

COMPARATIVE STUDY OF HEMATOLOGICAL PROFILES IN SMOKERS AND NON-SMOKERS: COVID-19 PATIENTS FROM LARKANA

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Abstract

Background: Smoking has been associated with changes in hematological parameters and heightened susceptibility to COVID-19 and other respiratory infections. It is still unclear how smoking affects blood cell indices in COVID-19 patients especially in regional populations. The purpose of this study was to compare the hematological profiles of COVID-19-positive patients from Larkana who smoked and those who did not.

Methodology: Between March and June of 2020 LINAR Hospital in Larkana carried out a cross-sectional comparative study. There were 50 smokers and 50 non-smokers among the 100 confirmed COVID-19 patients between the ages of 20 and 50. Written informed consent was given by eligible participants. Non-smokers had never smoked whereas smokers had been active cigarette smokers for at least six months. Patients with major chronic illnesses hematological disorders recent infections pregnancy or medications that affected blood indices were not included.

Results: 50 smokers and 50 non-smokers with similar baseline demographics participated in the study. The most prevalent symptom in both groups was fever which was followed by exhaustion and a dry cough. Breathlessness tightness in the chest and low oxygen saturation were among the respiratory symptoms and complications that smokers experienced more frequently. Smokers had higher mean RBC count hemoglobin WBC count and platelet levels than non-smokers according to hematological analysis suggesting that smoking COVID-19 patients had a comparatively elevated inflammatory and hematological response.

Conclusion: Study Concluded that COVID-19 patients smoking was linked to higher hematological values and more severe respiratory symptoms indicating that smoking exacerbates the severity of the disease and affects inflammatory and blood profile responses.

INTRODUCTION

Since 2020 the World Health Organization (WHO) has designated the coronavirus disease

2019 (COVID-19) as a global public health emergency. The COVID-19 pandemic which has

rapidly spread throughout the industry and is typically a respiratory illness with a high death rate particularly among the elderly has raised serious concerns about public health [1,2]. Numerous factors such as age male gender high blood pressure diabetes asthma and chronic obstructive pulmonary disease (COPD) have been linked to the severity of mortality and terrible outcomes of hospitalized individuals with inflammation [3]. Due to the fact that smoking affects all of the bodys organs it is a significant factor linked to a poor prognosis for numerous illnesses [4]. The effect of smoking status on COVID-19 has been the subject of several studies [5]. According to a previous study heavy cigarette smoking did not significantly increase the severity of COVID-19. Additionally it was found that hospitalized COVID-19 patients had a very low incidence of current smoking compared to the general population [6]. Intense acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is more common in smokers than in non-smokers [7]. Although there is no statistically significant correlation between smoking and death smoking is most likely associated with COVID-19 detrimental development and terrible outcomes in accordance with other research [8]. According to recent case studies and publications smoking has little effect on COVID-19 contamination [9]. Furthermore smoking has been found to be a significant factor in the improvement of COVID-19. Furthermore COVID-19 is more likely to spread among smokers than among non-smokers [10]. Given that smoking entails frequent contact with hands saliva and devices direct contact may be the initial means of viral transmission [11]. Additionally for four hours to two to several days the virus is actively seen on shared surfaces of smoking apparatus. After oral or nasal launch SARS-CoV-2 can survive for many hours to days in aerosols and on surfaces like paper plastic and steel [12,13]. Cigarette smoke exposes endothelium cells to reactive oxygen species (ROS) and oxidative stress (OS) by producing excessive amounts of peroxynitrite hydrogen peroxide superoxide and radical hydroxyl [14]. Smoking may increase the expression of the angiotensin-changing enzyme 2 (ACE2) receptor

which serves as a binding site for the SARS-CoV-2 S protein [15]. Numerous studies found that COVID-19s superiority decreased in current smokers compared to the trendy population. The likelihood of current smokers checking out was significantly lower than that of both current and former smokers. The low prevalence of current smokers among COVID-19 patients led to the hypothesis that smoking nicotine should have a preventative effect [16]. However it was anticipated in a unique study that quitting smoking would reduce the risk of getting COVID-19 and the likelihood of suffering from severe COVID-19 outcomes. Clinicians must encourage smokers to quit as soon as possible because smoking is the main risk factor for respiratory infections because it suppresses the immune system [17]. This is particularly true for COVID-19 patients [18]. Tobacco use is a well-known risk factor for lung cancer asthma and COPD in COVID-19 patients all of which can lead to more serious illnesses [19]. Guan and partners. According to a study of 1099 Chinese language COVID-19 patients about 32% of contributors with a smoking history (smokers and ex-smokers) had been diagnosed with a serious form of COVID-19 pneumonia upon admission compared to those who had never smoked [1]. In this study we tried to demonstrate the relationship between cigarette smoking and COVID-19 sequelae in patients who had been admitted to a sizable quarantine medical facility in Larkana.

