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Protective Effect of ABO Blood Group Against Severe COVID-19 Infection : An Outcome of Hospital-Based Study in Taiz City, Yemen

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Abstract:

The importance of this study it helped in reversing the actual image to health sector in facing the epidemic with the lack of capabilities that qualified the staff to face any challenges and the result was loss of a number of the most efficient medical staff in Yemen. The aims of this study was identify the prevalence of SARS COV-2 in the health sector in Taiz city, Study of clinical symptoms on who infected with COVID-19 , Study of some factors including gender, type of blood grouping, LDH values in addition to the impact vaccine and means of prevention on the prevalence of COVID-19.and Study of some chronic and epidemic diseases on chance of COVID-19. The prevalence of SARS COV-2 among the health sector in Taiz city, Yemen was investigated in 180 samples and examined some by real time PCR and some with COVID-19 IgG/IgM cassette CTK Biotech. The results in this study showed that the prevalence percentage of SARS COV-2 was 48.33% that detected in workers of health sector. The clinical symptoms were fever and exhaustion were highest percentage (94.25%) then joint pain (89.66%), headache (86.21), loss of smell and taste (83.91), sore throat (74.71%), dry cough (73.56), runny nose (62.07%), chest pain (59.77%). The male infection was 50.57% but female infection was 49.43%. The A group of blood was49.31% more than other also the infection in A group of blood more severe from other .It was reached into isolation , intensive care and taking oxygen in 27 (75%) from total 36 individual with A group who infected of COVID-19 infection. The tonsillectomy increased chance of infection in rate (42.42%) also Some of medicines proved their effective during infection like Azithromycin, Aspirin, C, D vitamins and Zinc and steam inhalation of cloves and mint . All of these contributed to make light infection also helped to avoid the infection. The LDH was high in 46 samples(52.87%) from total 87samples. The vaccine contributed in avoid infection in the rate 15.56% *although of crowded work place and contacted with infected people but also not vaccinated people and not infected people of COVID19 were* 36.11% *and they protected due to unknown. Perhaps the epidemiology of some diseases in this city helped overcome the COVID19 in a less severe so, when Study of some chronic and epidemic diseases in covid-19 patients in health workers it was noted this result the highest was Dengue infection (69%) then Malaria (39.1%), Chikungunya fever (26.4%) ,also it was noted that the means of prevention don't achieve the desired effect and this was due to either intermittent use or to the poor quality of the used type.*

Keywords: Prevalence; COVID-19; Symptoms; ABO grouping; LDH; vaccine; Means of prevention; epidemic diseases; Steam inhalation; Hospital ;Health workers; Taiz city; Yemen .

1. Introduction

Coronaviruses (CoV) are a large group of RNA viruses that primarily target the human respiratory system and can lead to a wide range of illnesses from the common cold to severe respiratory syndromes. In the past 2 decades, outbreaks of CoV-related infections, including the severe acute respiratory syndrome (SARS)-CoV and the Middle East respiratory syndrome (MERS)-CoV, led to great public health problems and concerns [1]. A new coronavirus has emerged in the end of 2019 which was named SARS-CoV-2 and the disease caused by this new virus was termed COVID-19 (coronavirus disease 2019) is currently associated with an increasing number and rate of morbidities and fatalities. The genetic analysis of the causative virus of COVID-19 exhibited >50% sequence identity to MERS-CoV and 80% to SARS-CoV [2]. The innate immune system represents the first line of defense against viruses, which can inhibit virus replication, improve virus clearance, promote tissue repair, and activate a prolonged adaptive immune response against the viruses[3].

