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THE EFFECT OF THE COVID-19 PANDEMIC (CORONA VIRUS) ON HBA1C AND DAILY SUGAR LEVELS ON DIABETIC PATIENTS

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Abstract

In light of the outbreak of a new virus and its spread to the world in 2019, when this virus, known as Corona virus (Covid-19) (Severe Acute Air Syndrome) type II (SARS-2), we decided to examine the impact of the Corona virus on diabetis patients and non diabetis patients in our study.It has been found that there is a relationship between it and diabetes patients and its effect on vital functions in the human body. Factors for minimizing sugar and anti-viruses therapies may modify hazards, taking into account with intense caution the warnings regarding its use and the expected side effects that may occur with the treatments of Covid-19. lastely, sever hitting with coronavirus itself may be aggravating factor of diabetis patiants, where it may be leads to ocurr sever metabolism intricacy via throught direct adverse effects on β-cell work.

In our research, we decided to study the effect of the Corona virus on patients infected with it and on others with diabetes by measuring dialy blood sugar and (HbA1c) for patients and comparing them with the control group. Moreover, high blood sugar reduces the immunity of the infected, causing severe complications that may be leading to death, as it was found that there is a relationship between the Corona virus and diabetes known affect the pancreas gland in the digestive system, which leads to an imbalance in the rate of high and low glucose level in the blood.

Keywords: SARS-2, Diabetes Mellitus, Mortality, Daily FBS and HbA1c.

Introduction

A group of atypical interstitial pneumonia cases appeared in 2019, it resulted by severe infection with the SARS-2 virus, which was determined in China, in the city of Wuhan. After a quike diffusion of Covide-19 virus in 2020 on March, the World Health Organization stated this virus is a universal pandemic. Therefore, the necessary measures have been taken to increase health and preventive awareness, in addition to taking preventive measures and reorganizing health hospitals around the world to receive the increasing numbers of patients infected with this deadly virus (Health map, 2020).

At the end of 2019, in China, specifically in Hubei Province, a series of respiratory infections swept. The agent responsible for this viral infection has been identified, and it is a new coronavirus that belongs to the Coronaviridae family called SARS-2. Researchers viewed it as very similar to the SARS-2 coronavirus, which appeared beginning in 2002-2003. The

virus responsible for this disease was described as the Covid-19 virus by the World Health Organization, as it was believed that the disease had spread through an animal source from the seafood markets in Wuhan, China. While human-to-human transmission has been identified as being responsible for the transmission of the disease in society, and it has been reported in two hundred countries in the world (Wu Z, McGoogan JM, 2020).

In about thirty on January 2020 it was promulgation as a public health emergency, where health emergency declared COVID-19 has been declared pandemic by the World Health Organization. This virus (SARS-2), which spread at a frightening speed all over the world, had its first appearance in China, specifically in the city of Wuhan (Zhu N et al., 2020).

The number of cases from all over the world was approximately eleven and a half million on July 6, 2020, with nearby 536,893 deaths from the SARS-2 virus, and the cause was the infection of the upper respiratory tract of patients with the virus. Many disease states are associated with a higher risk of mortality including gender, age, hypertension, DM, obesity, cardiovascular disease, COPD and cancers (Apicella M et al., 2020 and Marouf et al., 2021).

Previous studies have shown that the advanced age of people and the incidence of chronic diseases such as diabetes and high blood pressure are the most vulnerable to infection with the virus-19, and therefore they are at a greater risk of death (Wang D et al., 2020; Chen N et al.,2020 and Zheng Z et al., 2020). DM as it is known globally, represents the third most important reason of dying around the world as a result of fatness, where the last has been a huge prevalent in a worldwide and has been caused a lot of diseases (Riaz S et al.,2009). It is like the internationally deadly effect of alcohol abuse, cigarette smoking (Marouf et al., 2020 and Marouf et al., 2023) and other diseases (Marouf et al., 2021).

Due to the global outbreak of diabetes, there are frequent ailments between people infected with diseases related with coronavirus-19 (Shenoy A et al., 2020).

In general, the risk of infection with the virus rises with diabetes, as many studies have shown that there is a great similarity between the global spread of diabetes and the spread of infection, as both are affected by many factors such as region, age and ethnicity. Diabetics who control their blood sugar levels are not known to have a raised risk of SARS-2 infection (Apicella M et al., 2020).

