



Tobacco and COVID-19: a crisis within a crisis?

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Abstract

During the pandemic, the world's media have publicized preliminary findings suggesting that tobacco use is protective against COVID-19. An ad hoc multidisciplinary group was created to address the major public health implications of this messaging. Key messages of this commentary are as follows: 1) The COVID-19 crisis may increase tobacco consumption and decrease access to healthcare. As a result, smoking-related morbidity and mortality could increase in the coming months and years; 2) Smoking and tobacco-related diseases are prognostic factors for severe COVID-19; and 3) In theory, smokers may be at lower risk of COVID-19 infection because of having fewer social contacts. In conclusion, tobacco control is a greater challenge than ever in the context of the COVID-19 pandemic. Public decision-makers must be vigilant in ensuring that public health practices are consistent and compliant with the principles of the WHO Framework Convention on Tobacco Control. In addition, researchers and the media have a responsibility to be cautious in communicating preliminary results that may promote non-evidence-based research, self-destructive individual behaviours, and commercial agendas.

Résumé

Pendant la pandémie, des résultats préliminaires sur l'effet protecteur du tabac sur la COVID-19 ont été largement diffusés dans le monde entier. Dans ce contexte, et en raison des questions de santé publique liées à ce sujet, un groupe multidisciplinaire ad hoc a été créé en réponse aux demandes des institutions de santé publique. Les messages clés de ce commentaire sont les suivants : 1) La crise de la COVID-19 pourrait entraîner une augmentation de la consommation de tabac et une diminution de l'accès aux soins. En conséquence, la morbidité et la mortalité liées au tabagisme pourraient augmenter dans les mois et les années à venir; 2) Le tabagisme et les maladies liées au tabac sont des facteurs pronostiques de formes graves de la COVID-19; et 3) Hypothétiquement, les fumeurs, notamment en réduisant la fréquence et la durée des contacts sociaux, pourraient être moins susceptibles d'être contaminés. En conclusion, même pendant et malgré la crise sanitaire due à la pandémie de la COVID-19, la lutte contre le tabagisme reste plus que jamais un défi. Les décideurs publics doivent être particulièrement vigilants pour assurer la cohérence des pratiques publiques, y compris le respect des principes de la Convention-cadre de l'OMS pour la lutte antitabac. Il incombe également aux chercheurs et aux médias de communiquer avec prudence des résultats préliminaires susceptibles de générer des comportements individuels contre-productifs et d'être instrumentalisés à des fins commerciales.

Keywords Tobacco · COVID-19 · Health policy

Mots-clés Tabac · COVID-19 · politique de santé

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Introduction

The coronavirus disease-19 (COVID-19) pandemic has forced preventive medicine and lifestyle-related chronic health conditions to the background. In this context, tobacco use is a major concern. Tobacco use is one of the leading causes of avoidable morbidity and mortality worldwide. It resulted in 7.10 million deaths and 182 million disability-adjusted life years in 2017 (GBD 2017 Risk Factor Collaborators 2018). It is the most common substance-use disorder affecting the respiratory tract that is also targeted by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

This raises questions about the impact of the pandemic on tobacco consumption; the relationship between tobacco consumption, related chronic conditions, and the progression and severity of COVID-19 in patients infected with SARS-CoV-2; and the relationship between tobacco consumption and the risk of SARS-CoV-2 infection.

Impact of the pandemic on tobacco consumption and tobacco-related disease burden

The pandemic has increased the prevalence of stress and anxiety, both of which contribute to tobacco use (Fluharty et al. 2017). The unprecedented countermeasures ordered in response to the pandemic, particularly social distancing and lockdown, have had social and economic consequences (such as temporary or definitive unemployment) with additional negative effects. This raises the worrisome possibility of an increase in tobacco consumption and smoking relapses (Patwardhan 2020). In France, more than a quarter of smokers in the general population reported increased tobacco consumption during lockdown (Santé Publique France 2020). Similar trends were observed in the United States in the early stages of the pandemic (Knell et al. 2020). However, the pandemic may also have prompted some smokers to consider reducing or quitting tobacco use (Santé Publique France 2020; Klemperer et al. 2020).

