MAYO CLINIC

Thank You for Not Smoking

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Proven public health measures to mitigate the spread of a pandemic infection include social/physical distancing, stay-at-home orders, travel restrictions, and isolation/quarantine of known cases. However, preventable risk reduction strategies may play an important role in containment as well as reduce serious morbidity and mortality rates. Whereas most of the confirmed cases of the pandemic severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or coronavirus disease 2019 (COVID-19) have asymptomatic or mild illness, up to one-quarter may develop severe disease or require intensive care unit (ICU) management, making the mitigation of risks of this infection to decrease both morbidity and mortality an emergent public health issue. The route of entry of COVID-19 is typically through the mucosal membranes (mouth, nose, and conjunctiva) where it enters the cells using angiotensin-converting enzyme II (ACE-2) receptors; and tobacco smoking is known to negatively impact both of these factors.[1]

Tobacco smoking leads to pulmonary inflammation and release of cytokines and tumor necrosis factor α, increases epithelial cell permeability, promotes mucus overproduction, and decreases mucociliary clearance. Taken together, these factors cause smokers to have more prolonged and severe respiratory infections compared with never-smokers. In addition, smokers and individuals with chronic lung diseases typically have upregulation of ACE-2 receptors in lower respiratory cells that may enhance both the likelihood of infection with SARS-CoV-2 and the severity of COVID-19 symptoms.

Current data suggest that smokers are much more likely to develop severe COVID-19 manifestations and adverse outcomes compared with nonsmokers, and also require ventilator support, ICU admission, and/or die due to disease progression. In the study by Guan et al[2], one-quarter of the patients who required ICU, ventilator support, or died were smokers compared with less than half of those alive not needing ICU or ventilator support. Moreover, among those who contracted a severe illness in this study, 16.9% were current smokers and 5.2% had previously smoked. Prior data have indicated that quitting smoking can have immediate short-term and long-term benefits; some benefits, for example, decreased cough and dyspnea, can start within 1 to 9 months of smoking cessation.

The study by Liu et al[3] involving 78 confirmed COVID-19 cases reported that patients with a history of cigarette smoking were 14.3 times more likely than non-smokers to show severe symptoms and develop pneumonia.[3] In the same cohort, the prevalence of non-recovery among smokers was 27.3%, compared with 3.0% with those without a smoking history.

Smoking patterns across China resonate with WHO reports of higher fatality rates among males relative to females (4.7% and 2.8%, respectively), as the estimated prevalence of smoking among Chinese men have been reported to be 48% relative to 3% among women.

Besides cigarette smoking, consistently vaping electronic cigarettes has also been reported to alter the risks of infection by decreasing the expression of immune genes responsible for regulating the neutrophil and macrophage activity within the nasal epithelial cells.[4] The suppression of intrinsic immune response pathways in the nasal cavity among those who regularly use vaping products may cause enhanced susceptibility to COVID-19, although the risk of acquiring SARS-CoV-2 infection with vaping has not been reported as of yet. Nicotine plays a role in regulating ACE-2 as the ACE-2

receptors that nicotine binds are the ones that SARS-CoV-2 also affects. Some studies have suggested that nicotine use would lead to worse COVID-19 outcomes and others speculate the opposite. Testing of nicotine replacement therapy as a potential treatment for COVID-19 is currently ongoing.

Smoking tobacco via the shisha or hookah is a tradition for social gatherings in settings that could also augment transmission of COVID-19 (social/physical interactions, pipe sharing, inadequate apparatus hygiene/sanitation, etc), leading to enhanced spread of COVID-19 infection. Evidence for the increased risk of coronavirus transmission among shisha smokers was previously shown in the Middle East respiratory syndrome − related coronavirus outbreak. Chronic shisha smoke is known to reinforce longer-lasting adversities on the intrinsic immune pathway as well.[5] Data comparing the effects of shisha smoking and cigarette smoking have shown that the reductions in mucociliary clearance rates were more pronounced in shisha smokers comparatively. Because shisha/hookah smoking is extremely prevalent in many Asian (particularly the Middle Eastern) and European countries, it poses a significant threat to the community efforts in containing the primary or secondary propagation of COVID-19.

Although it is well known that tobacco smoking is the most important preventable risk factor for invasive pneumonia and increases the risk of death with pneumonia, the global efforts from the health policy perspective have been relatively slow in providing firm recommendations for tobacco cessation during the COVID-19 crisis. Despite a ban on international travel, lockdowns, and social/physical distancing, the escalating number of confirmed COVID-19 cases and evolving trends of geographical spread are raising alarming concerns, and require more concerted health policy efforts at a local, regional, and international levels.

Therefore, we call upon the policymakers at the WHO and the World Trade Organization to produce urgent recommendations for enhanced tobacco control efforts at an international level. This also requires health policy changes from within the governmental sectors including warning their citizens of the enhanced risk of acquiring the infection, and increased serious morbidity and mortality with continued smoking among those who acquire COVID-19 infection. Combining these efforts with other proven tobacco control measures such as increasing the taxes associated with cigarette/shisha/hookah/waterpipe/electronic cigarette sales, banning indoor smoking, and plain package and graphic labelling will reduce the prevalence of smoking tobacco, and ultimately reduce the negative impacts of the COVID 19 pandemic.

Immediately regulating tobacco at a global level at this moment of the expanding pandemic is critical for minimizing the risk of COVID-19 transmission. The WHO already recommends the Framework Convention on Tobacco Control and Monitor, Protect, Offer, Warn, Enforce, Raise as part of a comprehensive tobacco control plan. WHO and partner nations have pledged to help more than 1 billion people quit tobacco to reduce the risk of COVID-19. All public health advocates should endeavor to execute these effective policies applied to all forms of tobacco use, encompassing shisha, cigarettes, and vaping as part of a multipronged effort to control COVID-19 transmission and halt the COVID-19 pandemic.

Lastly, we thank the readership of *Mayo Clinic Proceedings* for joining us in the war against the pandemic by NOT smoking, and by providing effective tobacco dependence treatment for patients, being a role model for the public, and getting the message of tobacco cessation across the globe!

CONCLUSION

In light of this, we believe that current smoking status is the most significant modifiable host factor associated with the progression of COVID-19 pneumonia. Greater efforts are needed to inform clinicians and the public that smoking cessation should be part of the overall plan to reduce the negative health impacts of COVID 19. Because both the infectivity and the mortality rate of COVID-19 is higher among smokers compared with

nonsmokers, strongly advising clinicians to provide effective tobacco cessation treatment is urgently needed.

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