Original Article

Frequency, Type and Extent of Smoking in COVID-19 Patients and its Association with Disease Severity

Roma Gulzar[1], Adnan Wajih Akhtar[2], Faizan Ahmad[2] and Moniba Waqar[3]

ABSTRACT

Objective: To assess the frequency of smokers in patients who are confirmed to have COVID-19 through PCR testing and to determine the association of cigarette and windpipe smoking with the disease severity

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Medicines, Shaikh Zayed Hospital, Services Hospital and Ittefaq Hospital Lahore, Pakistan from 13th June 2020 to 15th March 2021.

Materials and Methods: Three hundred and sixty seven patients were taken from different hospitals of Lahore, Pakistan. Only COVID-19 PCR positive patients with age over 25 were selected to be part of the study. The COVID- 19 case was defined as mild moderate and severe based on the severity of symptoms. History of current and former smoking, mode of smoking whether windpipe or cigarette and the no. of pack years smoked was asked from each patient or next of kin in severe disease.

Results: There were 39.5% females and 60.5% males. The smoking population was fairly low to about 12.53% among which 46 were cigarette smokers, 4 used windpipe and the other 4 had used both cigarette and windpipe. The no. of years smoked are divided into three groups and their relation with the severity of disease observed in this study.

Conclusion: There was no significant association found between the disease severity in COVID-19 infection and smoking habit. Also, it was found that the intensity of smoking was unrelated to the severity of symptoms in COVID-19.

Key Words: Frequency, Type, Smoking, COVID-19

Citation of article: Gulzar R, Akhtar AW, Ahmad F, Waqar M. Frequency, Type and Extent of Smoking in COVID-19 Patients and its Association with Disease Severity. Med Forum 2021;32(8):123-127.

INTRODUCTION

In late 2019, several cases of a novel virus were identified to cause pneumonia in Wuhan, china. This virus named COVID-19 rapidly spread in the whole world and became global pandemic on 11th march 2020.[1] This virus has affected 219 countries worldwide up till now and the number of affected cases is steadily increasing.[2] It is important to identify the possible reasons to why it affects some people more than the others to decrease the spread. To date, many factors are considered to increase the risk of infection as well as development of severe disease such as cardiovascular disease, hypertension, chronic lung disease, diabetes, cancer, chronic kidney disease, obesity i.e. BMI ≥30.[3]

Smoking through windpipe or use of cigarette is known to cause many lung diseases and malignancies but its direct role in increasing the risk of COVID-19 is yet to be determined. Several studies have been done in the world to establish the role of smoking in the development of covid-19 infection and to see connection with the severity of symptoms. As tobacco smoking is known to cause lung diseases primarily like chronic obstructive pulmonary disease and also, acute respiratory distress syndrome (ARDS) which is also a direct complication of COVID-19.[4] So the possibility of smokers having similar risk of acquiring severe COVID cannot be ruled out.

The use of tobacco has a strong impact on respiratory health and it is renowned cause of lung cancer. It is known to cause swelling and rupturing of air sacs in lungs with prolonged usage thereby, decreasing the capacity of lung to transfer gases i.e. oxygen and carbon dioxide.[5] Also, it builds up mucus plugs resulting in coughing and breathing difficulties.

In addition, there is notable increase risk of severe COVID-19 infection in patients who have other chronic illness like cardiovascular disease (CVD) for which smoking is also a risk factor.[6] Moreover, a patient with

[1.] Consultant Physician, Ittefaq Hospital Trust & Teaching Hospital Lahore.
[2.] Department of Rheumatology / Medicine[3], Shaikh Zayed Hospital, Lahore.

Correspondence: Dr. Roma Gulzar, Senior Registrar (Consultant Physician), Ittefaq Hospital Trust & Teaching Hospital, Lahore.
Contact No: 0332-4393016
Email: romagulzar@gmail.com

Received: May, 2021
Accepted: June, 2021
Printed: August, 2021

a weak heart condition amid COVID-19 infection is vulnerable to develop severe symptoms.[7]

The largest study population of 1099 patients with COVID-19 was provided by Guan et al. from multiple regions of mainland China. Descriptive results on the smoking status of patients were provided for the 1099 patients, of which some had severe symptoms, and many had non-severe symptoms. Among the patients with severe symptoms, mostly were current smokers and few were former smokers. Thereby, proving there is a link of smoking to the disease severity.[8] In the same way, Zhang et al[9] presented clinical characteristics of 140 patients with COVID-19. The results showed that most were smokers with severe disease giving some association between smoking and COVID infection. Many other researches show contradictory opinion showing no link of smoking and COVID 19 infection.[10] Hence, it is important to gather more evidence to expand our information about the possible relationship of smoking cigarette and windpipe to the severity of symptoms in COVID-19 which can help in designing the management plan. The Prevalence of smoking in Pakistan is 19.1% on average[11], so it is important to determine whether the smokers are at risk of developing complications of this disease. This study was therefore designed to study the frequency of smokers (cigarette and windpipe) in hospitalized patients and to compare the severity of symptoms in smokers and non- smokers.