Methodology:

A cross-sectional comparative study was conducted to evaluate hematological changes in 100 adult participants including 50 smokers and 50 non-smokers aged 20-50 years. Data were collected from 100 COVID-19 patients (including Non-Smokers and Non Smokers) all of whom were registered during March 2020 – June 2020. The study was carried out at LINAR Hospital Larkana. Data collection was completed over the designated study period. Participants were included if they: Were between 20 and 50 years of age. Provided written informed consent. For smokers: were active cigarette smokers for ≥6

months. For non-smokers: had no past or current regular smoking history while participants were excluded if they; had a history of hematological disorders, recent infections or hospitalization within the last 4 weeks, users of medications affecting hematological parameters, having severe chronic diseases influencing blood indices, pregnant or lactating females and had recent major surgery or trauma.

Results & Discussion:

As indicated in Table 1 the study comprised fifty smokers and fifty non-smokers and mean and

standard deviation values were used to compare their demographic characteristics. The average age of smokers was 35.4 years with an 8.2 standard deviation the average age of non-smokers was 34.8 years with a 7.9 standard deviation. Smokers were 167.2 cm (SD $\pm$ 7.4) tall on average while non-smokers were 166.5 cm (SD $\pm$ 7.9) tall on average. In a similar vein smokers weighed an average of 71.3 kg with a 10.4 standard deviation while non-smokers weighed an average of 69.8 kg with a 9.7 standard deviation.

Table 1. Demographic Characteristics of Study Participants (N = 100)

Variable	Smokers (n = 50) (Mean $\pm$ SD)	Non-Smokers (n = 50) (Mean $\pm$ SD)
Age (years)	35.4 $\pm$ 8.2	34.8 $\pm$ 7.9
Height (cm)	167.2 $\pm$ 7.4	166.5 $\pm$ 7.9
Weight (kg)	71.3 $\pm$ 10.4	69.8 $\pm$ 9.7

Fever was the most prevalent symptom among the 50 smokers and 50 non-smokers with COVID-19 as shown in table 2. 0 occurring in 40 smokers (80%) and 38 non-smokers (76%). 32 smokers (64%) and 28 non-smokers (56%) reported having a dry cough while 25 smokers (50%) and 22 non-smokers (44%) reported feeling weak or exhausted. Twelve non-smokers (24%) experienced shortness of breath whereas 20 smokers (40%) experienced it more frequently. 15 smokers (30%) and 18 non-smokers (36%) reported losing their taste while 14 smokers (28%) and 16 non-smokers (32%) reported losing their smell. 16 smokers (32%) and 15 non-smokers (30%) reported having a sore throat while 18 smokers (36%) and 20 non-

smokers (40%) reported having body aches or myalgia. Seven smokers (14%) and five non-smokers (10%) experienced gastrointestinal symptoms like nausea or vomiting whereas six smokers (12%) and four non-smokers (8%) experienced diarrhea. In comparison to 8 (16 percent) 6 (12 percent) and 3 (6 percent) non-smokers 12 (24 percent) 10 (20 percent) and 8 (16 percent) smokers reported respiratory complications such as chest tightness rapid breathing or tachypnea and reduced oxygen saturation. In general smokers tended to have more severe respiratory symptoms whereas taste and smell disturbances were slightly more common in non-smokers.

Table 2. Clinical Features of COVID-19 Patients (Smokers vs Non-Smokers)

Clinical Feature	Smokers (n = 50) – Number (%)	Non-Smokers (n = 50) – Number (%)
Fever	40 (80%)	38 (76%)
Dry cough	32 (64%)	28 (56%)

Fatigue / Weakness	25 (50%)	22 (44%)
Shortness of breath	20 (40%)	12 (24%)
Loss of taste	15 (30%)	18 (36%)
Loss of smell	14 (28%)	16 (32%)
Sore throat	16 (32%)	15 (30%)
Body aches / Myalgia	18 (36%)	20 (40%)
Nausea / Vomiting	7 (14%)	5 (10%)
Diarrhea	6 (12%)	4 (8%)
Chest tightness	12 (24%)	8 (16%)
Rapid breathing / Tachypnea	10 (20%)	6 (12%)
Reduced oxygen saturation	8 (16%)	3 (6%)

The hematological parameters of COVID-19 patients were compared between fifty smokers and fifty non-smokers in Table 3. The mean red blood cell (RBC) count was $5.1 \times 10^6/\mu\text{L}$ with a standard deviation of 0.5 for smokers and $4.7 \times 10^6/\mu\text{L} \pm 0.4$ for non-smokers. In a similar vein smokers had higher mean hemoglobin levels ($15.2 \text{ g/dL} \pm 1.3$) than non-smokers ($14.1 \text{ g/dL} \pm 1.2$). White blood cell (WBC) counts were $7.8 \times 10^3/\mu\text{L} \pm 1.9$ in non-smokers and $8.5 \times 10^3/\mu\text{L} \pm 2.1$ in smokers.

$10^3/\mu\text{L} \pm 2.1$ in smokers. Additionally, smokers had slightly higher platelet counts (mean of $220 \times 10^3/\mu\text{L} \pm 50$) than non-smokers (mean of $210 \times 10^3/\mu\text{L} \pm 45$). In comparison to non-smokers smokers generally showed slightly higher RBC hemoglobin, WBC and platelet values. This could be due to the physiological effects of smoking as well as systemic inflammation linked to COVID-19.