In our study, we decided to study the effect of the Corona virus pandemic on patients infected with it and on others with diabetes and its impact by measuring the proportion, HbA1c, sugar, lipids, kidney function, liver function, for patients and comparing it with the control group of volunteers from infected cases, because It has a significant negative impact on patients affected by it.

Especially on diabetics or patients at risk of developing diabetes, the Corona pandemic has claimed many lives since its appearance in 2019, especially diabetics. The focus and attention has been on diabetics since the beginning of the spread of Covid-19 in China, and the reason is due to the poor diagnosis of those infected with the virus for patients with type 2 diabetes or patients with type 1 diabetes, as both are at risk of severe infection with the virus. The poor prognosis for the infection of diabetics with the Covid-19 virus is due to several factors, and this reflects the nature of the diabetes syndrome in general (DM1 or DM2) (Ma RC and Holt RI, 2020). As for those recovering from the virus, it has caused them to suffer from complications and chronic diseases after recovering from the virus.

Subject (Material and Methods)

We took blood samples from patients infected with the Corona virus who were sleeping in the quarantine hospital in the city (Ramadi - Anbar Governorate in Iraq). The period of study was from (1st of February 2022) to (1st of August, 2022). Blood Sample (5ml) was drawn from all patients in the study. We made biochemical test of blood samples after isolation, such as kidney function, liver function, lipids, and measurement of glucose and cumulative sugar for infected patients. Before the specialist doctor and after giving these doses of treatment as well, in order to know the extent of the effect of the treatment on the virus in positive and negative terms and vital body functions, as well as its impact on the percentage of low and high blood sugar levels in patients infected with the virus who have diabetes before infection with the virus and those who are infected with the virus and do not have an infection Diabetes, where some negative and positive effects were observed on the cases from the groups that were divided Previously, in terms of high and low blood sugar level for people infected with the virus and have diabetes, and those infected with the virus and do not have diabetes, and the changes that occurred in the biological (biochemical) reactions in laboratory tests conducted on infected cases.

Where it was been noticed that there are groups of cases who were infected with the virus and they were originally diabetic before infection with the virus, a defect and irregularity in the low and high level of their sugar during infection, before, and after they were given treatment. Cases infected with Covid-19 and not previously infected with diabetes were also noted, as there are Those who had negative and positive effects through high and low blood sugar levels and during infection before and after giving them treatment, and also changes were observed in the vital reactions of some members of the body in the groups of all affected cases**.**

Study Period

1- 130 people (54 female and 54 mal) with different grades of illness efficacy with a monitoring set (22 female and male). Co-vid 19, HbA1c and FBS (GLU) will been measured in 108 patients.

2- We will work in four groups:

I. Gruop1: is a control group (22 people).

II. Gruop2: beneficiary patients from treatment (28 people).

III. Group3: non-beneficiary patients from treatment (28 people).

V. Group4: abnormal patients from treatment (52 people)

Statistical analysis: We used the program to calculate the value of statistical significance, we used the application of the statistical program SAS, where the value of statistical significance was less than 0.02 ($p < 0.02$), and we also used the LSD test (analyses of Differences ANOVA) to make important comparisons between the standard deviations of the values and their averages.

Results

Our research included about 130 people (54 female and 54 mal) with different grades for illness levels with a monitoring set (22 female and male). Covid-19, HbA1c and FBS (GLU) will been measured in 130 people (108 patients and 22 healthy individuals).

With regards into group 2 (beneficiary patients, 28 subject) their (mean ± SEM) of fasting blood sugars were (214.63 ± 100.28, 166.58 ± 50.70 & 134.10 ± 35.51) as compared to control group1 (G1) (88.7 ±9.43) respectively, as explained in figure (1).