This pandemic has also caused a crisis of access to usual care. Lockdown, the sudden divergence of healthcare resources to COVID-19, and fear of nosocomial and nosohusial infections have reduced the accessibility of usual care. Smoking cessation services are no exception. In France, lockdown has caused a dramatic decrease in pharmacy dispensations of reimbursed nicotine replacement therapy products (ANSM 2020).

We suggest that public health campaigns mounted during the pandemic should reference the importance of tobacco prevention and cessation. Healthcare providers should offer evidence-based pharmacological and behavioural smoking cessation therapies with remote support. Smokers' helplines should offer their services to all smokers, including those with symptomatic or asymptomatic COVID-19. Smoking is more

prevalent among less economically advantaged groups. Interventions should target these groups in particular, as they may be at higher risk for COVID-19 (Berlin et al. 2020).

The reduced accessibility of usual care also raises concerns about the treatment of acute or chronic health conditions associated with smoking. Emergency departments have reported fewer admissions and more delays in admissions for myocardial infarction and stroke (Metzler et al. 2020; Masroor 2020). We hypothesize that excess mortality and a possible increase in smoking-related morbidity and mortality could result from the postponement of essential healthcare for conditions unrelated to COVID-19.

Smoking is a prognostic factor for COVID-19

Among hospitalized patients, the risk of developing severe COVID-19 (as measured by admission to the intensive care unit and/or in-hospital death) is consistently higher among smokers. The largest meta-analysis to date included 47 studies with a total of 32,849 hospitalized COVID-19 patients (Reddy et al. 2020) and confirmed that current smokers had an increased risk of severe COVID-19 (risk ratio [RR]: 1.80; 95% confidence interval [CI]: 1.14–2.85; $p = 0.012$) and severe or critical COVID-19 (RR: 1.98; CI: 1.16–3.38; $p = 0.012$). A history of smoking was associated with severe COVID-19 (RR: 1.31; CI: 1.12–1.54; $p = 0.001$), severe or critical COVID-19 (RR: 1.35; CI: 1.19–1.53; $p < 0.0001$), in-hospital mortality (RR: 1.26; CI: 1.20–1.32; $p < 0.0001$), progression of COVID-19 (RR: 2.18; CI: 1.06–4.49; $p = 0.035$), and need for mechanical ventilation (RR: 1.20; CI: 1.01–1.42; $p = 0.043$).

These results are consistent with previous findings indicating a relationship between smoking and other respiratory infections (Arcavi and Benowitz 2004; Park et al. 2018; Nam et al. 2017; Qiu et al. 2017). Smoking is known to upregulate angiotensin-converting enzyme-2 receptors, which are potential targets of SARS-CoV-2 (Brake et al. 2020; Cai et al. 2020). This could contribute to the higher risk of severe COVID-19 in smokers.

Moreover, several tobacco-related chronic diseases increase the likelihood of severe COVID-19 regardless of current smoking status. This is the case for chronic obstructive pulmonary disease (COPD) (Zhao et al. 2020; Alqahtani et al. 2020), as well as for cardiovascular and cerebrovascular diseases (Pranata et al. 2020; Wang et al. 2020).

Is tobacco protective against SARS-CoV-2 infection?

Some studies have suggested that tobacco may be protective against SARS-CoV-2. The world's media outlets gave extensive coverage to these studies. Their findings are particularly

intriguing because smokers are generally at increased risk of infectious diseases, and could be expected to be at higher risk of COVID-19 because of repetitive hand-to-mouth movements and increased mask handling (Berlin et al. 2020).

The hypothesis of a protective effect of tobacco consumption emerged from hospital studies. Indeed, the prevalence of smoking among hospitalized patients was typically lower than the smoking prevalence in the general population of the regions included in these studies (Emami et al. 2020; Simons et al. 2020). However, several biases limit the validity of these studies:

1. Smoking status is generally poorly documented in hospital medical records (classification bias). A review of records from a US teaching hospital in 2016 found that only 2.9% of patients were documented as active smokers, but 36.4% were documented as “unknown” or found to have inconsistencies in records of their smoking status over time (Polubriaginof et al. 2017). Similarly, in a recent French hospital study on risk factors for COVID-19, a telephone call to outpatients to check their smoking status led to a three-fold increase in the recorded proportion of smokers (HCSP 2020). Just 3.2% were recorded as smokers in hospital records, whereas 11.1% of patients contacted by telephone reported themselves to be smokers (HCSP 2020).
2. Records on smoking status generally lack details on the level of tobacco use of current smokers and on the duration of abstinence of former smokers. None of the above studies verified smoking status biochemically. Moreover, individuals with severe COVID-19 symptoms may have stopped smoking prior to admission to a care facility and therefore may not have been recorded as current smokers (reverse causality bias) (Polubriaginof et al. 2017).
3. COVID-19 patients may differ from members of the general population by sex, age, area of residence, socio-economic status, and other known or unknown confounders.

