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Research Article

Fate of clinical observations on covid-19 in Thi-Qar population

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Abstract

Coronavirus disease–2019 (COVID-19) was detected in Wuhan, China, in December 2019 and has resulted in a 2% fatality rate. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is the virus that causes this illness, and it is a newly discovered zoonotic strain. TLRs, which identify microbial components originating from invading pathogens, are implicated in the activation of innate responses to SARS-CoV-2 infection as well as the hyper inflammatory phenotype of COVID-19.

Aim: Determine the molecular structure of Toll-like receptor genes and clarify the immune pathogenesis of TLRs associated with covid 19 to provide insight into the role and early detection of covid 19.

Results: The highest age group of patients with covid_19 was (45-54 years) were 26 (29.5%) of all study patients. The most frequent symptom was fever (82.9%) and the least was diarrhea (21.6%). The study found no significant positive effect of smoking and non-smokers.

Conclusion: The most common clinical symptoms of covid_19 were Fever, Headache, Muscle/ body ache and Loss of taste and/ or smell.

Keywords: Covid_19, TLRs, CRP, D dimer.

1. Introduction

Coronavirus disease 19 commonly called as COVID-19 is caused by a recently identified beta coronavirus classified as severe acute respiratory syndrome coronavirus 2. (SARS-CoV-2).This virus only contains a single strand of RNA [1]. After the first incidence was detected in December 2019 in Wuhan, China, COVID-19 has swiftly spread over the globe and become pandemic, with over 563 million individuals infected and over 5 million fatalities in over 200 nations [1]. Since the beginning of the century, the COVID-19 outbreak is the third CoV outbreak [2]. The first pandemic, which started in China in November 2002 and concluded in July 2003, was caused by SARS-CoV, resulting in 8,422 cases reported and 772 mortality in 26 countries [3]. The second one appeared in Saudi Arabia in June 2012 and was caused by a novel subtype of the Middle East respiratory syndrome coronavirus (MERS CoV) [4] .The MERS-CoV epidemic continues, with 2,499 cases and 858 deaths reported in 27 countries as of December 2019 [2].

The molecular structure of SARS-CoV-2 has four key proteins: the spike (S), envelope (E), membrane (M), and nucleon capsid (N). SARS-CoV-2 shares approximately 80% of its genetic sequence with SARS-CoV the virus causative for the pandemic of SARS in 2002 [5]. Despite the similarities the severe acute respiratory S protein which enables the virus to connect to the ACE2 receptor is many amino acids lengthier than the SARS-CoV S protein. It is possible that this is the reason why COVID-19 has expanded so rapidly over the globe, in contrast to SARS, which was immediately restricted to its original location [6]. Human angiotensin-converting enzyme 2 (ACE2) is a type I membrane protein that binds viral S proteins. SARS-CoV-2 binds to ACE2 10 to 20-fold more strongly than SARS CoV, which may explaining reason human-to-human transfer is simpler [7].

The clinical presentation of SARS-CoV-2 infection might vary greatly from patient to patient [8], Approximately 80% of patients had moderate illness 14% had significant signs or symptoms, such as shortness, hypoxia, or lungs infiltrates encompassing more than fifty percent of the parenchyma of the affected lung(s), and 5% had indications suggestive of se-

vere illness, including shocks, respiratory failure, or multiple organ failure. Notably, the total mortality rate for the group was 2.3% [9] . Fever, a dryness cough, and exhaustion are often the symptoms that are experienced by the majority of people in the early stages of a COVID-19 infections [10]. Less common symptoms include nausea or vomiting, muscular or joint pain, dry mouth, lack of odor, rhinitis, conjunctivitis, headaches, different skin rashes, diarrhea, chills, and disorientation [11]. In the advanced stages of the illness, the patients will have severe difficulty breathing, decreased blood oxygen (hypoxia), damage of the lungs, and various organ failure [12]. Other consequences of COVID-19 sickness include more extreme and uncommon neurological symptoms such as stroke, encephalitis, insanity, and nerve damage [13].