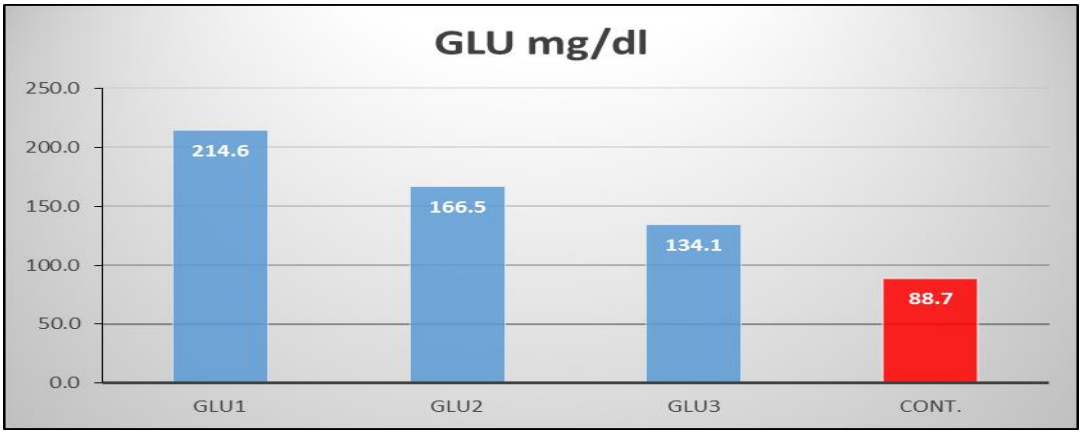

Fig.1. Each value represents the mean ± S.E.M of FBS1, FBS2 and FBS3 as (GLU1, GLU2 and GLU3 respectively) of beneficiary group (G2) as compared to control group1 (G1) respectively.

In addition, HbA1c values of group 2 (beneficiary patients, 28 subject) their (mean ± SEM) were (10.10 ± 0.21, 8.30 ± 0.29 & 6.80 ± 0.31) as compared to control group1 (G1) (4.60 ± 0.43) respectively, as showed in figure (2).

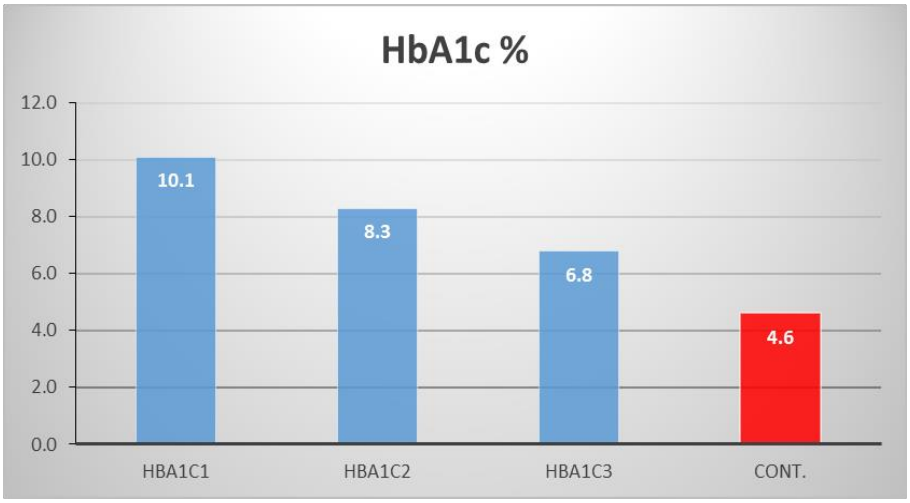

Fig.2. Each value represents the mean ± S.E.M of HbA1c values (1,2 &3) of beneficiary group2 (G2) as compared to control group1 (G1) respectively.

Moreover group 3 (non-beneficiary patients, 28 subject) their (mean ± SEM) of fasting blood sugars (mg/dl) were (175.80 ± 60.38, 215.10 ± 95.73 & 268.40 ± 135.51) as compared to control group1 (G1) (88.7 ± 9.43) respectively, as noticed in figure (3).