Up to July 2020 around 10 million people worldwide have been identified as infected with SARS-CoV-2, of which nearly 500.000 succumbed to COVID-19 [4]. In addition to China, early outbreaks took place in South Korea, Japan, and Central Europe where by now, the spread of the virus could be contained with great efforts. However, COVID-19 had been declared a pandemic by the WHO on March 10,2020 [4]. Health care workers are at exceptionally high risk of infection as they work on the frontline of this pandemic [5]

Until November 2021 , globally ,the number of cases of COVID-19 infections reached 250,878,722 and 2,271,00083 cases were recovered, and the number of deaths were 5,068,772.In Yemen, the number of COVID-19 infections in the regions affiliated with the internationally recognized government was 9,883, including 6,556 cases of recovery, and the number of deaths was 1,909. In Taiz specifically, the number of COVID-19 infection was 1649, including 993 recoveries, and the number of deaths was 261 [6] When we look to analysis of the epidemiological situation of Taiz Governorate 2020 Statistics that the number of infections with COVID 19 that was confirmed by PCR was 301 cases. The number of suspected cases conforming to the standard specifications of the COVID-19 virus was 564 cases. The distribution of infections according to sex, it is higher in males 76% more than females 24% and the number of deaths were 63 death cases (79%) from male and 13 death cases (21%)from female [7].

The clinical manifestations of COVID-19 include a variety of phenotypes, ranged from asymptomatic disease to severe interstitial pneumonia with acute respiratory distress syndrome (ARDS) and death [8]. However, mild-to-moderate flu-like symptoms are the most common presentations among COVID-19 patients, including fever, dry cough, sore throat, runny nose, and, in some cases, involvement of the lower respiratory tract that may lead to acute respiratory distress syndrome (ARDS) [9].

Other general symptoms such as weakness, headache, and gastrointestinal symptoms including diarrhea and vomiting have also been reported [10]. Moreover, to a lower extent some of the COVID-19 patients experienced loss of smell and taste [11]. Some affected individuals could further progress to severe forms of the disease, where they develop severe pneumonia, pulmonary edema, septic shock, and organ failure that would result in death [12]. Thromboembolic events and acute kidney injury have also been reported as COVID-19 complications [9].

The clinical evolution of COVID-19 can be described in three major patterns mild illness with upper respiratory tract clinical symptoms; non-life-threatening pneumonia; and severe pneumonia with ARDS, which begins with mild symptoms for seven-to-eight days and then rapidly progresses to symptoms requiring advanced life support [8].

Various biomarkers are currently under investigation for their role in determination of prognosis in patients with COVID-19. Lactate dehydrogenase (LDH) is one such biomarker of interest, especially since elevated LDH levels have been associated with worse outcomes in patients with other viral infections in the past [13]. Early data in COVID-19 patients has suggested significant differences in LDH levels between patients and without severe disease [14]. LDH has been associated with worse outcomes in patients with viral infections. Elevated LDH levels were associated with a ~6-fold increase in odds of developing severe disease [15].

The importance of this study it helped in reversing the actual image to health sector in facing the epidemic with the lack of capabilities that qualified the staff to face any challenges and the result was loss of a number of the most efficient medical staff in Yemen. If this was the case of the medical staff who was the most knowledgeable and aware, what about the case of the general public who lives in a state of poverty, war and lack of awareness.

The aims of this study was:

1- Identify the prevalence of SARS COV-2 in the health sector in Taiz city.

2- Study of clinical symptoms on who infected with COVID-19

3- Study of some factors including gender, type of blood grouping, LDH values in addition to the impact vaccine on the prevalence of COVID-19 .

4- Study of some chronic and epidemic diseases on chance of covid-19 infection in addition to the impact means of prevention on the prevalence of COVID-19 .

2. Materials & Methods

2.1. Sample collection

Sampling procedure: Samples were selected under the following inclusion and exclusion criteria. Sample size was 180 samples from suspected patients of covid 19 which were selected randomly from a total of 4251workers in health section of Taiz city of Yemen . The questionnaire distributed to 180 workers in the health sector. during the study period from September 2021 to August 2022.

