*wjpmr, 2021,7(5), 197-200*

**SJIF Impact Factor: 5.922**

**WORLD JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH**

www.wjpmr.com

**Review Article**

**ISSN 2455-3301**

**WJPMR**

# DIABETES TYPE -2 AND COVID -19

**Narendra Kumar Awasthi*[1] and D. K. Awasthi[2]**

[1]Department of Chemistry B.S.N.V.PG. College Lucknow UP India.
[2]Department of ChemistryJ.N.M.PG. College Lucknow UP India.

***Corresponding Author: Narendra Kumar Awasthi**

Department of Chemistry B.S.N.V.PG. College Lucknow UP India.

**Article Received on 25/03/2021** **Article Revised on 05/04/2021** **Article Accepted on 25/04/2021**

## ABSTRACT

Patients with diabetes are highly susceptible to COVID-19–induced adverse outcomes and complications. The COVID-19 pandemic is superimposing on the preexisting diabetes pandemic to create large and significantly vulnerable populations of patients with COVID-19 and diabetes People with type 2 diabetes are definitely at higher risk of COVID-19 complications and death, but those with type -1. People more than 60 suffering from, respiratory problems, high blood pressure,cardiac problem,obesity, cancer also at a higher risk for serious illness from the novel coronavirus if you have diabetes and wish to stay in the best health possible during this pandemic, For patients with diabetes, it is important to wash their hands thoroughly before administering insulin or injectable medications. They should also use soap and water to clean the areas on their body where they inject their medication.

**Details** People with type 1 and type 2 diabetes are both three to four times more likely to develop serious COVID-19 disease and be hospitalized than those who don't have diabetes,They observed an association between having diabetes and an increased risk of dying from COVID-19. Those with stable blood sugar levels had a better prognosis than those with diabetes whose blood sugar control was poor. In fact, the survival rate for those with good blood sugar control was nearly 99 percent, compared with an 11 percent death rate among those whose control was considered poor. Participants' blood sugar levels were measured using postprandial and fasting blood glucose tests. The poor blood sugar control as tending to exceed 180 milligrams per deciliter (mg/dL), and well-controlled blood sugar as ranging from 70 to 180 mg/dL. Patients between ages 65 and 74 were three times more likely to die than individuals younger than 55. Diabetes is fundamentally a disease of insufficient production of, or response to, insulin, the hormone that enables cells to use glucose as a fuel. In type 1 diabetes, which often strikes in childhood or adolescence, people lack the capacity to produce insulin because the beta cells in the pancreas have been destroyed by antibodies that target the body's own proteins. In type 2 diabetes, the more common form, body cells have become less sensitive to insulin and beta cells are depleted or dysfunctional. The SARS-CoV-2 genetic sequence is similar to both SARS-CoV and MERS-CoV, with each originating in bats. Angiotensin-converting enzyme 2 (ACE2) is found in multiple locations, including the upper respiratory system, alveolar epithelial cells in the lungs, the heart, endothelial cells, kidney tubular epithelium, enterocytes, and the pancreas. ACE2 is also the cellular receptor for SARS-CoV-2. Once the virus enters the cytosol, it replicates, forms mature virions, and spreads. As infected cells undergo apoptosis, it activates proinflammatory cytokines or chemokines. SARS-CoV-2 will also infect immune cells and increases apoptosis of lymphocytes, which is associated with subsequent lymphocytopenia. The so-called cytokine storm occurs when high amounts of inflammatory cytokines are released, and it is believed to contribute to hyperinflammation, leading to multiorgan failure.

Perhaps the biggest point of contention about diabetes and COVID is whether or not SARS-CoV-2 directly attacks and destroys the specialized beta cells in the pancreas that produce insulin. Insulin-producing cells cultured in a lab express ACE2 receptors—the key doorway through which SARS-CoV-2 enters human cells—and that the virus can invade these cells. It is also found ACE2 on beta cells and suggested that the earlier SARS-CoV virus could use the receptors to enter and destroy those cells. The ACE2 protein in beta cells and found only negligible amounts. A second protein called TMPRSS2 that also plays a role in coronavirus entry to cells was largely absent as well. Patients with COVID-19 have been found to have a high prevalence of cardiovascular disease. Acute myocarditis has been reported, myocardial injury has been hypothesized, and stress-induced cardiomyopathy may result from COVID-19. Overall cardiovascular-related problems may occur due to pneumonia, increased cardiac demand, electrolyte