Transmission can occur by coughing and sneezing and inhaling droplets as well as direct contact with the mouth, nose, and eyes [5]. from Human-to-human occurs through common ways such as contact transmission, direct transmission, and airborne transmission [14]. Viral life cycle and replication begin with viral integration onto ACE2 receptors in mucosal, pulmonary, cardiac, and renal epithelia. Age-related ACE2 expression increases adult ACE2 receptors [15]. Antigen-presenting cells (APCs), which include dendritic cells and macrophages, are able to take in the virus and then pass it along to T cells for processing. APCs are responsible for the induction and differentiation of T cells, as well as the following massive release of cytokines once these processes have taken place [16]. The innate immune system of the host Utilizes pattern recognition receptors (PRRs) such as toll-like receptors (TLRs) to identify viral components. The production of inflammatory factors that can mediate lung inflammation and fibrosis is stimulated by TLR binding [17] .

The ten members of the TLRs family (TLR1–TLR10) are expressed on macrophages, epithelial cells, and fibroblast cells. Multiple pathogen-associated molecular patterns (PAMPs) from bacterial, virus, and other foreign pathogens may activate TLR [18]. TLRs initiate innate immune activity by producing inflammatory cytokines, IFN, and other mediators. TLR 1, 2, 4, 5, 6, 10 are cell surface receptors; TLR 3, 7, 8, and 9 are endosome receptors [19]. Dendritic cells (DCs), macrophages, natural killer cells, adaptive T cells, and B cells express TLRs. TLR3 recognizes double-stranded RNA, TLR4 recognizes lipopolysaccharide, TLR7/8 recognizes single-stranded RNA, and TLR9 recognizes methylated Chg. DNA [20]. TLR activation through MyD88- and TRIF-dependent pathways causes nuclear translocation of NF-B, IRF-3, and IRF-7, resulting to the production of pro-inflammatory cytokines (IL-1, IL-6, TNF-) and type I IFN-/, which are necessary for anti-viral responses [21].

2. Material and Method

Sampling and source: Case control study was enrolled from October 2021 to June 2022, from Al Hussein Teaching hospital, Dhi Qar-Southern Iraq. During the process of collecting data, the patients' names, marital status, gender, age clinical investigation include included fever, headache, shortness of breath, runny nose, diarrhea, and cough, Each patient's personal information and clinical illness data were recorded on a single questionnaire. Blood samples were collected from symptomatic patients. The patient's in-hospital suffering from COVID-19 infections. All patients with COVID-19 enrolled in this study were positive nasopharyngeal swab in RT- PCR and CT scan and /or X-ray.

The sample studied were (N=176) cases including 88 patient and as (healthy person) from a control sample. The mean age was (51) years ranging between 29 to 73 years.

2.1. Sampling

To conduct medical tests, blood samples were drawn from patients as follow:

1. Venous blood of 10ml was drawn from patients lying in the isolation ward with covid 19 patients through a two syringe of 5 cc. The blood was divided into 3mL in EDTA tube for hematology test and immunological test, 3 mL in gel tube for biochemistry test and molecular test, 3 mL in the sodium citrate tube for D dimer test,

2.2. Exclusion Criteria

1. All of the patients suffer from atopic illnesses.
2. All patients who have autoimmune disorders.
3. Patients suffering from infectious disorders.
4. Suspected patients with COVID-19 infection but with negative PCR.

2.3. Laboratory Examination

Hematological assays methods: Hematological parameters were performed on EDTA blood using (SPINREACT / spin) in hematology laboratory Al Raffia General Hospital five par to estimate numbers and percentages of white blood cells. Whole blood was collected via an EDTA tube. An automatic hematology analyzer (SPINREACT / spin) was used to measure, Total WBCs, monocytes, Lymphocytes Neutrophils, Eosinophils, basophils, and platelets.

