How to Cite:
Aldabbagh, H. K. S., & Ali, W. M. (2022). Assessment of the impact of coronavirus disease (COVID-19) on glycemic control. *International Journal of Health Sciences*, *6*(S5), 9296–9304.
https://doi.org/10.53730/ijhs.v6nS5.11939

Assessment of the impact of coronavirus disease (COVID-19) on glycemic control

Dr. Hijran Kamal Salih Aldabbagh
M.B.Ch.B. \ C.A.B.M. \ (Consultant Internist), Iraqi Ministry of Health, Kirkuk Health Department, Kirkuk General Hospital, Kirkuk, Iraq
Email: hijrandabbagh1967@gmail.com

Dr. Waleed Mohammed Ali
M.B.Ch.B. \ F.I.B.M.S. \ (Consultant Internist \ Diabetologist), Iraqi Ministry of Health, Kirkuk Health Department, Kirkuk General Hospital, Kirkuk, Iraq.
Email: waleed.alsafar@mesiq.edu.iq

***Abstract*---**This study aimed to know the effects of COVID-19 on blood sugar control where the designed study was based on a retrospective cross-sectional study by collected 400 patients with COVID-19 from several different hospitals, and it was found that the prevalence of diabetes is high. In Covid, 19 patients reaches 30%. It is considered one of the most prevalent comorbidities, and it was also revealed that diabetic patients are the most vulnerable group to hospitalization. It was also noted that the number of deaths increased compared to non-diabetic patients where The results revealed males were more exposed compared to females, as (110 were with 27.5% females, 290 males with 72.5% males) with no statistical difference was found in terms of previous and last visits, where the p-value was 0.78, and no difference was found between the two study groups with respect to FPG mg/dl, but different results were detected at HbA1c, where the results were significantly higher 7.4 ± 5.1 after lockdown when compared with HbA1c levels before lockdown.

***Keywords*---**Lockdown glycemic, control, FPG, CO-19, CoV-2.

Introduction

Coronavirus 2019 (COVID-19) pandemic started in Wuhan, China, in December 2019 and spread rapidly across the world and due to the cancellation of scheduled in-person visits during the spread of the COVID-19 [1,2]. epidemic, telemedicine was the only way to provide health care services to individuals People with diabetes and to check blood sugar control during this unexpected event. [3] The aim of this study is the assessment of the impact of coronavirus

disease (COVID-19) on glycemic control. Diabetes mellitus is considered a risk factor for an adverse outcome in patients with COVID-19 is similar to what results with influenza [4]. There is a similar risk between people with diabetes and infections caused by other coronaviruses (SARS-CoV and MERS-CoV). [,5,6,7]. Today, COVID-19 is a far-reaching public health problem in the world [9-11]. DM is one of the most common comorbidities and is associated with increased mortality [12-14]. This is particularly seen in the elderly and in people with DM2, obesity, and hypertension (HTN).

In China, Guan et al. participated in a study of 1,099 patients with COVID-19; it was found that 173 seriously ill patients, of whom 16.2% had DM2, followed by coronary artery diseases (5.8%), hypertension (3.7%), cerebrovascular diseases (2.3%) [11,12,13]. Zhang evaluated 140 hospitalized patients with COVID-19, 30% of whom were diagnosed with hypertension and 12% diagnosed with DM2 [16]. A meta-analysis that included six studies in Chinese patients (n = 1687) found that the presence of DM2 gives a greater risk of developing a more negative course of the disease in comparison with those without DM2 [14,15,16].

In Italy, the median age of patients' mortality COVID-19 was 80.5 years (interquartile range [IQR]: 31 - 103 years), 70% were male, and 35.5% of the 355 patients deceased with information on comorbidities had DM2 [17,18]. Collected data from the year 2018, in which the prevalence of DM2 was of 20.3%, and comparing it with that found in patients who died from COVID-19, for the same age range and distribution by sex, the ratio was found to be as high as 1.75 % [19,20].

Material and Method

Patient sample

A study was conducted in several different hospitals in Iraq, where 400 patients with Coronavirus 19 were included. This paper aims to know and assessment the impact of coronavirus disease (COVID-19) on glycemic control.