$n= z^2 \times p \times (1-p)/d^2$
Z= degree of freedom 1.96 or 95 %
P= prevalence
d= margin of error = 0.05 %
P=(4430/3885943) × 100 = 0.114
n= (1.96×1.96)×0.114×(1-0.114)/0.05×0.05
n= 3.8416×0.114×0.886/0.0025
n=155
n=155 +25= 180
25 = control sample

2.2. Methods

Five ml of venous blood were collected from health sector workers . The blood samples were placed in a sterile plain tube. The blood were allowed for clotting at room temperature for 30 minutes then centrifuged 2000 rpm for 10 minutes by centrifuge RCF 1790xg . Serum was used for detection of COVID 19 IgG & IgM antibodies using a commercial kit Cassette CTK Biotech. The procedure of detection was according to the manufacturer's instructions.

2.2. 1.LDH Measurement

Specimen Type was Serum. Specimen Volume was 100 µL . Specimens was mixed well, then allowed clot to fully form ,and centrifuge 10 minutes at 2000 x g before use. Non-hemolyzed serum was used. LDH in serum was reported stable for 7 days at 15 - 25 °C, or for 4 days at 2 - 8 °C. Spectrophotometer 340 nm was used .It was blanked with sample then added 2400 µL of reagent1 and 100 µL of sample, mixed and incubated for 2-3 min , then added 600 µL of reagent2 mixed and read the absorbance after 1 min and read again for additional 3 min .The analyser calculates the activity of each sample automatically with a specified valid calibration factor from calibration process [16].

Normal value: <248 U/L

2.2. 2.COVID-19 IgG/IgM cassette CTK Biotech

The laboratory method for detecting COVID-19 is RT-PCR. 35 of target group had a positive result with covid 19 infection by real time PCR (RT-PCR) from the central laboratory of AL-Thawra hospital. However, this method requires sophisticated equipment and highly trained laboratory technicians. Moreover, viral load decreases rapidly 9 or 10 days after onset of symptoms. During the acute phase of infection, the titer of IgM to SARS-CoV rises rapidly and peaks around 2-3 weeks after the infection. SARS CoV-specific IgG antibodies appear shortly after IgM and persist for months (6). The SARS-CoV specific antibodies are useful markers for diagnosis and epidemiologic survey. All reagents are ready to use as supplied. Store unused test devices unopened at 2-30°C. If stored at 2-8°C, ensure that the test device is brought to room temperature before opening. The test device is stable until the expiration date printed on the sealed pouch. Do not freeze the kit or expose the kit to temperatures above 30°C. Blood specimen was Collected into collection tube containing no anticoagulants for serum by venipuncture to make serum specimen, then allowed blood to clot, then centrifuged collected specimens and carefully withdraw the serum into a new pre-labeled tube. specimens were stored at 2-8°C, if not tested immediately. The specimens can be stored at 2-8°C for up to 3 days. The specimens should be frozen at -20°C for longer storage. Did not use samples demonstrating gross lipemia, gross hemolysis or turbidity in order to avoid interference with result interpretation. specimen and test components were equilibrated to room temperature. If frozen, the specimen was mixed well after thawing, prior to performing the assay. The test device was placed on a clean, flat surface. The device was labeled with specimen's ID number . The plastic dropper was filled with the specimen. Holding the dropper vertically, dispense 1 drop (10-15 µL) of serum into the S well of the test cassette. Ensure there are no bubbles .Immediately add 3 drops detection buffer (~100 µL) into the D well of the test cassette. Ensure there are no bubbles. Set up timer .Then read results at 10-15 minutes. Positive results may be visible as soon as 1 minute. Negative results must be confirmed after 15 minutes. Any results interpreted outside 10-15 minutes window should be considered invalid and must be repeated. Discard used device after interpreting the results following local laws governing the disposal of device [17] .

Positive Result: In addition to the presence of the C line, if the G or M line develops, or both G and M lines develop, the test indicates the presence of SARS-CoV-2 IgG and/or IgM antibody. The result is positive or reactive.

2. 3. Data analysis

All the collected data was analyzed by using a Microsoft window and Excel computer software devised with Statistical Package for Social Sciences (SPSS).

3. Results

The total number of screened workers in health sector in Taiz city in this study was 180 persons including 95 Male patients and 85 Female . The total positive results were 87 positive results to covid19 infection including 35 positive results by RT-PCR , 52 positive results by COVID-19 IgG/IgM cassette including 5 IgM , 26 IgG , 21 IgM & IgG .