MATERIALS AND METHODS

This cross-sectional study was conducted at Department of Medicines, Shaikh Zayed Hospital, Services hospital and Ittefaq Hospital Lahore, Pakistan from 13th June 2020 to 15th March 2021. Three hundred and sixty seven patients were taken from different hospitals of Lahore, Pakistan. Only COVID-19 PCR positive patients with age over 25 were selected to be part of the study. The COVID-19 case was defined as mild moderate and severe based on the severity of symptoms. History of current and former smoking, mode of smoking whether windpipe or cigarette and the number of pack years smoked was asked from each patient or next of kin in severe disease. An informed consent was obtained on approaching a patient. Only COVID-19 PCR positive patients were selected for the study. COVID-19 case was defined as ***Mild*** (no or mild pneumonia) Patients with mild respiratory symptoms of low grade fever (<100°F), cough, flu will be considered as mild cases, **M*oderate, p***atients with shortness of breath in addition to above symptoms of fever (>100°F), cough ± sputum, flu will be taken as severe case and **S*evere*** e.g. with respiratory failure, shock, or multiorgan dysfunction. Patients with above symptoms and requiring need of ventilation or have organ damage such as liver or renal dysfunction will fall into category of critical case

A full protocol of donning and doffing was followed to visit the patient by the researcher as per WHO guidelines. An informed consent was taken from patients themselves in mild and moderate case whereas for severe cases it was taken from the first degree relative. The patient details were taken from their medical record in severe case and confirmed from patient themselves in moderate and mild cases. As for severe cases, history was taken from the next of kin. The mild cases were hospitalized due to lack of availability of isolation at home or previously in first wave of COVID, all PCR positive were admitted in Pakistan due to fear of spread of infection. The smokers and non-smokers were identified on basis of history and registered. The mode of smoking whether wind pipe or cigarette was also inquired. They were also categorized into former and current smokers and also, number of pack years for cigarette smoking and no. of years for windpipe or hukka smoking was asked from each patient.

The patients with age above 25, Covid PCR positive and symptomatic COVID case as per case definition were included in the study. The patients diagnosed case of Diabetes for more than 10 years[12], having asthma or active tuberculosis; bronchiectasis and cerebrovascular accident[13] based on history alone were excluded. A full record was maintained for each patient along with their demographic details. The patient's details were recorded by researcher to minimize spread of infection. Later, patients were thanked for their participation and mobile phone was disinfected on leaving the isolation.

Data analyzed using SPSS version 23. Categorical data summarized as counts and percentages and other data presented as means and standard deviation if normally distributed or as medians and interquartile ranges if data is Skewed. P value of ≤ 0.05 is considered statistically significant.

RESULTS

The mean age of participants is 51.06±15.73 of which 60.5% were males and 39.5% were females. The results show that men are more affected by COVID-19 than the women. The highest frequency of COVID PCR positivity is between age group of 58-67 which may be because of low immunity in people of advanced age. Only 46 individuals were found to have smoking history of which 34 were currently smoking at the time of admission. Of the total smokers, 38 were cigarette smoker, 4 smoked only windpipe and 4 smoked both windpipe and cigarette. Most of the smokers had used for over a decade. Most of them were retired 21.52 while 19.61% were employed when they were infected (Table 1).