Study design

In this study, 400 patients with CO 19- and diabetes were included, and the inclusion criteria were patients who were more than 20 years old, in addition to being under follow-up and treatment with the diagnosis of type 1 or type 2 diabetes for at least six months. As for the exclusion criteria, they included the previous COVID 19 in addition to pregnant women and patients with severe infection. Patients' demographic data and information were recorded as patients' notes were taken, which included (comorbidities, current anti-diabetic medications, and diabetes episodes that patients are exposed to. Self-monitoring of blood glucose was introduced to patients, through which hypoglycemia was identified. The patients' primary information, height, and weight were withdrawn from which body mass index, HBA1C, cholesterol, and glucose levels were calculated.

Study period

Work ethics were applied by obtaining all the licenses required to conduct this study, as cooperation was made with the specialized committees for the purpose of collecting data on patients. The study period was a full year, from 15-5-2019 to 22-6-2020.

Aim of research

This study aims to Assessment of the impact of coronavirus disease (COVID-19) on glycemic control.

Statistical analysis

Statistical processing of data obtained on a personal computer was carried out using the SPSS 14.0 package for Windows for applied statistical software using appropriate statistical criteria. The search results are saved in the form of spreadsheets in Microsoft Access format. A calculation was also made to the variables obtained using the arithmetic mean, in addition to using Kolmogorov-Smirnov to test the normality of data distribution and the statistical differences between the parameters were also calculated, and the difference value was considered as a p-value > 0.05

Results

Patients' profiles were distributed according to age, and the most frequent ages were from 40-44 years for 40 patients with 10%, 45-49 years for 49 patients with 12.25%, followed by from 50-54 to 33 patients with 8.25 %. were the least frequent in relation to the distribution of patients from 65-70 years of age for 15 patients with 3.75%, and the statistical differences between the ages of patients were p-value of 0.068

Table 1- Distribution of patients according to age

	F	P %	Chi-square	P value
40-44	40	10	4.44	0.068
45-49	49	12.25		
50-54	33	8.25		
55-59	38	9.5		
60-64	25	6.25		
65-70	15	3.75		

Table 2- Distribution of patient according to sex

Sex	Frequency	P%	P value
Male	290	72.5	0.04
Female	110	27.5	

Table 3- Baseline features of Patient's characteristics

Variable	Results
Age (Mean±SD)	50.55±10.1
BMI (Mean±SD)	28.99±4.42
Sex	
Male (N)	290
Female (N)	110
Disease duration, years	10 (5–12)
PGWBS score	19 (14–26)
Education level	
Primary (N)	20
Secondary (N)	100
College (N)	40
High education (N)	40
Smoking	
Yes (N, %)	60 (15)
No (N, %)	140 (85)
Therapy	
Metformin, (n) %	120 (30)
DPP4-i, (n) %	20 (5)
Basal insulin, (n) %	15 (3.75)
GLP1-RA, (n) %	30 (7.5)
MDI, (n) %	15 (3.7)

Table 2- Differences in characteristics between the patient after lockdown

Parameters	Before lockdown n (%)	After lockdown n (%)
BW kg ± SD	86 ± 20	84± 19
Resistant Hypertension	100 (25%)	120 (30%)
blood glucose falls below normal	19 (4.75%)	28 (7%)
Difficulty in accessing to medical assistance	14 (3.5%)	25 (6.25%)
Complaining of emotional stress	44 (11%)	80 (20%)

