CLINICAL MANIFESTATIONS OF SARS-COV-2 (COVID19)

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Abstract:
By the end of December 2019, multiple new cases of pneumonia were reported. All of these cases had a particular characteristic in common; they had been caused by a new virus named by the WHO as Covid-19 and the International Committee on Taxonomy of Viruses called it, SARS-CoV-2.   In order to discuss the clinical manifestation and symptoms of the 2019-Covid-19. It is imperative to describe the virus's characteristics and structure; This is an RNA positive-strand virus, a non-segmented belonging to the family of Coronaviridae widely distributed between humans and mammals(1). This virus can be asymptomatic or produce a "common flu" symptoms and death through its complications. Fever, cough, and difficulty in breathing are the most important manifestations to declare a patient as a suspicious case; comorbidities with age, past medical history, time of diagnosis, and treatment received are the most important predictor of the prognosis of the disease.
Until 23rd of May, 2020, the world health organization has 5,306,237 confirmed cases and 340,047 deaths (2).
Key words: *covid-19, susceptibility, clinical manifestation, follow up*

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Structural Characteristics of the SARS-CoV-19:
Structurally the coronaviruses are spherical, pleomorphic with a diameter between 80 to 120 nm. The viral envelope is reinforced by the membrane's glycoprotein (M). It is surrounded in the membrane by three trans membrane domains covered by a smaller membrane with a lipid envelope that makes it highly hydrophobic, when attached to the infected cell (3). The viral strand is constituted by a nucleoprotein (N). It binds to viral RNA in a string-like helical structure to protect the RNA from degradation (4).

Analysis of the genome sequences for Covid-19 shows strong similarities when compared to SARS-CoV. However, there are specific differences such as the lack of the coding region for protein 8a in Covid-19, so it could imply the difference seen in its pathogenesis when compared to SARS-CoV. The coronavirus genome is non-segmented, positive-polarity, single-stranded RNA (+ ssRNA), with 27 to 32 kilobases in size (5).

Transmission Rate:
Coronaviruses primarily replicate in the lower respiratory area's epithelium cells and, to a lesser extent, the upper respiratory tract; the spread is believed to occur after the patient presents signs of infection in the lower respiratory tract (6). However, patients with Covid-19 infection detected in a severe status have a higher possibility of transmitting the virus since hosts carry a more significant number of infectious particles (viral load) compared to patients who present the infection in a mild or asymptomatic status. Identifying and quarantining these patients in health institutions where outbreaks have occurred, along with the implementation of adequate infection control and constant case reports in different countries, has been effective in reducing transmission and containing outbreaks of the disease (7).

The average number of new cases produced by the coronavirus throughout its infectious period ranges from 2.24 to 3.58 (p<0.05), that is, that a person can infect approximately 2 to 4 people, which means that the infection can spread rapidly and widely among the population (8). Before February 2020, travel restrictions, it is estimated that 86% of all infections are not documented (95% CI: [82%–90%]); the registration of per person transmission was 55% of confirmed cases (9).

Susceptibility of infection:
The virus may infect people of all age groups, although older age groups and patients with comorbidities or pre-existing conditions such as asthma, diabetes, heart disease, HIV, and any kind of immunosuppression seem more likely to become severely ill with the virus. The higher mortality rate is seen amongst individual above the age of 70, with a mortality rate higher than 8 % in this specific age group. According to reports, most of the deceased patients were 56 years old on average and most of them suffered from other diseases that may have made them more vulnerable to the virus complication and poor prognosis.