2.4. Biochemical Test

C reactive protein test assay

Procedure

- UPT Analyzer was switched on. The instrument will be warmed and stabilized for 20 minutes. In the meantime, the cassette of test, the sample diluted, and the sample were brought at room temperature, which is between 20 and 25 degrees Celsius.
- Read Parameter, Press setting button on screen of device and choose read parameter. Button, enter and insert the parameter card successfully, then take out the card.
- The aluminum packaging was Removed and the cassette of test was placed on a REFE even laboratory platform.
- The identification number of the sample was written on the plastic casing of the test cassette.
- 10uL serum or plasma sample was added to the sample diluent contained in the tube and mixed gently for a while.
- After thoroughly mixing the sample, one hundred microliters of the diluted specimen was transferred into the designated area of the test cassette.
- The substance was incubated for three minutes at room temperature. The result that was obtained after five minutes is not legitimate.
- Manual Test. Enter, scan the barcode, insert the test card to get the result.

2.5. D Dimer Rapid Quantitative Test Procedure

The test need to be carried out at ambient temperature.

Step 1: Preparation Activate the "use" option in the settings first, then the changes was saved. Checked to ensure that the lot number on the ID Chip and the Detection Buffer both correspond with the number on the Test Cartridge. Fine care's FIA system requires that you inserted your ID chip.

Step 2: The pipette was used for sampling, 15 Pl of whole blood or 10 Pl of plasma was collected, and then added it to the Detection Buffer tube.

Step 3: Putted the cap back on the Detection Buffer tube, and then the sample solution was shacked around ten times to ensure that it is properly combined.

Step 4: Loading Pipette was Prepared a sample volume of 75 Pl and placed it in the sample well of the Test Cartridge.

Step 5: Results are presented on the main screen and may be printed using the "Print" button. After being freed from the Fine care TM FIA System, the spent Test Cartridge must be discarded in accordance with local rules and procedures.

3. The Results

Demographical study: A case control study was conducted on 88 patients with covid 19 who were recruited from Al Hussein Teaching Hospital in The Qar province between October 14, 2021, and June 1, 2022. The patients' ages ranged from (29 to 73) years. The number of cases is determined using a minimal size equation that depends on the ratio of the disease, along with (88) people who were considered the control group. They were all examined and found to be free of any respiratory illnesses or other health issues that were also analyzed.

3.1. Distribution by Age Group of Covid 19 Patients and Controls

Table (3-1) documented that the highest age group of patients with covid_19 was the (45-54 years) were 26 (29.5 %) from total study patients 88 (100.0%), followed by (55-64 years) were 21 (23.9 %) from total study patients, at the decades (35-44 years) they were 20 (22.7%), the decades (≥ 65) years covid_19 patients were 12 (13.6%), while less cases of covid_19 patients appeared at first to second decades were 9 (10.2%) from total study cases 88 (100.0%).

According to statistics, these differences weren't significant (p value = 0.128*).

Table (3-1): Distribution of the sampled population by age group (Years)

Categorial age group (Yrs.)		Studied Groups		Total	P-value
		Patient	Control		
< 30	Count	9	11	20	0.128*
	%	10.2%	12.5	11.3%	
31-40	Count	20	28	48	
	%	22.7%	31.8%	27.2%	
41-50	Count	26	25	51	
	%	29.5%	28.4%	28.9%	
51-60	Count	21	17	38	
	%	23.9%	19.3%	43.2%	
> 60	Count	12	7	19	
	%	13.6%	7.9%	10.8%	
Total	Count	88	88	176	
		100%	100%	100%	