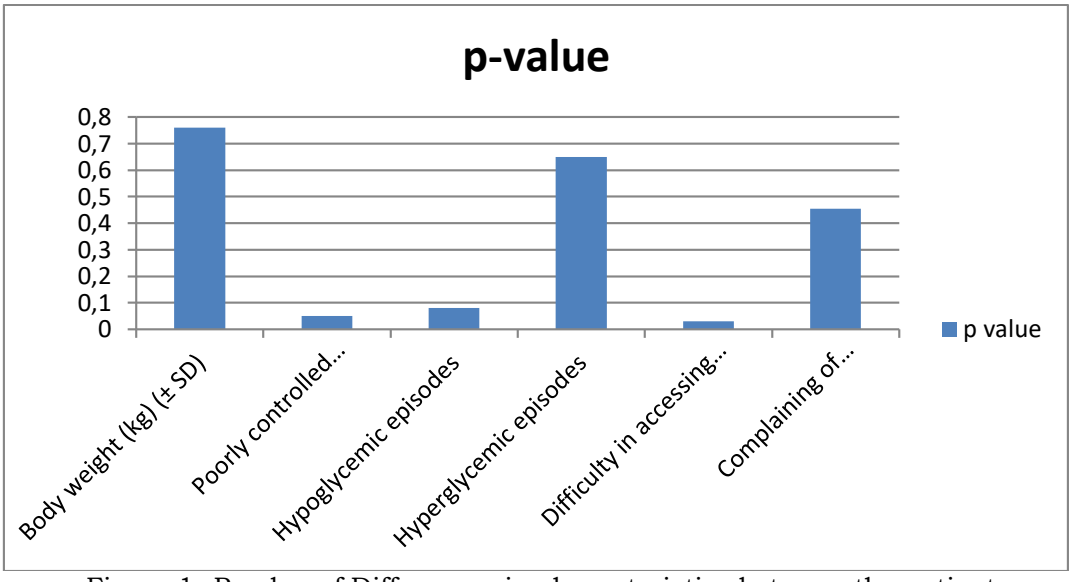

Figure 1- P-value of Differences in characteristics between the patient

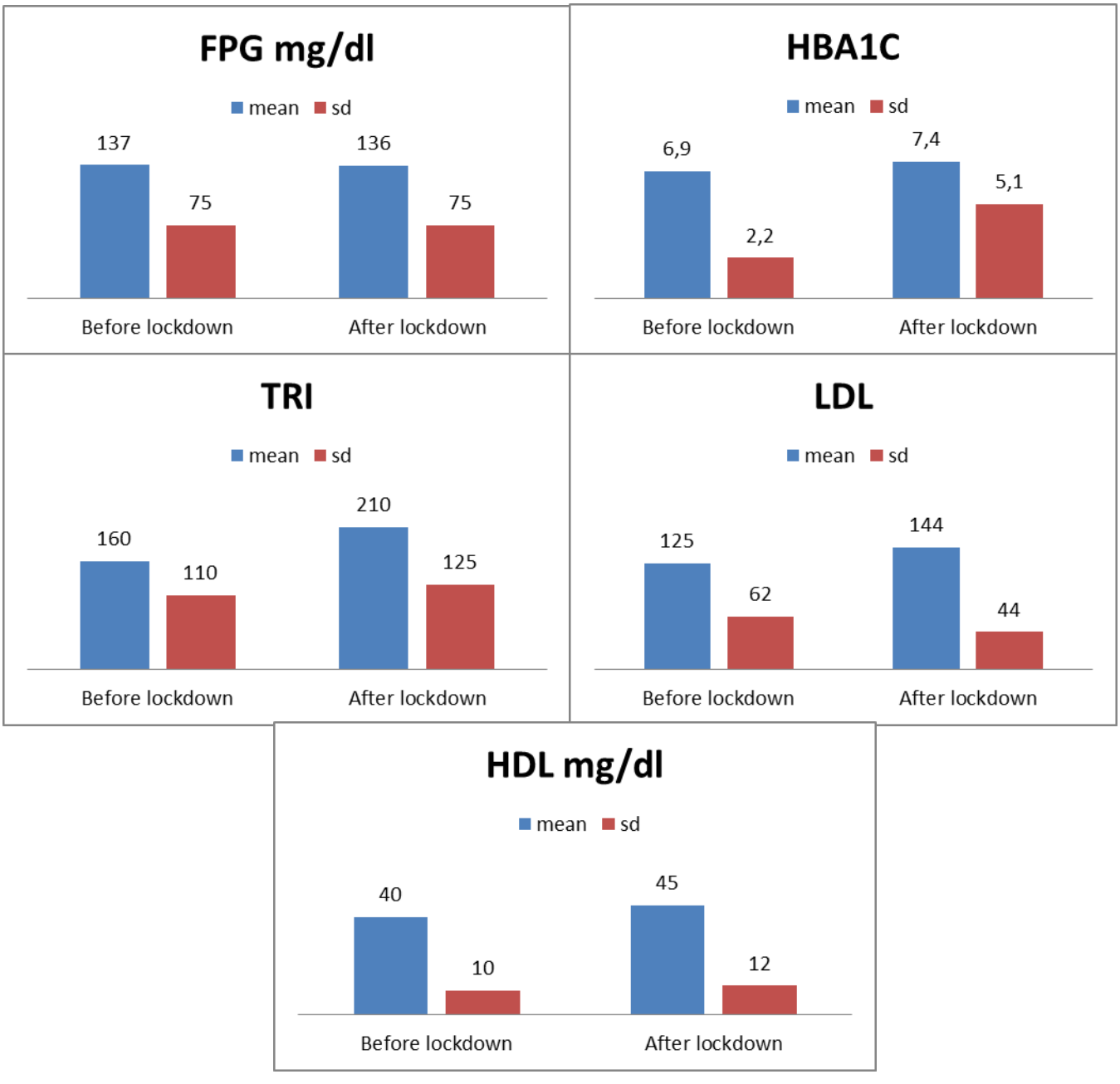

Figure 2- Changes in laboratory parameters before and after lockdown

Discussion

Covid 19 contributed to leaving negative effects, as the health care provider and hospitals were affected, in addition to the supply of medicines, and the lockdown policies contributed greatly to the deterioration of cases suffering from chronic

diseases. b Adherence to the diet. Regarding weight, no significant changes were observed before and after lockdown, and this did not match with previous studies. A study (to Palo Address 2021 in Canada) found an increase in HBA1C levels after 60 days of lockdown, although the statistical differences were Very few [16]. Also, many studies showed that there are results after the lockdown in controlling the sugar level by relying on the presence of continuous monitoring of the glucose rate for patients which use CGM [19]

A study was identified in Italy similar to ours, which revealed an increase in HbA1c levels after a state of emergency, and a study was found in Britain to Henry Jane 2021, which revealed a deterioration in blood sugar control. Self-management, in another way, depends on the cultural and educational level of the patient, as the less cultural awareness is, the more difficult it will be to control the self-management of the disease. Our results showed that there is a difficulty in obtaining medicine after the lockdown, where the lockdown can clearly affect the lifestyle of the population, which Contributed significantly to high blood pressure in addition to hyperlipidemia [18,19]

Adequate control of hyperglycemia has been shown to result in a lower rate of negative outcomes in patients with diabetes and COVID-1918. Metformin is a first-line drug in the management of type 2 diabetes and improves insulin sensitivity by activating AMPK-dependent protein kinase (AMPK) in the liver. It has been hypothesized that metformin could be beneficial in COVID-19 due to the fact that AMPK activation causes ACE2 phosphorylation and, thus, generates functional changes that reduce SARS-CoV-2 binding to the receptor

Conclusion

We conclude in this study there is a direct negative relationship between COVID 19 disease and the control of blood sugar before and after the lockdown. A sufficient amount of previous studies were found that prove the actual effect of COVID 19 in controlling blood sugar after lockdown. It is also recommended to improve the metabolic management of patients for purpose of reducing the burden and effort on the healthy system.

Recommendation

1. Control of blood glucose and comorbidities must be individualized in order to reduce the incidence of complications and reduce the burden on health systems.
2. Maintain good blood sugar control as it will help reduce infection risk and severity of illness (due to COVID-19); It even reduces the potential for total bacterial pneumonia as it requires more frequent monitoring of capillary blood glucose levels.

