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Relationship between COVID-19 and Smoking

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Abstract

The novel coronavirus has disrupted the normal life of each individual with masks becoming an integral part of life. Mostly every person is well informed about the precautions that need to be taken for the containment of the virus such as regular hand washing, wearing of masks in outdoors, social distancing, etc. Yet there has been little reference to the deleterious habit of smoking that can weigh heavily on one's health. This article aims to look into the connection and intricacies of smoking that may directly or indirectly affect the severity of the symptoms of COVID-19. Smoking is already a known etiologic factor for many cardiovascular and pulmonary diseases such as Chronic Obstructive Pulmonary Disease (COPD), coronary artery disease, carcinoma of the lungs, etc. While COVID-19 is a virus that causes respiratory distress in severe cases, not much is known or emphasized in the medical field of its possible relationship with smoking. Our information is limited to whether the presence of smoking history in infected patients worsens the condition or there is no relationship between smoking and COVID-19. Moreover, with the introduction of lockdown as a measure to contain the virus, it substantially increases the incidence of anxiety, depression and other mental health diseases which can contribute tremendously to the relapses of smoking or convert a non-smoker to a smoker. Hence, it is imperative to look into the possible relationship of Severe Acute Respiratory Syndrome-Corona Virus-2 (SARS-CoV-2) and smoking.

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INTRODUCTION

The outbreak of covid-19 have left people in chaos and have affected the lives of many due to the nationwide lockdown in India since 24/03/2020 issued by the MHA (Ministry of Home Affairs) Most people are concerned about the health of their parents that they can't see now, and all the other uncertainties around it (Patwardhan, 2020; Stubbs *et al.*, 2017). Staying at home, people listen to some real/fake news of all kinds. The feeling of helplessness will be intensified as there is no longer the normal comfort of expressing their fears, and life pressures with friends and family (As a result we should predict a dramatic rise in the stress rate in the community.

The pandemic is likely to have a negative effect on mental health. Chances of conditions like anxiety and depression getting worse and high stress and depression are considered to be predisposing factors for smoking and relapse.

Current scenario of smoking in India

People may have cut back on smoking because they are not permitted to smoke at their workplace (Patwardhan, 2020; Stubbs *et al.*, 2017). Ex-smokers may be present who effectively quit smoking by going to the gym. Others may have quit smoking by starting a new job. These and so many other forms, people may have used in transition towards a healthy lifestyle and suddenly all of these facilities are unavailable due to lockdown. Ironically, while there are people who are enjoying their free time from work with families during this lockdown, there are also people who are on their journey of quitting tobacco and smoking who can be helpless as the lockdown does not permit them to seek their counsellors physically and do the outdoor activities to counteract upon the cessation of smoking (Patwardhan, 2020; Stubbs *et al.*, 2017). Increasing chances of smoking relapse as well as higher smoking rates among current smokers will set back smoke-free goals by years, and probably decades. This is precisely what COVID-19 threatens to do. A strong message must be sent to all smokers, ex-smokers and their healthcare advisors: these are periods that are understandably difficult, but smoking is no answer. They need to alert patients of the possible temptation to smoke and provide solutions to remain smoke-free with all the cessation aids and services available. Ex-smokers can retain their hard-earned quit status is imperative and helping active smokers cut back to quit. (Gopalan and Misra, 2020) COVID-19 pandemic and challenges for socio-economic issues, healthcare and National Health Programs in India. Diabetes Metab. Syndr. 14, 757–759. Although the lockdown may uberly increase the level of stress and anxiety in the society, period can also be a blessing in disguise in quitting tobacco as the unavailability and cost of the product can substantially rise.

Mechanism of transmission of virus from smoking a factory packed cigarettes

Transmission of viruses when a cigarette from the packet is lit.

The smoker holds the packet with his left hand and takes the cigarette out with his bare fingertips (most commonly the right-hand thumb and index finger). Fingers are usually bare. Cigarettes are arranged with the filter up inside the packet, When the cigarette is removed, the fingertips reach and hold the filter (or the upper end of the cigarette in the case of unfiltered cigarettes), thus contaminating the filter with the fingertips. Soon after, the cigarette is handled briefly (sometimes with both hands) to ensure that there is enough space at the filter end for the lips to hold the cigarette, (Kampf *et al.*, 2020; Tindale *et al.*, 2020).

The cigarette comes in close contact with the lips at that point and at least one hand comes close to or in contact with the mouth (sometimes both hands). The fingers come into contact with lips or mouth area. Thus, contamination in these actions extends from fingertips of the entire cigarette sheet to the lips and the area around the mouth. (Kampf *et al.*, 2020). Around 20 times a day (given that there are 20 cigarettes per packet), a cigarette is pulled from the packet and lit for about 10 times (number of puffs for one cigarette) and about two-three seconds per puff, each cigarette comes in close contact with the contaminated filter and contaminated hands/fingertips also comes very close to the mouth during the smoking action (Tindale *et al.*, 2020). The contaminating power could indeed diminish somewhat from the first to the twentieth cigarette; however, viruses are likely to be transmitted to the lips and mouth 200 times a day (10 puffs x 20 cigarettes) (Kampf *et al.*, 2020).