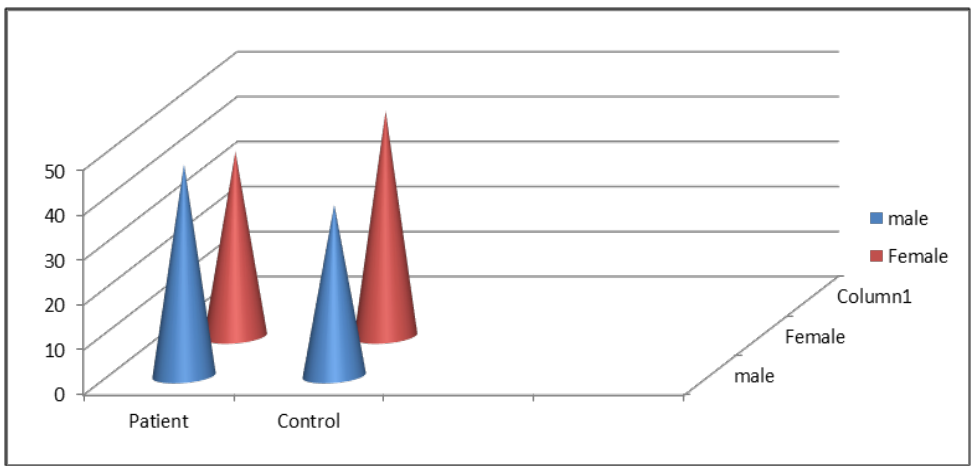

Figure (3-1): Distribution of the sampled population by age group (Years)

Patient and control gender distribution for Covid 19

From a total of 88 study participants, male groups had the largest percentage of COVID 19 occurrences, with 47 (53.4%) compared to 41 (45.8%) for female groups (100.0 percent). And 38 (43.2%) for male groups compared to 50 (56.3%) for female groups from the overall research controls. According to statistics, these deviations weren't significant (sig = 0.451) as shown below the following table.

Table (3-2): Distribution of the study population by gender group

Gender		Studies groups		Total	sig
		Patient	Control		
male	Count	47	38	85	0.451**
	%	53.4%	43.2%	48.3%	
Female	Count	41	50	91	
	%	45.8%	56.3%	51.7%	
Total	Count	88	88	176	
		100%	100%	100%	

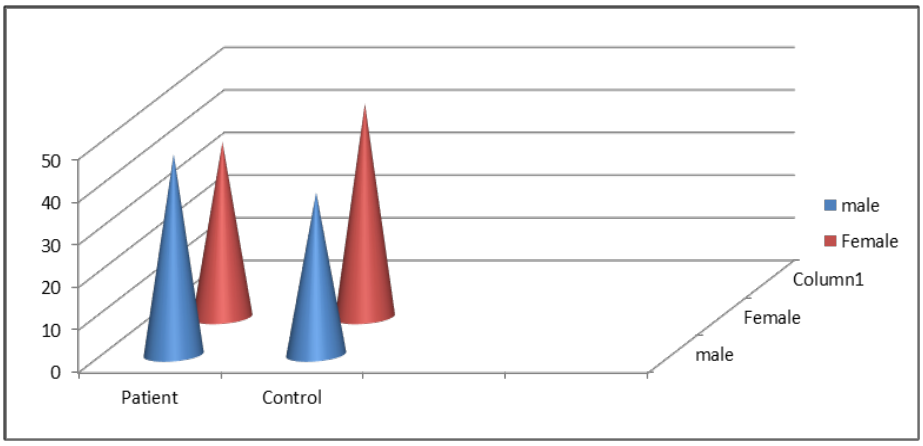

Figure (3-2): Gender-Based Distribution of the Study Group

Smoking characteristics of the study population

Table (3-3) shows a comparison of some of the basic characteristics in patients and controls. It is clear from the Table that there was no any significant statistical difference in these characteristics in the two groups.

Table (3-3): Sociodemographic characteristics of the study population

Characteristic	Patient	Control	Total	Sig.
Smoking				
Yes	31	22	53	0.454**
	35.2%	25.0%	30.1%	
No	57	66	123	
	64.7%	75.0%	69.9%	
Total	88	88	176	
	100.0%	100.0%	100.0%	

* Mann Whitney U Test
** Chi2 Test

Clinical study

Clinical symptoms: Table (3-4) presents the distribution of clinical features among patients. The most frequent symptom was fever (82.9%) and the least was diarrhea (21.6%).