3.1. Covid-19 Prevalence Rate

Prevalence rate of infected health sector workers was calculated as follows: Prevalence (%) = (Number of health sector workers infected with COVID-19) / Total number of health sector workers examined) ×100.

Prevalence (%) = (87 /180) ×100.
Prevalence (%) = 0.4833×100
Prevalence (%) = 48.33%

Table 1. Clinical Symptoms on who infected with COVID-19 infection

COVID-19 symptoms	No	Yes	Ratio %
Fever	5	82	94.25%
Dry Cough	23	64	73.56%
Exhaustion	5	82	94.25%
Muscle Pain	15	72	82.76%
Sore Throat	23	65	74.71%
Diarrhoea	52	35	40.23%
Eye Infection	60	27	31.04%
Runny Nose	33	54	62.07%
Headache	12	75	86.21%
Nausea	29	58	66.67%
Rash	66	21	24.14%

Vomiting	70	17	19.54%
Chest Pain	35	52	59.77%
Difficulty Breathing	30	57	65.52%
Behind pain of the eyes	21	66	75.86%
Joint pain	9	78	89.66%
Swollen Glands	74	13	14.94%
Collywobbles	50	37	42.53%
Hardship	8	79	79.31%
Subcutaneous bruising	58	29	33.33%
Rapid breathing	70	17	19.54%
Loss of smell and taste	14	73	83.91%

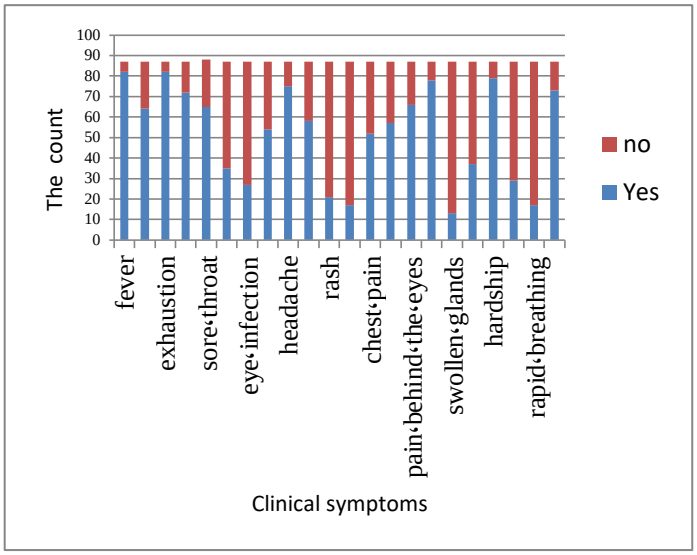

Figure 1. clinical symptoms on who infected with COVID-19 infection

Fever and exhaustion were the highest percentage (94.25%) then joint pain (89.66%), headache (86.21) ,loss of smell and taste (83.91), muscle pain (82.76%) , hardship (79.31%) ,pain behind the eyes (75.86%) , sore throat (74.71%), dry cough (73.56) ,nausea (66.67%) , difficulty breathing (65.52%), runny nose (62.07%), chest pain (59.77%) ,collywobbles (42.53%),diarrhea(40.23%),subcutaneous bruising(33.33%), eye infection (31.04%),rash (24.14%), vomiting and rapid breathing the same percentage (19.54%),and the lowest percentage swollen glands(14.94%).

Table 2. Effect of used medicine during infection

used medicine during infection		COVID-19, infection		p-values
		No	Yes	
C,D,Zinc	No	14	3	0.008
	Yes	79	84	
Aspirin	No	69	41	0.000
	Yes	24	46	
Azithromycin	No	39	27	0.129
	Yes	54	60	
Inhalation cloves	No	66	46	0.012
	Yes	27	41	
Inhalation mint	No	67	48	0.024

It was noted that all of these medicine and steam inhalation of all of cloves and mint contributed in became light infection also helped other individuals to avoid the infection.

