (i.e., infectious diseases specialists, obstetricians, and mental health providers).^{21,28,34,41,50,64,65,82}

The references included in the present study were based on the authors' scrutiny, rather than a systematic search. The majority of the authors are experts on smoking cessation in special populations and participated in the symposium on smoking cessation in special populations at the World Conference on Tobacco or Health in 2018. Despite not favoring a particular treatment or hypothesis, we recommend that readers balance the information we have presented with their personal experience and other studies.

Epidemiological studies investigating specific smoking behaviors (i.e., not only prevalence and level of dependence), adverse health outcomes due to smoking, and the effects of different tobacco control policies on special populations would be of special interest. Studies on tailored interventions and the integration of cessation treatment in specialized care settings are also needed. The inclusion of such special populations in randomized controlled trials, followed by sensitivity analysis for evaluating possible different outcomes, should be routinely supported by funding agencies.

In conclusion, due to the higher smoking prevalence in these populations, as well as the lower success rates of smoking cessation treatment compared with the general population, more resources are needed if we are to

Table 1 The main evidence on smoking behaviors and smoking cessation in special populations

MHSUD	TB	PLWHA	Pregnant	LGBTQ	Finding
X	X	X		X	Higher smoking prevalence than the general population
X	X	X	X		Disparate adverse health burden caused by smoking
X	X	X	X	X	The need for focused and tailored smoking cessation interventions
X	X	X		X	Routinely left out of anti-smoking campaigns
X	X	X	X	X	Routinely left out of the smoking cessation care
X			X		Small modifications to the traditional cessation guidelines are welcome
X	X	X	X		Systematically excluded from clinical trials
X	X	X		X	Lower smoking cessation rates than the general population
X	X	X	X	X	Need for integrating cessation treatment in specialized care settings

LGBTQ = Lesbian, gay, bisexual, transgender, and queer; MHSUD = mental health or substance use disorders; PLWHA = persons living with human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS); TB = tuberculosis.

reduce the health disparities that exist in these vulnerable populations. Additionally, we believe that more effort should be made to integrate smoking cessation treatment in the specialized care settings frequented by these subpopulations.

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