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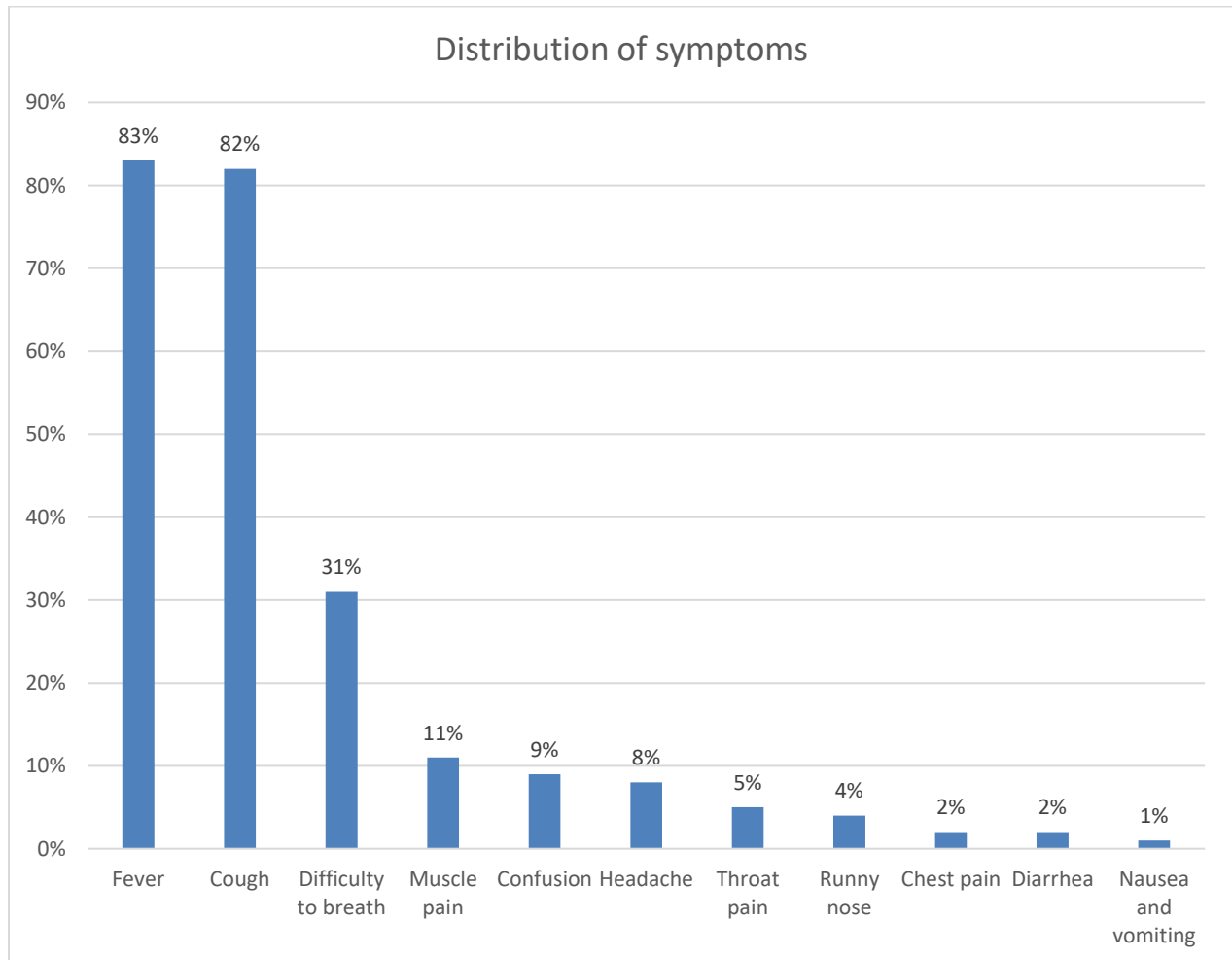
In China, around 1 to 2 men were infected compared to every woman (men 1-2:1 woman). It was speculated that the low vulnerability of women to acquire viral infections might be assumed due to the protection of the XX chromosomes compared to men. However, this difference may be inaccurate due to the different gender, and cultural roles in the country may vary across the globe. Children contain a different immune system than adults, and the most common transmission of the virus is seen through their mothers with suspected or confirmed cases occur; however, lower severity and extremely low mortality have been observed in this age group (10).

Clinical Manifestations:
The disease, COVID-19, is diagnosed as a virus-induced pneumonia. Based on the clinical symptoms, patients show similar manifestations like other respiratory viruses. Same as those who have been exposed to confirmed cases and have visited affected zones (11). A detailed study carried out in January of 2020, with a sample size of 99 patients attended at Wuhan Jinyintan Hospital, 49% showed pneumonia, and 51% had a chronic condition. The average hospitalized patients were 56 years old, 32 % were men, and 67% were women, and the incubation period for the virus was estimated to be between 7 and 14 days.

Table 1 . Clinical manifestations of Covid-19 in Wuhan, China. Descriptive study(12).

Clinical Manifestations	Proportion
Fever	83.0%
Cough	82%
Difficulty to breath	31.2%
Muscle pain	11%
Confusion	9%
Headache	8%
Throat pain	5%
Runny nose	4%
Chest pain	2%
Diarrhea	2%
Nausea and vomiting	1%

Figure 1. Clinical manifestations of Covid-19 in Wuhan, China. Descriptive study(12).