The individuals were grouped in smokers and non-smokers category where it was seen that smokers were slightly more affected for severe disease from non-smokers. In contrast, most non-smokers had only mild

disease. For moderate symptoms i.e. slight respiratory involvement there was no significant difference in both groups. The details of individual categories are more precisely explained in Table 2

Table No.1: Distribution of patients by COVID-19 severity, smoking status of study participants and their smoking habits

Variable	No.	%
COVID-19 cases		
Mild	93	25.3
Moderate	191	52.0
Severe	83	22.6
Smoking status		
Non-smoker	321	88.0
Smoker	46	12.0
Type of smoker		
Current smoker	34	9.3
Former smoker	12	33.0
Mode of smoking		
Cigarette	38	10.4
Windpipe	4	1.09
Both	4	1.09
Years of smoking (years)		
≤10	15	4.1
11-20	8	2.2
>20	19	5.2
Gender		
Male	222	60.5
Female	145	39.5
Profession		
Students	56	15.25
Business	66	17.98
Employed	72	19.61
Housewife	45	12.26
Professional	49	13.35
Retired	79	21.52
Age (years)		
25 – 38	156	
39 – 67	190	
68 – 97	20	

Based on the smoking history; former smokers had more severe disease in comparison to former smokers by only a minor difference of 1%. 8.3% and 11% had only mild symptoms of COVID 19 infection for former and current smokers respectively. There was no significant difference found for severity of disease in respect to smoking now or in past. Of the total of 46 smokers majority (38) smoked cigarette; 11 had severe disease, 22 had moderate symptoms 5 had mild cough or fever. Among the 4 windpipe smokers; 2 had moderate infection and 2 had severe infection and same was seen for people who smoked both cigarette and windpipe. For extent of smoking, number of years smoked; there was no significant correlation found with the severity of symptoms. The pack year of smoking was grouped into <10, 10-20 and more than 20 as group 1, 2 and 3 respectively. Group 1 and 3 had same number of individual showing no difference between the extents of smoking to the disease severity. For group 2, mostly had moderate infection and few had mild or severe disease (Table 3).

Table No.2: Association between COVID-19 cases and smoking

Smoking status	COVID -19 cases			χ^2 value	P value
	Mild	Moderate	Severe		
Non-smoker	88 (94.6%)	165 (86.4%)	68 (81.9%)	6.87	0.032
Smoker	5 (5.4%)	26 (13.6%)	15 (18.1%)		

Table No.3: Association between COVID-19 cases and years of smoking

Pack years of smoking	COVID -19 cases			χ^2 value	P value
	Mild	Moderate	Severe		
<10	3 (60%)	10 (38.5%)	6 (40%)	1.35	0.852
10-20	1 (20%)	5 (19.2%)	2 (13.3%)		
>20	1 (20%)	11 (42.3%)	7 (46.7%)		

DISCUSSION

There is contradictory evidence of direct relation of smoking to COVID 19 infection. It seems important as we have faced the worst pandemic in history unexpectedly in this new era to identify the factors which are responsible for predisposing a person to this possibly fatal infection. If we are able to identify modifiable risk factors such as smoking to add on the spread of the infection, we can possibly take measures to stopping this ongoing nightmare. It is therefore, self-explanatory that this information is vital to our survival. This study shows that more males than females were affected by this infection. The cause may be that men are more exposed to the risk of disease as they go outside more often or are mostly breadwinner of the family. Only small proportioned of the study population; who belonged to different ethnic and social groups, was smoker. Cigarette smoking was more common than wind pipe or hukka as mode of smoking. Former and Current smokers were relatively equally affected with the disease severity. The years smoked had no significant influence on the intensity of disease symptoms of COVID infection.

Most of the prior work shows association of smoking to the severity of disease and they also prove significant correlation of smoking habit and worsening of symptoms.[14,15] However, some researchers successfully provided evidence that tobacco neither directly increase the susceptibility to COVID -19 infection[16] or other respiratory comorbidities[9,17] nor has effect on its progression. Lippi and Henry[10] reported that the results of this preliminary meta-analysis based on Chinese patients suggest that active smoking does not

apparently seem to be significantly associated with enhanced risk of progressing towards severe disease in COVID-19.

This research was conducted due to this controversy arising about whether smoking habit is directly related to adverse outcome in COVID 19 patients. Due to high prevalence of smoking in Pakistan[11], we were of the opinion to get a random cross sectional survey which will provide necessary information to support this ideation. The possible mechanisms involved include up regulation of ACE-2 gene expression in the epithelium of major airways in COPD patients and active smokers which could lead to adverse symptoms in this infection.[18] Also, places where virus is found commonly like paper or plastic can be easily contaminated through smoke from the affected individuals indirectly contributing to the spread of infection.[19]

This study had some limitations, firstly patients who were being mechanically ventilated; smoking history was taken from next of kin who might not know about the patient's habit or former history. Secondly, several patients might have felt judged by researcher or other admitted patients and might have hidden the correct details. Thirdly, patients who have recently quit, just before to admission insist on being classified as non-smokers and do not tell about their former smoking habit. Fourth, most patients being females and as our country has low prevalence of smoking in females, this might have caused additional bias. Finally, due to small study sample the results can vary and cause false impact of the studied correlation.