Mechanism of transmission of virus from smoking a hand rolled cigarette

For a first move the smoker takes the cigarette-paper packet with lightly dirty fingers, opens it and pulls a small sheet out. In this practice, the contaminated hands, the cigarette-paper packet and the small sheet are likely to become contaminated. Then, the smoker positions the small contaminated sheet on a flat surface with contaminated fingertips (experienced smokers may also place the small sheet on the left hand instead), opens the filter packet with his / her right hand, select a filter and puts it carefully on the paper in the right position. In these actions, the filter packet and the chosen filter become contaminated. Next, the smoker takes the tobacco from the packet with dirty fingertips and arranges it loose on the paper near the filter, contaminating the tobacco packet, the tobacco inside and the tobacco cigarette (Kampf *et al.*, 2020; Tindale *et al.*, 2020). After that, the smoker raises everything from the flat surface to create a cylindrical cigarette shape and rolls it up with her / his contaminated hands. In these acts the outer side of the hand-rolled cigarette paper is more deeply contaminated than before, Last but not least, the smoker uses his tongue to gather the rolled cigarette paper to contaminate the smoker's tongue.

It should be remembered that, since both hands have to be bare, because of the amount of acts and because the tongue is used, rolling a cigarette has much more contaminating power than taking a cigarette out of a factory packet. With 10 puffs per cigarette and 20 cigarettes a day, a tainted, uninfected cigarette smoker will risk self-infection about 1220 times in the course of a two-month Covid-19 outbreak (Kampf *et al.*, 2020; Tindale *et al.*, 2020).

Particles can only follow a path toward the lungs entering through the mouth, the nose or the eyes.

The suggested avoidance of touching the eyes nose and mouth stems from the fact that the virus can only pass through the eyes, nose and mouth to the lung The higher the contaminate on load on the mouth, nose or eyes, the greater the risk of infection (Tindale *et al.*, 2020). However, the effect of contamination on the mouth, nose or eyes depends mostly on how many times we place our infected hands in the mouth, nose or eyes, and a smoker brings hands to the mouth far more frequently than a non-smoker does; About 200 times more a day (10 puffs a cigarette times 20 cigarettes a day) (Kampf *et al.*, 2020).

Transmission of virus from water pipe smoking

Usually when water pipe smoking is done majority of the time the users share a single mouthpiece and hose especially in social settings. In addition, the water pipe system itself (including the nozzle and compartment) could provide an environment that facilitates the survival outside the body of microorganisms (World Health Organization, 2020; WHO, 2020). After every smoking session, often these restaurants do not seem to clean the water pipe gear, including the water jar, since water pipe scrubbing and hoovering is stressful and time-consuming. These factors boost the capacity of users to pass on infectious diseases. In line with all of this, data proves that the use of water pipes is linked with an increased incidence of infectious agents dissemination, including respiratory viruses, hepatitis C viruses, Epstein Barr viruses, Herpes Simplex viruses, tuberculosis, Heliobacter pylori and Aspergillus (Yang *et al.*, 2020).

Social events also provide enough opportunities for the virus causing the spread of SARS-CoV-2. As all water pipe vaping is frequently a public interaction in gatherings and the use of water pipes boosts the transmission of infectious diseases, COVID-19 transmission in social gatherings could also be facilitated. If water pipes are used indoors, as is the case in many cases, the risk can be higher (World Health Organization, 2020).

General precautions should be taken in relation to MERS-CoV and SARS-CoV from prior experience, in particular at social gatherings. Water pipes can be a cause for social activities in areas which may increase the transmission of diseases. Information from other incidents triggered by viruses with the same category as SARS-Cov-2 indicates that tobacco smoking can directly or indirectly lead to increased risk of infection, poor prognosis and/or death for respiratory infectious diseases (Barnsley and Sohal, 2020; WHO, 2020).

Relation of smoking and covid-19

The influence of smoking in both the propagation of new mortality rates for SARS-CoV-2 was given inadequate attention. Smokers have far more respiratory symptoms than non-smokers. They are 34 per cent more likely than people who do not smoke to suffer from flu (Kampf *et al.*, 2020). It is also the fourth-largest death row in the world (Brake *et al.*, 2020).