Several other reports have found that being a smoker is associated with decreased odds of testing positive for SARS-CoV-2 (de Lusignan et al. 2020; Rentsch et al. 2020).

According to the most comprehensive review to date, which was limited to “good” and “fair” quality studies and included 45 studies with data on SARS-CoV-2 infection among people meeting local testing criteria (Polubriaginof et al. 2017), current smokers were at reduced risk of testing positive for SARS-CoV-2 compared with people who had never smoked (RR = 0.74, 95% CrI = 0.58–0.93, τ = 0.41, 95% CI = 0.24–0.64).

These observations could be affected by numerous biases, in addition to those already described for the hospital studies. Active smoking may affect nasopharyngeal viral load and

therefore alter RT-PCR test sensitivity (de Lusignan et al. 2020). In addition, smokers might be more likely to be tested than non-smokers if they have a chronic cough or other non-specific symptoms (de Lusignan et al. 2020).

Despite the methodological limitations of these observational studies, their results are intriguing and merit further investigation. There is a critical need for further research; specifically, for prospective, population-based studies using representative samples and validated and standardized methods of ascertaining smoking status. Population-based serological studies are most suitable for generating risk estimates that are not biased by differential use of the healthcare system by smokers and non-smokers. Collecting data on the use of e-cigarettes and nicotine replacement therapy would allow further exploration of the possible effect of nicotine.

In the absence of a conclusive explanation for the findings of the observational studies, several theories drawing on the pathophysiology of nicotine use have been proposed. Nicotinic acetylcholine receptors could play a key role in the pathophysiology of COVID-19 infection (Changeux et al. 2020), or nicotine could maintain or restore the function of the cholinergic anti-inflammatory system (Farsalinos et al. 2020). Nicotine is also known to downregulate ACE2 receptors (Oakes et al. 2018).

It is also possible that the heat associated with smoking reduces nasopharyngeal viral load and therefore risk of infection. A comparison between cigarette smoking and use of alternatives, such as e-cigarettes and smokeless tobacco, would be interesting.

Alternatively, it could be hypothesized that the studies’ results are not attributable to pathophysiological factors at all, but can, instead, be explained by differences in the behaviour of smokers and non-smokers. COVID-19 is a “contact disease” (hence, the social distancing measures). Previous studies have established several differences in the social contact patterns of smokers and non-smokers. Smokers and non-smokers are organized into clusters (i.e., there is more contact within these groups than between them), with anti-smoking measures increasing the distance between groups (Christakis and Fowler 2008). Smokers may have fewer social relationships than non-smokers (Moore et al. 2014). In addition, smoking bans and clean indoor air policies mean that smokers are probably less exposed to enclosed spaces, which appear to be the main source of COVID-19 infection (Setti et al. 2020).

Tobacco control policy in the context of the crisis

During the COVID-19 pandemic, tobacco control is a greater challenge than ever for health policy-makers, healthcare providers, and researchers. The recent success of many countries in combatting smoking (WHO 2000–2025) should not be

compromised by the current crisis. Public decision-makers must be particularly vigilant in ensuring that public health practices are consistent and compliant with the principles of the WHO Framework Convention on Tobacco Control. In some European countries, tobacco retailers were treated as “essential retailers” and excluded from general shutdowns (Hefler and Gartner 2020). In other countries, the tobacco industry has donated cash, personal protective equipment, and medical equipment through government officials (Global Center for Good Governance in Tobacco Control 2020). Researchers and the media have a responsibility to be cautious in communicating preliminary results that may promote non-evidence-based research, self-destructive individual behaviours, and commercial agendas.

Compliance with ethical standards

Conflict of interest We declare that FA, VNT, RG, AP, SQ, MS, PA have no conflicts of interest. IB declares having received occasional honoraria for presentations at meetings from Pfizer Ltd. in the last 3 years not related to this article.

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