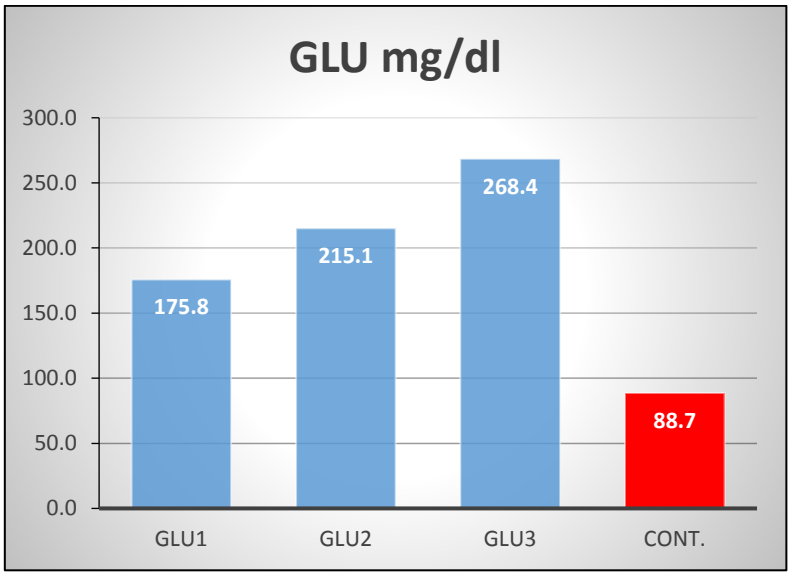

Fig.3 Each value represents the mean ± S.E.M of FBS1, FBS2 and FBS3 as (GLU1, GLU2 and GLU3 respectively) of non-beneficiary group (G3) as compared to control group1 (G1) respectively.

Again, HbA1c values of group3 (non-beneficiary patients, 28 subject) their (mean ± SEM) were (7.60 ± 0.33, 9.60 ± 0.23 & 12.20 ± 0.21) as compared to control group1 (G1) (4.60 ± 0.43) respectively, as showed in figure (4).

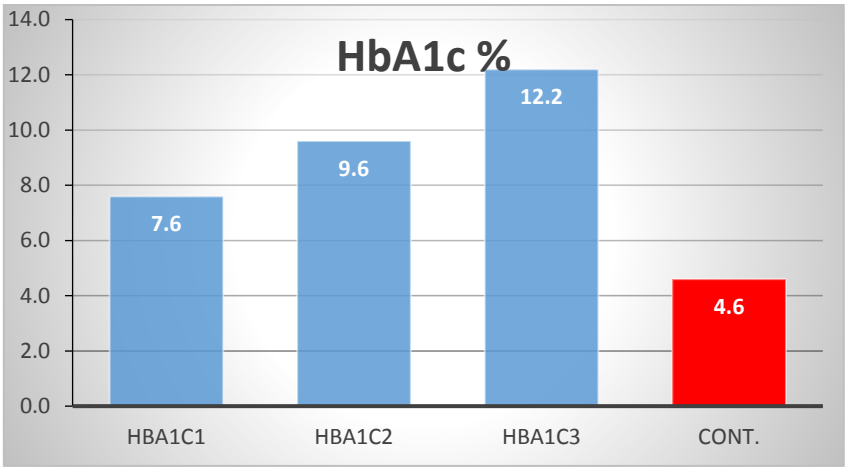

Fig.4. Each value represents the mean ± S.E.M of HbA1c values (1,2 &3) of non-beneficiary group3 (G3) as compared to control group1 (G1) respectively.

With regards into group 4 (abnormal patients, 52 subject) their (mean ± SEM) of fasting blood sugars (mg/dl) were (179.0 ± 62.18, 238.10 ± 115.43 & 192.0 ± 86.91) as compared to control group1 (G1) (88.7 ± 9.43) respectively, as explained in figure (5).

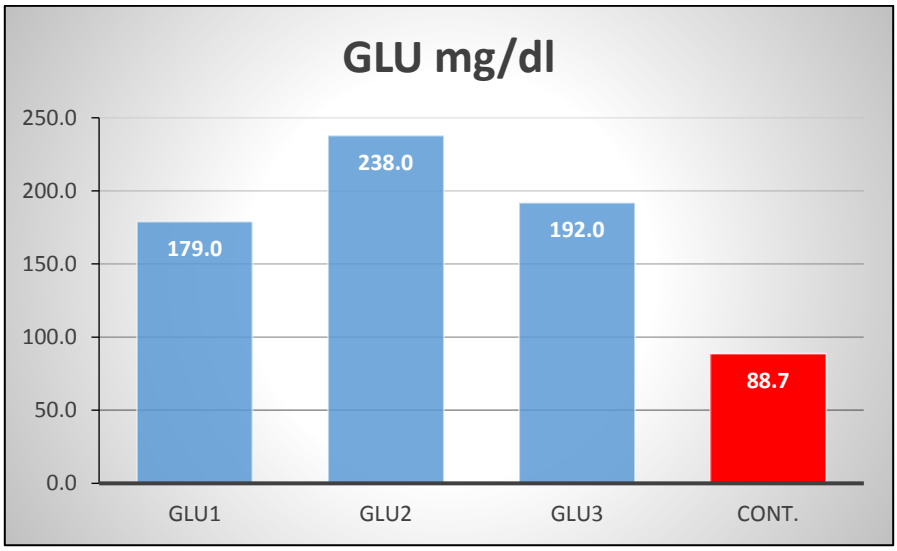

Fig.5 Each value represents the mean ± S.E.M of FBS1, FBS2 and FBS3 as (GLU1, GLU2 and GLU3 respectively) of abnormal group 4 (G4) as compared to control group1 (G1) respectively.