The distinctive characteristic of coronaviruses is due to the existence of glycoproteins with trans membrane spikes (S) of large size 1 (Brake *et al.*, 2020; Leung *et al.*, 2020). This intensely glycosylated surface cell protein has two distinct functional domains (S1 and S2) (Brake *et al.*, 2020; Berlin *et al.*, 2020). The S1 domain contains the ACE-2 receptor which is responsible for the first step of host cell entry. The S2 facilitates the fusion of cell membrane with virus (Brake *et al.*, 2020). The Latest researches have shown that the modified S-protein of SARS-CoV-2 has a substantially greater ability to bind with ACE2 and therefore is Ten to Twenty times most likely to be connected to ACE2 in human cells than that of the prior SARS-CoV's (Zhao *et al.*, 2020). This enhanced binding can encourage the spread of the virus from one person to another (Berlin *et al.*, 2020). Recently, GuoshuaiCai reported higher expression of the ACE2 gene in smoker samples compared with people who do not smoke, observed that ACE2 is expressed specifically in pneumocytes of type 2 in which genes which regulate viral replication and transmission are expressed, which means smokers may be more vulnerable to Covid-19 infection (Guan *et al.*, 2020) patients with COPD and stable lung function smokers, Samuel James Brake et al. have reported enhanced ACE2 expression in resected lung tissue of the former and comparatively less in the latter (Guan *et al.*, 2020; Zhao *et al.*, 2020). The virus' attachment to ACE2 cell surface protects them from mechanisms of immune surveillance, leaving them attached to the host for longer periods, thereby making them an effective carrier and susceptible and also it was observed that smok-

ing and Covid-19 link to the ACE2 (Zhao *et al.*, 2020). The rise is shown in cigarette smoking also poses the question of if this also applies to persons participating in alternatives like e-cigarettes (Guan *et al.*, 2020). It's indeed important to remember that this type of product is no safer. These are in reality a psychoactive substance that produces smoke much like traditional cigarettes, and can therefore cause infectious lung harm. Smokers should be encouraged to leave as a vulnerable group and recommended to stay away from people where they may be exposed to SARS-Cov-2, especially those with asthma and other respiratory health problems. When a vaccine is produced, smokers can be given priority over vaccination, especially if they are found to be a crucial mode of exposure (Zhao *et al.*, 2020).

E-cigarettes

Bearing in mind the substantiation that e-cigarette use can be correlated with lung injury, and the recent connection to a lung injury epidemic in the United States, identified as 'e-cigarette or vaping product use associated with lung injury' (EVALI), SARS-Cov-2 may have ramifications for e-cigarette users. It is for the fact that COVID-19 virus hampers the respiratory tract. In addition, e-cigarette consumption depress immune and inflammatory genes like in cigarette thus, may entitle users of e-cigarettes to COVID-19 (Begh and Aveyard, 2020). The finger-to-mouth behaviour of e-cigarette users can indeed place them at an increased risk of becoming infected. Sharing e-cigarette apps would also likely increase the risk of transmission. Considering that certain nations are in house arrest and availability to e-cigarettes might well be restricted, particularly for young people, users sharing in these situations will be far more prevalent (Begh and Aveyard, 2020).

Clinical features of covid-19

Coronavirus is predominantly a respiratory tract disease characterized by severe acute respiratory syndrome (Vardavas and Nikitara, 2020). The key route of virus entry is through the mucosal tissues of the tonsil, larynx and pharynx and less often through the mucosa of conjunctiva (Vardavas and Nikitara, 2020). Exposure to tobacco smoke results in chemotaxis and inflammatory infiltration of lung processes and mucosa, production of inflammatory markers like cytokines, TNF-α, enhanced permittivity in epithelial cells, excess mucous development and disrupted mucociliary clearance (Vardavas and Nikitara, 2020). Awareness about host factors and smoking avoidance can be critical in minimizing viral infection & severity (Vardavas and Nikitara, 2020).

The systematic review by Vardavas and Nikitara identified 5 studies, concluding that "smoking is most likely associated with COVID-19 negative progression and adverse outcomes" Conversely, the short meta-analysis by Lippi and Henry did not note any association of smoking status with COVID-19 severity (Lippi and Henry, 2020). That being said, the majority of instances in several existing studies is quite limited which is not succinct, so the correlation between COVID-19 severity and smoking status cannot be fervently concluded. In extreme cases, underlying health problems such as COPD, asthma and coronary disease are more prevalent. Furthermore, MERS-CoV, that also caused a minor coronavirus outbreak in 2012, showed 215 certain early symptoms as the recent COVID-19, and sources claim a correlation between smoking status and fatality rates. MERS-CoV contains the DPP4 receptor while SARS-CoV-2 incorporates the ACE2 receptor (Vardavas and Nikitara, 2020). They abound in epithelial mucosal cells and alveolar pulmonary tissue and have different physiological functions. Both viruses bind to its receptor to infect the host which is a probable key stage for its infections.