Table 3. Effect of tonsillectomy on chance of infection

Tonsillectomy	Infection	No	N%	Yes	N%	Total	p-values
	COVID-19	19	42.42 %	14	57.58 %	33	0.384

It was noted that tonsillectomy increased chance of infection in rate (42.42%) because individuals who tonsillectomy their immune system decreased its efficiency.

Table 4. Effect of type of blood on the infection

Type of blood	count	No infection	n. of infected	Rate of COVID19 infection	P-Values
A	73	37	36	49.31%	0.0001
B	13	7	6	46.15%	
O	93	48	45	48.39%	
AB	1	1	0	0.00%	
Total	180	93	87	48.33%	

It was noted the A group of blood was49.31% more than other and followed it O group was 48.39% .

Table 5. Effect of type of blood on the severe infection

Type of blood	severe covid19		Total covid 19 infection	non covid19	p-value
	yes	no severe			
A	27	9	36	37	0.002
B	1	5	6	7	
O	13	32	45	48	
AB	0	0	0	1	
Total	41	46	87	93	180

Also it was noted the infection in A group more severe from other .It was reached into isolation , intensive care and taking oxygen in 27(75%) from total 36 individual with A group who infected of COVID-19 infection while only 13 individual (28.89%) in O group more severe from total 45 individual with O group who infected of COVID-19 infection but only 1 individual (16.67%) in B group more severe from total 6 individual with B group who infected of COVID-19 infection .

Table 6. Effect of gender on the infection

COVID-19 infection	Yes	Rate%
Male	44	50.57%
Female	43	49.43%
Total	87	100%

It was noted that male infection 50.57%was more than female infection 49.43%

Table 7. Effect of LDH on infection although of infected individuals became recovered

LDH	COVID-19 infection		p-values
	No	Yes	

Low	18	8	0.0001
normal	54	33	
High	21	46	

It was noted that LDH was high in 46 (52.87%) of infected people from total 87 of infected people.

Table 8. Effect of the COVID-19 Vaccine on infection

Infection	Vaccinated group		Total of Vaccinated group	Rate	Non vaccinated group	Rate	p-values
	Vaccine Type						
	AstraZeneca	Jansen					
No Covid 19 Infection	21	7	28	15.56 %	65	36.11 %	0.268
Covid 19 Infection	26	7	33	18.33 %	54	30%	
Total	47	14	61	33.89 %	119	66.11 %	180

It was noted this vaccine contributed in avoid infection although crowded work place and contact with infected people in the rate 15.56% but also not vaccinated people and not infected people in the rate 36.11% also protected due to unknown.

Table 9. Effect of means of prevention on chance of infection

means of prevention		Covid19 Infection				
		No		Yes		P-Values
		Count	N %	Count	N %	
Mask	no	16	17.2%	16	18.4%	0.835
	yes	77	82.8%	71	81.6%	
Gloves	no	19	20.4%	15	17.2%	0.585
	yes	74	79.6%	72	82.8%	
Change of work clothes	no	42	45.2%	31	35.6%	0.193
	yes	51	54.8%	56	64.4%	
Take off shoes outside	no	36	38.7%	30	34.5%	0.556
	yes	57	61.3%	57	65.5%	
Disinfected	no	14	15.1%	10	11.5%	0.483
	yes	79	84.9%	77	88.5%	
Wash hands with soap and water	no	8	8.6%	4	4.6%	0.282
	yes	85	91.4%	83	95.4%	

Through the results, it was noted that the means of prevention do not have the effect that it is supposed to achieve, and this is due either to intermittent use or to the poor quality of the used type that does not achieve the desired effectiveness.