HbA1c values of group4 (abnormal patients, 52 subject) their (mean ± SEM) were (7.90 ± 0.31, 10.70 ± 0.20 & 8.70 ± 0.31) as compared to control group1 (G1) (4.60 ± 0.43) respectively, as showed in figure (6).

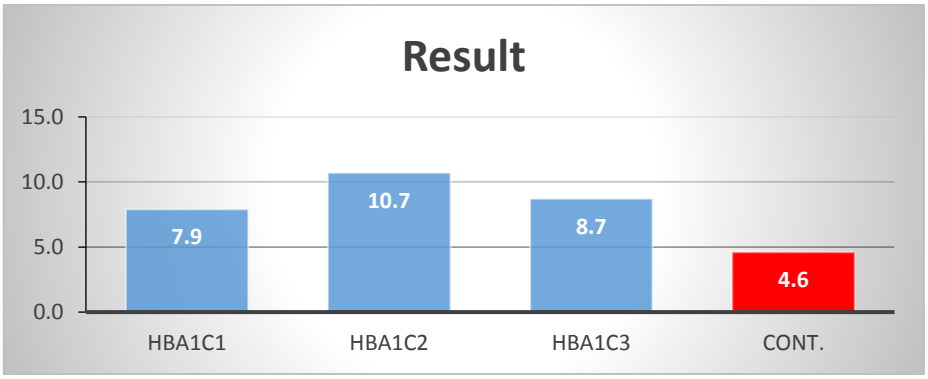

Fig.6. Each value represents the mean ± S.E.M of HbA1c values (1, 2 &3) of abnormal group4 (G4) as compared to control group1 (G1) respectively.

Comparison results of FBS3 as GLU3 for beneficiary, non-beneficiary and abnormal groups respectively (of 108 patients) as compared to a control group are explained in figure (7).

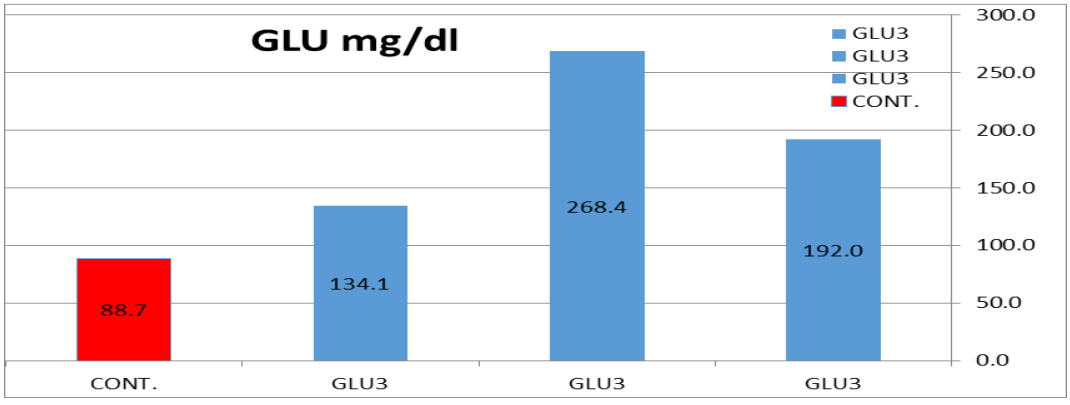

Fig.7. Each value represents the mean ± S.E.M of FBS3 as GLU3 of beneficiary, non-beneficiary and abnormal groups respectively as compared to a control group.

Comparison results of HbA1c values for beneficiary, non-beneficiary and abnormal groups respectively (of 108 patients) as compared to a control group are explained in figure (8).