CONCLUSION

Both current and former smoking is not associated with increased presentation or morbidity in patients who are in hospital with COVID-19. As a result of possible misclassification of smokers as non-smokers, the analysis may underestimate the likelihood of severity in such patients. As the global pandemic continues to escalate due to genetic mutations of corona virus, the policy makers and healthcare workers should prioritize managing the undeniable risk factors contributing to the crisis. To add on, the healthcare workers are working to their full capacity to address this pandemic, other relevant researches in similar population can aid in determining the true course of illness in relevance to the smoking habit.

Author's Contribution:

Concept & Design of Study:	Roma Gulzar
Drafting:	Adnan Wajih Akhtar, Adnan Wajih Akhtar
Data Analysis:	Faizan Ahmad, Moniba Waqar
Revisiting Critically:	Roma Gulzar, Adnan Wajih Akhtar
Final Approval of version:	Roma Gulzar

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Coronavirus confirmed as pandemic by World Health Organization. BBC World News, Source Internet 2020;3.
2. Wang C, Wang Z, Wang G, Lau JYN, Zhang K, Li W. COVID-19 in early 2021: current status and looking forward. Signal Transduction Target Therapy 2021; 6:114.
3. Mclntosh K. COVID-19: epidemiology, virology, clinical features, diagnosis, and prevention. Up to Date 2021.
4. WHO. Clinical management of severe acute respiratory infections when novel coronavirus is suspected: What to do and what not to do, World Health Organization. Interim Guidance Feb 11, 2020.
5. Global Burden of Disease 2017 Risk Factor Collaborators. Global, regional and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: a systematic analysis for Global Burden of Disease. Lancet 2017;392(10159):1923-94.
6. Banks E, Joshy G, Korda RJ, Stavreski B, Soga K, Egger S, et al, Tobacco smoking and risk of 36 cardiovascular disease subtypes: fatal and non-fatal outcomes in a large prospective Australian study. BMC Med 2019;17(1):128.
7. Lewis DKL. How does cardiovascular disease increase the risk of severe illness and death from COVID-19? Harvard Health Publishing, 2020.
8. Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med 2020.
9. Zhang JJ, Dong X, Cao YY, Yuan YD, Yang YB, Yan YQ, et al. Clinical characteristics of 140 patients infected with SARS-CoV-2 in Wuhan, China. Allergy 2020;75(7):1730-41.
10. Lippi G, Henry BM. Active smoking is not associated with severity of coronavirus disease 2019 (COVID-19). Eur J Intern Med 2020; 75:107-8.
11. Muhammad A. Ibrar R. Huma Q, et al. Burden of Tobacco in Pakistan: findings from global adult tobacco survey 2014. Nicotine Tobacco Res 2018; 20(9):1138-44,
12. Kharroubi AT, Darwish HM. Diabetes mellitus: The epidemic of the century. World J Diabetes 2015;6 (6):850-67.
13. Yew KS, Cheng E. Acute stroke diagnosis. Am Fam Phys 2009;80(1):33-40.

14. Zhao Q, Meng M, Kumar R, Wu Y, Huang J, Lian N, et al. The impact of COPD and smoking history on the severity of COVID-19: A systemic review and meta-analysis. J Med Virol 2020;92 (10): 1915-21.
15. Robin K, Walton N, Alexandros S, et al. The effect of smoking on COVID 19 severity: a systemic review and meta-analysis. J Med Virol 2020;93(2).
16. Konstantinos F. Anastasia B. Konstantinos P, et al. Current smoking, former smoking and adverse outcome among hospitalized COVID-19 patients: a systematic review and meta-analysis. Therap Advan Chronic Dis 2020;11:1-14.
17. Alqahtani JS, Oyelade T, Aldhahir AM, et al. Prevalence, severity and mortality associated with COPD and smoking in patients with COVID-19: a rapid systematic review and meta-analysis. PLoS One 2020;15(5):e0233147.
18. Askin G. Burcu A. Berat U. The effect of smoking on COVID 19 symptom severity: systemic review and meta-analysis. Hindawi; Pulmonary Med 2020;7590207.
19. Ahmed N, Maqsood A, Abduljabbar T, Vohra F. Tobacco smoking a potential risk factor in transmission of COVID-19 infection. Pak J Med Sci 2020;36(COVID19-S4):S104-7.