Table 10 . Study of some chronic and epidemic diseases in Taiz city in covid-19 patients

Other diseases		Covid19 infection	
		Count	N %
Diabetic	No	82	94.3%
	Yes	5	5.7%
Liver Inflammation	No	85	97.7%
	Yes	2	2.3%
Kidney Problems	No	73	83.9%
	Yes	14	16.1%
Anaemia	Normal	61	70.1%
	Low	26	29.9%
Thrombosis	No	83	95.4%
	Yes	4	4.6%
Blood pressure	No	74	85.1%
	Yes	13	14.9%
Cancer	no	85	97.7%
	yes	2	2.3%
Chronic arthritis	no	71	81.6%
	yes	16	18.4%
Dengue infection	no	27	31%
	yes	60	69%
Chikungunya fever	no	64	73.6%
	yes	23	26.4%
Malaria	no	53	60.9%
	yes	34	39.1%
cholecystectomy	no	87	100%
	yes	0	0%
Tonsillectomy	no	73	83.9%
	yes	14	16.1%
Splenectomy	no	87	100%
	yes	0	0%
Appendectomy	no	81	93.1%
	yes	6	6.9%
Excision of any gland	no	87	100%
	yes	0	0%
Cholera	no	80	92%
	yes	7	8%

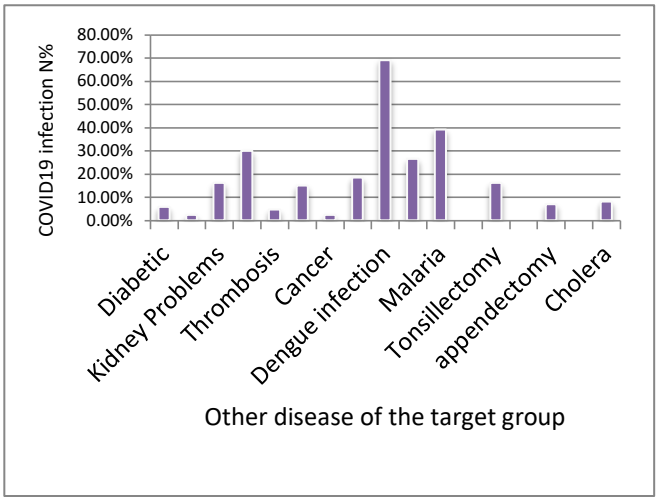

Figure 2. Study of some chronic and epidemic diseases in Taiz city in covid-19 patients

when Study of some chronic and epidemic diseases on chance of covid-19 infection it was noted this result the highest was Dengue infection (69%) then Malaria (39.1%) , Anemia (29.9%) , Chikungunya fever (26.4%) , Chronic arthritis (18.4%) , Tonsillectomy and Kidney Problems the same rate (16.1%) , Blood pressure (14.9%), Diabetic (5.7%) , cancer (2.3%) .Perhaps the epidemiology of some diseases in this city helped overcome the Covid in a less severe .

4. Discussion

Due to the different design and insufficient sample size, the clinical symptoms, laboratory and imaging results of the studies were different [18]. In our study , the clinical characteristics of COVID-19 patients was analyzed and consisted of 87 COVID-19 patients in health sector ,Taiz city, Yemen. The results showed that the male infection was 50.57% more than female infection was 49.43%.and the most common symptoms of patients with COVID-19 were fever and exhaustion the highest percentage (94.25%) then joint pain (89.66%) , headache(86.21) ,loss of smell and taste (83.91) , muscle pain (82.76%) , hardship (79.31%) ,pain behind the eyes (75.86%) , sore throat (74.71%) , dry cough (73.56) ,nausea (66.67%) , difficulty breathing (65.52%) , runny nose (62.07%) , chest pain (59.77%).

Other study in China were systematically review the clinical characteristic of COVID-19 patients showed that a higher proportion of infected patients were male (56.9%). The incidence rate of respiratory failure or ARDS was 19.5% and the fatality rate was 5.5%. Fever (80.4%), fatigue (46%), cough (63.1%) and expectoration (41.8%) were the most common clinical manifestations. Other common symptoms included muscle soreness (33%), anorexia (38.8%), chest tightness (35.7%), shortness of breath (35%), dyspnea (33.9%). Minor symptoms included nausea and vomiting (10.2%), diarrhea (12.9%), headache (15.4%), pharyngalgia (13.1%), shivering (10.9%) and abdominal pain (4.4%) [19].