Table 3. Hematological Parameters of COVID-19 Patients

Parameter	Smokers (n = 50) (Mean $\pm$ SD)	Non-Smokers (n = 50) (Mean $\pm$ SD)
RBC ($10^6/\mu\text{L}$)	5.1 ± 0.5	4.7 ± 0.4
Hemoglobin (g/dL)	15.2 ± 1.3	14.1 ± 1.2
WBC ($10^3/\mu\text{L}$)	8.5 ± 2.1	7.8 ± 1.9
Platelets ($10^3/\mu\text{L}$)	220 ± 50	210 ± 45

Discussion:

The demographics of COVID-19 patients both smokers and non-smokers were similar in our study: the average age of smokers was 35.4 ± 8.2 years while the average age of non-smokers was 34.8 ± 7.9 years. Similarly the average height and weight of smokers was 167.2 ± 7.4 cm and 71.3 ± 10.4 kg respectively. These minor variations in anthropometric measurements imply that smoking status did not correlate with a significant demographic gap in our sample. These results are somewhat consistent with more

extensive observational data. For instance a cross-sectional study of 901 confirmed COVID-19 cases found that the mean ages of smokers and non-smokers were similar: the mean age of smokers was approximately 38.3 years while the mean age of non-smokers was approximately 38.6 years (18). Similarly there was little age difference between smokers and non-smokers even though the absolute numbers differed. Therefore our data support the idea that smoking status in COVID-19 populations may not significantly affect age distribution. Our findings

however are at odds with some research that shows smokers have older mean ages than non-smokers. The mean age of smokers was found to be slightly higher than that of non-smokers in a recent cohort of hospitalized COVID-19 patients ($n = 198$) (52.0 ± 11.9 years vs. 49.0 ± 12.5 years $p = 0.042$) (19). The disparity may be explained by the fact that these studies frequently include older populations or a different comorbidity profile.

Fever was the most prevalent symptom in our cohort of 100 COVID-19 patients (50 smokers and 50 non-smokers) occurring in 80% of smokers and 76% of non-smokers. This is in fairly good agreement with more general data: a systematic review and meta-analysis of COVID-19 patients found that 81.2 percent of patients had fever (95 percent CI: 77.9–84.4%). In our sample cough (dry or persistent) was the second most common complaint (64 percent among smokers and 56 percent among non-smokers). This is again generally consistent with pooled estimates which show that cough prevalence ranged from 58.5 to 60.4 percent (20). In our study 50% of smokers and 44% of non-smokers reported feeling weak or tired which is higher than the pooled meta-analytic rate of roughly 33.6%. This discrepancy may be due to differences in the population the severity of the illness or reporting practices but it highlights the fact that fatigue is still a prevalent and significant symptom among COVID-19 patients. According to our data dyspnea or shortness of breath was more common in smokers (40%) than in non-smokers (24%). This finding raises concerns that smoking may make COVID-19 respiratory problems worse. According to extensive aggregated data the pooled prevalence of dyspnea among COVID-19 patients is approximately 26.2 percent (95 percent CI ~24.1–28.5 percent) (20).

Among the 100 COVID-19 patients in our sample (50 smokers vs. 50 non-smokers) we found that smokers mean red blood cell (RBC) count values were marginally higher (5.1 vs. hemoglobin (15.2 vs. $4.7 \times 10^6/\mu\text{L}$). White blood cell (WBC) count (8.5 vs. 14.1 g/dL). $7.8 \times 10^3/\mu\text{L}$) and platelets (220 vs. $210 \times 10^3/\mu\text{L}$)

in contrast to those who do not smoke. These results point to a pattern of elevated hematological parameters among smokers which may represent both an increased inflammatory or stress response potentially made worse by COVID-19 infection and physiological adaptations to smoking. Our findings are generally in line with earlier research looking into how smoking affects hematological indices. For example a recent study of Sudanese smokers found that their WBC hemoglobin and red blood cell counts were significantly higher than those of non-smokers (21). A different cross-sectional study in a healthy population found that smokers had higher WBC hemoglobin hematocrit RBC counts and other parameters than non-smokers. Similar research in a Kurdish population also revealed that active smokers had higher platelet counts WBC counts and RBC indices (including hemoglobin) than non-smokers.

Conclusion:

In conclusion similar demographic traits were displayed by smokers and non-smokers with COVID-19 suggesting that the groups baseline matching was good. Both groups frequently experienced fever dry cough and exhaustion however smokers had more severe respiratory symptoms including tightness in the chest shortness of breath and decreased oxygen saturation. Non-smokers experienced taste and smell disturbances somewhat more frequently. Hematological analysis showed that smokers had higher levels of platelets hemoglobin red blood cells and white blood cells than non-smokers. These results might be explained by the physiological effects of smoking in conjunction with inflammation linked to COVID-19. The significance of smoking status in clinical management is highlighted by the fact that smoking generally seems to worsen respiratory involvement and change hematological responses in COVID-19 patients.

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