Symptoms and signs:
The clinical manifestations of patients analyzed were: 83% presented with fever, 82% cough, 31% difficulty breathing, 11% muscle pain, 9% confusion, 8% headaches, 5% throat pain, 4% rhinorrhea, 2% showed chest pain, 2% diarrhea, and 1% with nausea & vomiting (12).

Diagnostic Imaging :
Based on imaging, 75% of these patients presented with bilateral pneumonia, 14% showed multiple mottling and ground-glass opacity, and only 1% presented with pneumothorax. Likewise, 17% acquired acute respiratory distress syndrome, with 11% deteriorating fast to their conditions leading to death due to multiple organ failure.

Another study performed with 81 confirmed cases in Wuhan with a sex distribution showed that 52% were men and 48% women. The mean age was 50 years old; with radiological findings revealed that 79% of patients presented with bilateral lung compromise, 54% showed peripheral lung compromise, and 65% showed ground-glass opacification during the diagnostic imaging of their lungs. The 27% of all lung lobes evaluated showed the right lower lobe affected even in asymptomatic cases and a positive correlation between 1 to 3 weeks, depending on how early the patient was diagnosed (13).

Hematology:
The blood tests showed that leukocytes were below the normal range in 9% of the subjects and above the normal range in 24%, with 38% of patients showing Neutrophilia, Lymphocytopenia, and anemia. Approximately 43% of these subjects showed liver function abnormalities, with ALT or AST above the normal range. Only one person presented with severe liver function damage (12).

Follow up:
Among Seventeen confirmed cases, 64.7% were men, and 35.3% were women between 18 and 70 years old in Wuhan, China. These patients were followed up in a cohort study and were evaluated every week. All patients had a history of being in contact with a COVID-19 confirmed case. 65% of the patients presented with fever, and 47% with coughs, 11.8% experienced the difficulty of breathing, 17.6% with fatigue, and none with diarrhea. Only 5 of the 17 patients had an increase in the severity of their clinical symptoms in the first week. However, no one needed to be assisted (mechanical) ventilation and were kept away from the ICU, with no ARDS,

septicemia, coagulation irregularities found in any of these patients.

Chest CT of these patients showed 47.1% with a lesion in both the lungs; 23.5% with one lobe and 29.4% had a standard lung presentation on their CT scan. In conclusion, this study showed a better prognosis of the Covid-19 infection in individuals with higher or normal lymphocytes count. However, it is challenging to reach a definite conclusion from this study due to the small sample size used(14).

Another study with 102 patients shows that 10% of the cases were inside of a familiar cluster, 33% were exposed in a clinical environment (nosocomial), 17.6% needed Intensive Care, and 17.6 % of them died. The survival group was found to be younger and less likely to have comorbidities than those who died. Also, only 14.1% needed ICU (compared to 35% on the non-survival group), and the chest imaging showed that the patients who died presented with 3.1 times more ground-glass opacities than the group of survivors (13).

Death rate:
Out of 200 deaths analyzed, 81.5% revealed at least one comorbidity (62% diabetes and 51% hypertension), the most common signs were fever for 88% of the patient and 60% with diarrhea. The 26.32% had a low oxygenation index; almost a third of the cases had between 200 and 300 oxygen indexes, with 44% having a higher Oxygen Index that decreases with time to 17%, with severe cases. On average, Patients passed away about 10.9 days after admission. In regards to age, patients with the highest mortality rate, 44% were 70 years or older with at least one significant comorbidity and low oxygenation. Among the patients, 91% presented with lung and other organ injuries like hepatic, cardiac, and renal damage. Patients with COPD had 3.2 times more risk of dying than patients who did not. From the patients analyzed, 15.6% presented with COPD. There was statistical significance seen among the fatality rate between genders (14).

CONCLUSIONS:
There were no statistically significant differences seen amongst infection rates between genders. Younger age groups (0 to 20 excluded) were the most frequently infected, and patients with more severe symptoms were the most likely to transmit the virus due to a high viral load. Pre-existing conditions and comorbidities such as asthma, diabetes, and heart disease significantly increased the mortality rate for individuals. The most common signs and symptoms were fever, coughs, and difficulty breathing.

Diagnostic imaging showed that the majority of patients had bilateral lesions of the lungs, and only a third shows one lobe affected. The mortality rate among patients is profoundly affected by comorbidities like diabetes, hypertension, and a low oxygenation index.

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