Other study in China were showed that the incidence of fever was 89.1% while the incidence of cough was 72.2% in COVID-19 patients. Another study indicated that the main clinical symptoms of COVID-19 patients were fever (88.5%), cough (68.6%) and myalgia or fatigue (35.8%) [20] .

In our study studied LDH level and found that LDH was high in 46 (52.87%) of infected people from total 87 of infected people this was after recovery.

In other study in USA elevated LDH levels were associated with a ~6-fold increase in odds of developing severe disease and a ~16-fold increase in odds of mortality in patients with COVID-19 [15].

In our study , we study some chronic and epidemic diseases and found this result was Dengue infection (69%) then Malaria (39.1%) , Anemia (29.9%) , Chikungunya fever (26.4%) , Chronic arthritis (18.4%) , Tonsillectomy and Kidney Problems the same rate (16.1%) , Blood pressure (14.9%), Diabetic (5.7%) , cancer (2.3%) .

In other study in Portugal found that respiratory, cardiovascular, and renal diseases were associated with mortality and ICU admission among patients hospitalized due to COVID-19 infection (odds ratio [OR] 1.48, 95% CI 1.11-1.98; OR 3.39, 95% CI 1.80-6.40; and OR 2.25, 95% CI 1.66-3.06, respectively). Diabetes and cancer were associated with serious outcomes only when considering the full sample of COVID-19–infected cases in the country (OR 1.30, 95% CI 1.03-1.64; and OR 1.40, 95% CI 1.03-1.89, respectively). Older age and male sex were both associated with mortality and ICU admission. The perception of risk for severe COVID-19 disease in the study population was 23.9% (n=40,890). This was markedly higher for older adults (n=5235, 46.4%), those with at least one chronic disease (n=17,647, 51.6%), or those in both of these categories (n=3212, 67.7%). All included diseases were associated with self-perceptions of high risk in this population [21] .

Also In our study , we found the highest was Dengue infection (69%) .

In other study in Brazil found that the regions where people had high antibody (IgM) levels for dengue fever had a low incidence of COVID-19 cases, and there was also a lower infection growth rate and mortality [22] .

Also the results are controversial in this study was A group more severe from other .It was reached into isolation , intensive care and taking oxygen in 27(75%) from total 36 individual with A group who infected of COVID-19 infection while only 13 individual (28.89%) in O group more severe from total 45 individual with O group who infected of COVID-19 infection but only 1 individual (16.67%) in B group more severe from total 6 individual with B group who infected of COVID-19 infection .

In other study in China was indicated that individuals with blood group A [odds ratio (OR) = 1.33, 95% confidence interval (CI) 1.14 to 1.56] and B (OR = 1.06, 95% CI 1.00 to 1.13) had a substantially higher risk of COVID-19, whereas this was not the case for blood group AB (OR = 1.07, 95% CI 0.88 to 1.30). Individuals with blood group O was not prone to develop the disease (OR = 0.71, 95% CI 0.60 to 0.84) [23] .

In this study was noted this vaccine contributed in avoid infection although crowded work place and contact with infected people in the rate 15.56% .

In other study in the US was noted that Vaccine effectiveness of three doses against emergency department or urgent care visits was 83% (82% to 84%) initially but waned to 46% (44% to 49%) by four to five months. Waning was evident in all subgroups, including young adults and individuals who were not immune compromised; although waning was more in people who were immune compromised. Vaccine effectiveness increased among most groups after a fourth dose in whom this booster was recommended. Conclusions Effectiveness of mRNA vaccines against moderate and severe covid-19 waned with time after vaccination [24] .

5. Conclusion

This study indicated that blood groups A and B may be risk factors for COVID-19, whereas the blood group O appears to be protective. Further rigorous and high-quality research evidence is needed to confirm this association. In conclusion undoubtedly, continuous health supporting, continuous medical examination and prompt treatment of patients minimizes the spread of COVID-19 infection . health education in general should be increased to raise awareness of the society with importance protective means. Also we should use of high-quality and effective means of prevention and more studies on the effectiveness of the vaccine . Our duties as researchers anywhere in the world explored the facts. and

credibility, accuracy in results.

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