Table (3-4): Clinical features of patients

Feature	Number*	Percent*
Fever	73	82.9
Headache	62	70.4
Muscle/ body ache	59	67
Loss of taste and/ or smell	45	51.1
Cough	44	50.0
Shortness/ difficulty of breathing	32	36.3
Congestion or runny nose	33	37.5
Chest pain	28	31.8
Nausea or vomiting	24	27.2
Diarrhea	19	21.6

* A patient may have more than one symptom.

4. The Discussion

Coronavirus disease 2019 (COVID-19) has become a global public health issue since its discovery at the end of 2019. The lower airway is the primary site of infection for coronavirus 2 in severe acute respiratory syndrome (SARS-CoV-2). The current coronavirus disease 2019 (COVID-19) outbreak is a worldwide emergency, as its rapid spread and high mortality rate has caused severe disruptions [23].

Demographical factors (Risk factors)

A case control study was conducted on a total of 88 cases of COVID-19 patients, whose ages ranged from (29 to 73 years). The highest age group of patients with covid 19 in this investigation was (45-54 years) were 26 (29.5%) from total study patients 88 (100.0%), followed by the (55-64 years), were 21 (23.9%), at the second to third decades (35-44), years they were 20 (22.7%), and the decades (65) years covid 19 patients were (100%).This results similar with Dhuaif (2021) that observed the patients were divided into three age groups (15–45 years old, 46–65 years old, and 66–85 years old), and their numbers were 169 (30%), 235 (43%), and 156 (27%), respectively [24]. Other study of Huang(2020) saying that the people are generally susceptible to COVID-19, including older middle-aged people are more predisposed to COVID-19 (median age of onset is about 55 years) [25].

From the 88 study participants, 47 (53.4%) of the male groups had covid 19 instances, compared to 41 (45.8%) of the female groups (100.0 percent). Men are more mobile than women, especially when they have to leave for work, which contributes to the higher rate of COVID-19 instances in men. Men are naturally more sensitive to viruses than women are, in addition to the factor of mobility at work. According to results that supported with study of Hikmawati and Setiyabudi (2020) the majority COVID-19 patients were male (56.5%). [26]. The study of Raba an(2020) agree with this study by showed males (58%) have higher risk factors for covid_19 than females (42%) [5].

In this study the most cases of covid_19 recorded nonsmoking 57 (64.7%versus smokers were 31 (35.2%) from total study cases which reflects no significant positive effect of smoking among studied patients groups (p value =0.454). This results supported by [27]. Observed that the number of never smoker patient more than smoker. In 10 Chinese studies, smoking prevalence in hospitalized patients ranged from 3.8% to 14.6% while in the Chinese population it is 27.7%. Low smoking prevalence among hospitalized patients was observed also in Korean and in the USA covid_19 patients [28].

Clinical factors

In the current study that the most clinical symptoms was fever (82.9%) and the least was diarrhea (21.6%). Headache (70.4%), Muscle/ body ache(67%), Loss of taste and or smell (51.1%), Cough(50%), Congestion or runny nose(37.5%), Shortness difficulty of breathing (36.3%), Chest pain(31.8%), Nausea or vomiting (27.2%). According to several prior studies, COVID-19's clinical symptoms included fever, cough, tiredness, pneumonia, headache, diarrhea, hemoptysis, and dyspnea [26]. Other study of reported that the most common clinical symptoms were similar to that of SARS-CoV infection: fever (87.9%), fatigue (69.6%), dry cough (67.7%), and myalgia (34.8%). A few infected patients also presented rhinorrhea, pharyngalgia, and diarrhea[5]. Some individuals demonstrated dyspnea and hypoxemia, which could ultimately result in acute respiratory distress syndrome (ARDS) and multiple organ dysfunction syndromes (MODS) within a week [29]. Fever, cough, dyspnea, and shortness of breath are the COVID-19 symptoms that are most frequently reported. Other signs and symptoms include headache, disorientation, myalgia, odynophagia, anosmia, dyspepsia, diarrhea, nausea, and vomiting [30].

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