References

1. Aragona M, Rodia C, Bertolotto A, Campi F, Coppelli A, Giannarelli R, et al. Type 1 diabetes and COVID-19: The “lockdown effect.” Diabetes Res Clin Pract. Elsevier Ireland Ltd; 2020;170. [PMC free article] [PubMed]
2. Biancalana E, Parolini F, Mengozzi A, Solini A. Short-term impact of COVID-19 lockdown on metabolic control of patients with well-controlled type 2 diabetes: a single-center observational study. Acta Diabetol. 2020; 21:1–6.
3. Capaldo B, Annuzzi G, Creanza A, et al. Blood glucose control during lockdown for COVID-19: CGM metrics in Italian adults with type 1 diabetes. Diabetes Care. 2020;43 (8): e88-e89.
4. Christoforidis A, Kavoura E, Nemtsa A, Pappa K, Dimitriadou M. Coronavirus lockdown effect on type 1 diabetes management on children wearing insulin pump equipped with continuous glucose monitoring system. Diabetes Res Clin Pract. Elsevier Ireland Ltd; 2020;166. [PMC free article] [PubMed]
5. Dwijayanti, N., Mufdlilah, M., & Suryaningsih, E. K. (2022). The role of midwives in the application of classroom services for pregnant women during the COVID-19 pandemic period. International Journal of Health & Medical Sciences, 5(3), 228-239. https://doi.org/10.21744/ijhms.v5n3.1918
6. Fernández E, Cortazar A, Bellido V. Impact of COVID-19 lockdown on glycemic control in patients with type 1 diabetes. Diabetes Res Clin Pract. Elsevier Ireland Ltd; 2020;166. [PMC free article] [PubMed]
7. Grossi E, Groth N, Mosconi P, et al. Development and validation of the short version of the psychological general well-being index (PGWB-S). Health Qual Life Outcomes. 2006; 4:88.
8. Hall G, Laddu DR, Phillips SA, Lavie CJ, Arena R. A tale of two pandemics: how will COVID-19 and global trends in physical inactivity and sedentary behavior affect one another? Prog Cardiovasc Dis. 2020; 8:108-110.
9. Kayikcioglu M, Kuman Tuncel O, Tokgozoglu L. Impact of the COVID-19 pandemic in patients with a previous history of premature myocardial infarction. Am J Prev Cardiol. Elsevier BV; 2020; 4:100128. [PMC free article] [PubMed]
10. Khare J, Jindal S. Observational study on Effect of LockDown due to COVID 19 on glycemic control in patients with Diabetes: Experience from Central India. Diabetes Metab Syndr Clin Res Rev. Elsevier Ltd; 2020; 14:1571–4. [PMC free article] [PubMed]
11. Maddaloni E, Coraggio L, Pieralice S, Carlone A, Pozzilli P, Buzzetti R. Effects of COVID-19 lockdown on glucose control: continuous glucose monitoring data from people with diabetes on intensive insulin therapy. Diabetes Care. 2020;43 (8): e86-e87.
12. Maddaloni E, D'Onofrio L, Pozzilli P. Frailty and geography: should these two factors be added to the ABCDE contemporary guide to diabetes therapy? Diabetes Metab Res Rev. 2016;32 (2): 169-175.
13. Önmez A, Gamsızkan Z, Özdemir Ş, Kesikbaş E, Gökosmanoğlu F, Torun S, et al. The effect of COVID-19 lockdown on glycemic control in patients with type 2 diabetes mellitus in Turkey. Diabetes Metab Syndr Clin Res Rev. Elsevier Ltd; 2020; 14:1963–6. [PMC free article] [PubMed]
14. Önmez A, Gamsızkan Z, Özdemir S¸, et al. The effect of COVID-19 lockdown on glycemic control in patients with type 2 diabetes mellitus in Turkey. Diabetes Metab Syndr Clin Res Rev. 2020;14 (6): 1963-1966.

15. Park SD, Kim SW, Moon JS, Lee YY, Cho NH, Lee JH, et al. Impact of social distancing due to coronavirus disease 2019 on the changes in glycosylated hemoglobin level in people with type 2 diabetes mellitus. Diabetes Metab J. Korean Diabetes Association; 2021; 45:109–14. [PMC free article] [PubMed]
16. Potier L, Hansel B, Larger E, Gautier JF, Carreira D, Assemien R, et al. Stay-at-home orders during the covid-19 pandemic, an opportunity to improve glucose control through behavioral changes in type 1 diabetes. Diabetes Care. American Diabetes Association Inc.; 2021; 44:839–43. [PubMed]
17. Rastogi A, Hiteshi P, Bhansali A. Improved glycemic control amongst people with long-standing diabetes during COVID-19 lockdown: a prospective, observational, nested cohort study. Int J Diabetes Dev Ctries. 2020;40 (4):476-481.
18. Rees S, Williams A. Promoting and supporting self-management for adults living in the community with physical chronic illness: A systematic review of the effectiveness and meaningfulness of the patient-practitioner encounter. JBI Database Syst Rev Implement Reports. Ovid Technologies (Wolters Kluwer Health); 2009; 7:492–582. [PubMed]
19. Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). The COVID-19 pandemic. International Journal of Health Sciences, 5(2), vi-ix. https://doi.org/10.53730/ijhs.v5n2.2937
20. Verma A, Rajput R, Verma S, Balania VKB, Jangra B. Impact of lockdown in COVID 19 on glycemic control in patients with type 1 Diabetes Mellitus. Diabetes Metab Syndr Clin Res Rev. Elsevier Ltd; 2020; 14:1213–6. [PMC free article] [PubMed]
21. Xue T, Li Q, Zhang Q, Lin W, Weng J, Li L, et al. Blood Glucose Levels in Elderly Subjects with Type 2 Diabetes During COVID-19 Outbreak: A Retrospective Study in a Single Center. SSRN Electron J. Elsevier BV; 2020.