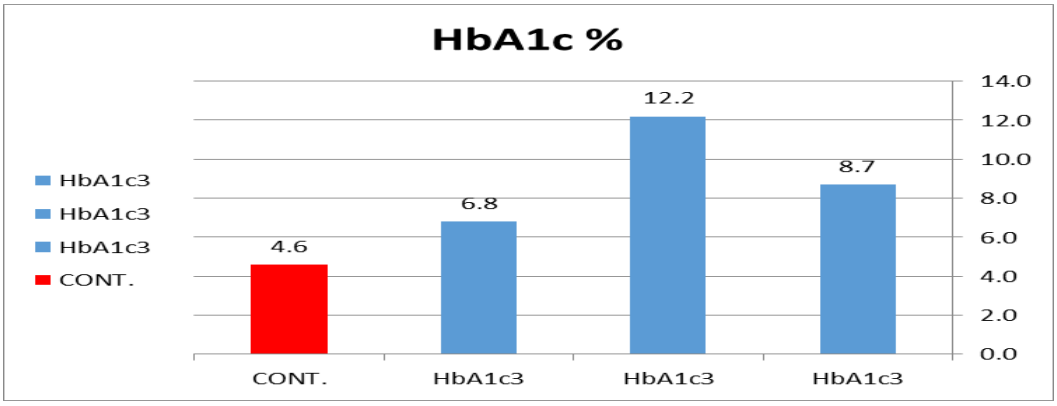

Fig.8. Each value represents the mean ± S.E.M of HbA1c values of beneficiary, non-beneficiary and abnormal groups respectively as compared to a control group.

Discussion:

The 3rd largest reason to die in the world is Diabetic which is responsible for a much multiple, affecting on different organs in the body (Khalid S et al. 2015). Until yet, a body of evidence indicates that an increased risk of contracting the SARS-2 virus has a strong relationship with diabetes (Katulanda P et al., 2020 and Argenziano MG et.al, 2020).
A positive relationship was found between high blood sugar and acute infection with the Covid-2 virus. Our investigations also indicated that there is a positive relationship between the HbA1c level and the severity of infection with the virus and these results were identical with the recently studied where by observing the high death rate for diabetics after their acute infection with the virus, as well as the death rate was high in those infected with the virus and non-diabetes, which their fasting glucose value is above average (pre-diabetic patent) (Yang JK et al., 2006). In addition, in our research, we examined the severity of infection with the virus for patients and the percentage of diabetes in the blood of those with severe infection with the virus, and we found that it was very high (the level of glucose in the serum > 140 mg / dl) (Chen J et al., 2020).

Furthermore, most of those infected with the virus died shortly after entering the quarantine hospital and giving him the necessary treatments, about 75% of them, and one of the most important of these reasons was the significant increase in blood sugar levels, even if the patient did not have diabetes, but all patients were infected with the SARS epidemic virus, and this is what confirmed by some recent research on the virus and diabetes (Yang JK et al., 2006). Also, our study showed that the patients showed three groups, a group of beneficiaries of the treatments, and they constitute 25%, and another group that does not benefit from the treatments, and they make up 25%, and another group that is abnormal, which constitutes 50%.

In other words, we noticed that those with acute infection with the virus have an important increase in the level of diabetes in the blood, and we see it clearly in patients with diabetes or patients who are predisposed to diabetes (pre-diabetes) or / and patients who have an increase in obesity. Also for patients with type 2 diabetes and obesity, their inflammatory

changes will lead to a change in cytokines and chemokines, and this in turn leads to activation of leukocytes, increased fibrosis and programmed cell death, and then an increase in the proportion of inflammatory cytokines (Saand AR et al., 2020).

Conclusion:

We conclude from this study that the Corona virus effects on immunity of human body does not on the respiratory system only , but also especially on It affects people with chronic diseases such as diabetes, heart disease and other diseases, and this virus may cause death for patients with weak immunity due to those diseases especially diabetes, where Some changes can occurred during in the blood sugar level in terms of its high and low in the blood of those who had diabetes before infection with the Corona virus, during infection and after recovery. These changes were noticeable on the cases and clear in terms of clinical and laboratory results, positive and negative on them. It appears that high blood sugar exacerbates the infection in non-diabetic Covid-19 patients to a greater degree compared to diabetic patients with Covid-19. In addition, the protocol used for treatment by doctors in the quarantine hospital is wrong, and this is evident in the death rate of patients after giving them treatments according to the medical protocol in the hospital.

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