Tobacco cessation in period of lockdown

As mentioned above the chances of relapse of smoking during the hour of lockdown is pretty high. Thus, the continual support to smokers during this hour is pertinent than ever before. Though appointments and discussions in person to person may not feasible but with the advancement of technologies, gone are the days of communication through posts rather we are fortunate enough to be engaged to one another through social media, phone calls or conference calls. Tobacco cessation community must ensure continual flow of counselling and advices through this media. The tool of teledentistry can do miracles to help the patient in the journey of tobacco cessation. They must be encouraged to take up practices such as yoga, home-exercises, and meditations to divert the mind from smoking for maintenance of health that could contribute tremendously in containing the pandemic virus.1800-11-2356 is the government helpline number for tobacco cessation (National Health Portal of India, 2020).

DISCUSSION

To fight this pandemic warrants social distancing with minimal contact, we should think on the line to provide tobacco cessation which does not have much physical contact but at the same time affective, this could be achieved by contacting the person through telephonic assistance through virtual platform like video calling/teledentistry. Though

this method maybe disadvantageous over the people who may not afford the technologies of the said above, they may be reached through mass communication such and television, radio, and over small ringtone that plays when a number is dialled through phone. These repetitive messages can act as a constant reminder of the detrimental effect of smoking and its possible relation with SARS-Cov-2. Reaching the underprivileged is still a challenge for health care providers during the pandemic but should retain the efforts to reach as much as possible through whatever means available.

Quitting lines should promote symptomatic or asymptomatic contact with smokers with or without COVID-19. Lockdown can contribute to both social isolation and mental distress which may indeed add the need to smoke as smoking is often practiced at times of mental distress. Smoking is perhaps more common between economically disadvantaged groups, and is conceivably at a greater risk for SARS-Cov-2 Large-scale initiatives must be aimed specially in those groups (Komiyama and Hasegawa, 2020).

The residential setting is perhaps the location that kids and youth would be most susceptible to passive smoking. This kind are shown to increase the chance of respiratory tract infection, asthma, middle ear disease and other crippling medical conditions. Second-hand smoke-exposed children are already prone to much more serious symptoms of respiratory syncytial infection (such as COVID-19, a type of viral pneumonia). During the pandemic, exposure to second-hand smoke could significantly raise as more people, including smokers and the people with whom they live, stay at their home to minimize the transmission of the disease as part of the lockdown measures (Leung *et al.*, 2020; Mahabee-Gittens *et al.*, 2020).

In addition, exposure to third hand smoke will rise. It is the sustained by-product of smoke from tobacco which accrues in soil, artefacts and surfaces through households where tobacco was used and re-emitted further into air. Through inhalation, absorption and dermal transfer, kids are exposed to smoke-toxicants via third hands smoke (Leung *et al.*, 2020; Mahabee-Gittens *et al.*, 2020). The WHO advocates total enforcement of a de facto ban across all types of tobacco consumption across all domestic and public venues (including restaurants and bars), as well as water pipe utilization (Mahabee-Gittens *et al.*, 2020). This very prohibition could effectively deter whatever greater risk of virus transmission causing SARS-Cov-2 Provinces are implored to ensure this ban is in influence and implemented.

Smoking shortages try to limit finger touches in the mouth. Tobacco users will then be more capable of treating any pre-existing problems if they are compromised, because quitting cigarettes seems to have an immediate beneficial impact on respiratory and coronary function and these benefits keep growing. These changes will boost the ability of COVID-19 patients to react to the virus and consequently minimize the incidence of serious complications (Mahabee-Gittens *et al.*, 2020).

CONCLUSION

Smoking practice is characterized by an action of breathing in and out with constant hand-to-mouth movements, which are strongly urged against virus infection. Initiatives for public health, like lockdowns, will gain exposure of close relatives to second & third hand smoke as smoking is presumably believed to increase with the introduction of lockdown; as stress and anxiety will increase with the isolation of individuals from their near ones. However, lockdown is perhaps a good time to stop or reduce smoking not just for the health risks of the smoker, but also for those of his family because quitting cigarette smoking has an immediate positive effect on the lungs and heart and it only gets better with time. Cigarette is feared to be a contributing factor for Covid-19's seriousness, because the activity of smoking is against the containment of the virus that is, repetitive hand-to-mouth action. Community wide approaches should be used to decrease the level of smoking to facilitate smokers to quit tobacco using this lockdown and post-lockdown as a stimulus for a healthy lifestyle. This warrants community wide outreach programme focussing more on virtual platform and mass media continuously bombarding people with advertisement that may subconsciously be embedded in the mind of individuals to quit or stay away from the habit of smoking. Cessation of smoking by any means should be a priority amongst healthcare providers. The research community should delve into the role of tobacco and the current COVID-19 pandemic. Databases should be identified and analyzes should concentrate on the role of this association in virus infection, severity, recovery ability and so on. Further study is warranted.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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