

## SARS-CoV-2 Infection increases its effect in smoking.

Zaiba Firoz\*

Department of Biotechnology, Meerut Institute of Engineering and Technology, Meerut, India

Accepted January 26, 2021

### COMMENTARY

Smoking is thought to increase the risk of cardiovascular and respiratory illnesses, including infections, so susceptibility to serious illness from COVID-19 is expected to be linked to it. This is particularly valid now that a new coronavirus strain, the extreme acute respiratory syndrome coronavirus (SARS-CoV-2), has arisen and sparked the latest pandemic, coronavirus disease 2019 (COVID-19). While the effects of smoking on COVID-19 are less well known and controversial, we agree there is a connection between the two. SARS-CoV-2 uses the angiotensin-converting enzyme-2 (ACE-2) and transmembrane serine protease 2 (TMPRSS2) primary entry genes to infect cells and cause a cytokine storm, which has been shown to increase the severity of the COVID-19 clinical path. Nonetheless, the effect of smoking on the expression of the ACE-2 and TMPRSS2 receptors is perplexing. As a result, further research is needed to understand the connection between smoking and COVID-19, as well as to explore the advancement of new treatments that can reduce the morbidity and mortality caused by this infectious disease.

The emerging coronavirus disease (COVID-19) pandemic poses a major public health danger, posing an acute risk to the health of the global community and having far-reaching, long-term effects. When this latest virus progresses, new concerns about risk factors arise. One highly debated topic is the possible effects of smoking on SARS-CoV-2 infection rates and the clinical results of the resulting illness, COVID-19.

There is substantial evidence that cigarettes, as well as those exposed to secondhand smoke, are more vulnerable to viral and bacterial respiratory infections [1, 2, 3]. The World Health Organization (WHO) has also identified smokers' hand-to-mouth behavior, smoking-induced lung disease, and the exchange of tobacco products such as water pipes as factors that may increase a smoker's susceptibility to SARS-CoV-2 infection and COVID-19 growth [4].

Evidence is emerging that chronic illnesses, including respiratory and cardiovascular disease, are risk factors for poorer COVID-19 outcomes. Smoking leads to the development of certain long-term conditions, conversely, smoking can raise COVID-19 risks. Early in the pandemic, it was suggested that higher male mortality in China could represent and be explained in part by the gender difference in smoking prevalence. Nonetheless, cigarettes are not officially listed as a victim group in the UK Government's COVID-19 social distancing guidelines [4].

There may also be a particular process by which cigarette smoke may affect SARS-CoV-2 infection. Following the advent of the SARS-CoV in 2003, researchers found a viral binding site on the angiotensin-converting-enzyme 2 receptor (ACE2R), and it appears that SARS-CoV-2 not only uses ACE2R as its receptor, but can do so more readily than SARS-CoV [5].

There are many conflicting hypotheses about the impact of smoking on the level of ACE2 expression in human respiratory tract cells. Given the function of ACE2 in allowing viral entry into human cells, any alteration in ACE2 expression induced by cigarette smoke (and possibly other nicotine-containing products) could have consequences for an individual's susceptibility to infection [1,6].

An alternative hypothesis suggests in which the nicotinic acetylcholine receptor (nAChR) serves as a co-receptor for viral cell entry inside the respiratory tract and central nervous system. It has been proposed that nicotine can compete with SARS-CoV-2 for the (nAChR) binding site, resulting in a decrease in accessible viral adhesion sites.

Smoking appears to play a role in COVID-19, according to epidemiological data. Given the broader effects of tobacco regulation on population wellbeing and the healthcare sector, optimising policies affecting tobacco consumption across the pandemic is critical.

As a result, we set out to review the results of previous systematic studies and meta-analyses on the connection between smoking and the risk of contracting SARS-CoV-2 and developing serious outcomes once contaminated, with the aim of informing public health policy, with a special emphasis on the public health system.

### References

1. Lawrence H, Hunter A, Murray R, et al. Cigarette smoking and the occurrence of influenza-Systematic review. *J Infect.* 2019; 79(5):401-406.
2. Han L, Ran J, Mak Y W, et al. Smoking and Influenza-associated Morbidity and Mortality: A Systematic Review and Meta-analysis. *Epidemiology.* 2019; 30(3):405-417.
3. Wang X, Fang X, Cai Z, et al. Comorbid Chronic Diseases and Acute Organ Injuries Are Strongly Correlated with Disease Severity and Mortality among COVID-19 Patients: A Systemic Review and Meta-Analysis. *Research.* 2020.
4. Wang B, Li R, Lu Z, et al. Does comorbidity increase the risk of patients with COVID-19: evidence from meta-analysis. *Aging.* 2020; 12(7):6049-6057.
5. Cattaruzza MS, Zagà V, Gallus S, et al. Tobacco Smoking and COVID-19 pandemic: Old and New Issues. A Summary of the Evidence from the Scientific Literature. *Acta Biomed.* 2020; 91(2):106-112.
6. Vardavas CI, Nikitara K. COVID-19 and smoking: A systematic review of the evidence. *Tob Induc Dis.* 2020; 18:20.

### \*Correspondence to:

Zaiba firoz  
Department of Biotechnology  
Meerut Institute of Engineering and Technology  
E-mail: zaibafiroz999@gmail.com