imbalance, or adverse drug reactions related to the use of medications for the treatment of COVID-19 Obesity has been tied to more severe COVID-19 illness and death. Abdominal fat can have a restrictive ventilatory effect, as it has been reported that mechanical ventilation was needed more for those with a BMI >35 kg/$m^2$ than those with a BMI <25 kg/$m^2$. Patients may develop disseminated intravascular coagulation, as obesity and diabetes are prothrombotic conditions. Myocarditis and cardiac dysfunction could be worsened by adipose tissue, and ACE2 is expressed in the adipose tissue, which could increase virus internalization. Inflammation induces the cytokine storm and increases risk for vascular hyperpermeability, multiorgan failure, and death as seen by high blood concentrations of inflammatory markers. The cytokine storm is more likely to occur in patients with diabetes because these patients at baseline carry a risk for low-grade chronic inflammation. Diabetes causes an increase in risk of thromboembolic events as it is tied to a prothrombotic state that results from an imbalance of clotting factors and fibrinolysis. COVID-19 increases coagulation activity even further. The endothelial dysfunction linked to hypoxia can cause intravessel coagulation during an infection. Anticoagulation therapy in patients with COVID-19 seems to improve prognosis.[11] In past epidemics, hyperglycemia has been found to be a predictor of death and morbidity.

According to the WHO- COMMON SYMPTOMS OF COVID-19 are:

- Fever
- Tiredness
- Dry cough
- Aches and pains
- Nasal congestion
- Runny nose
- Sore throat
- Loss of taste or smell
- Skin rashes
- Pain in the muscles or joints
- Discolored fingers or toes
- Diarrhea

Some infected people have no symptoms at all, but they can still spread the virus.

The CDC describes the seveare symptoms for COVID-19 in adults as

Difficulty breathing Persistent pain or pressure in the chest

- New confusion or inability to wake up or stay awake
- Bluish lips or face
- Inability to rouse or stay awake

If you are experiencing these symptoms,you are covid-2 infected.

**Follow CDC guide lines**

- Clean your hands often with soap and hot water for at least 20 seconds, or use sanitizer that is at least 60 percent alcohol.
- Avoid touching your eyes, nose, and mouth with unwashed hands.
- Avoid close contact and practice social distancing (staying at least six feet apart).
- Cover coughs and sneezes with a tissue. (Then clean your hands!)
- Clean and disinfect frequently touched surfaces daily, and dirty ones immediately.
- Stay home if you're sick.
- Separate yourself from others if you have been diagnosed with COVID-19 or think you have it.
- Wear a face mask covering your mouth and nose outside of your home and when you're around people who don't live in your household, particularly in settings where social distancing is hard to maintain.

.

Of course, in this fast-moving pandemic, local, state, and federal regulations and guidelines are constantly shifting regarding meetings, gatherings, travel, working, and when you should stay at home.

Two vaccines are more effective and available in market:

- Pfizer and BioNTech's vaccine, available to people 16 and older
- Moderna's vaccine, available to people 18 and older

14-day self-quarantine period for anyone exposed to the coronavirus, starting from the date of last contact.
Some over-the-counter drugs used totreatcold and flu symptoms may affect your blood sugar levels, These include:

- Cough syrups, except those that are labeled sugar-free
- Pills that contain the same ingredients as syrups and do not have carbohydrates
- Decongestantssuchssuch asphenylephrine andpseudoephedrine
- Aspirinin large doses
- Advil(ibuprofen) which can increase the Hypoglycemic effect of insulin

Long time type 2 diabetes, are vulnerable to developing a potentially life-threatening condition known asdiabetic ketoacidosis(DKA). When the body doesn't have enough insulin to convert glucose into energy, it begins to break down fat to use as fuel. The result is a buildup of acids in the bloodstream known asKetones, higher number COVID-19 hospitalized patients with diabetes in the United Kingdom developed DKA " it is advise to check their ketones at home if they are experiencing persistent hyperglycemia to make sure they don't go into DKA, regardless of whether they have any symptoms. This can happen in patients that miss injections or that have failures in their pumps or any problems getting access to

insulin. They need to go to the hospital, separate of any symptoms of COVID-19." the COVID-19 pandemic has changed daily life and increased stress for many people, it is advised to be checking your blood sugar more regularly Can the pandemic virus, SARS-CoV-2, directly trigger diabetes, or does something else explain these COVID-related cases? That question is the subject of a heated scientific debate and investigations that may ultimately lead to a better understanding of both ailments.Muddying the waters are several confounding factors such as the fact that any acute illness can disturb glucose metabolism, that COVID treatment can also impact blood sugar, and conflicting data on whether or not SARS-CoV-2 can invade insulin-producing cells in the pancreas. the anti-viral drug remdesevir and high doses of a steroid drug such as dexamethasone, which tamps down inflammation. The latter drug, however, raises insulin resistance and may therefore make hyperglycemia even worse SARS-CoV-2 can directly enter beta cells, there is evidence suggesting that it can attack other parts of the pancreas. Both of the Cell Metabolism studies found that viral entry proteins were expressed elsewhere in the pancreas and in the small blood vessels that nourish beta cells.CThe virus might also bring on diabetes by attacking or inflaming other organs and tissues that are involved in glucose metabolism. ACE-2 receptors are plentiful in the intestines, blood vessels and liver any severe health event—pneumonia, heart attack, stroke, trauma—can cause blood glucose levels to spike, a condition called hyperglycemia that is a signature of diabetes. Stress-related hormones such as cortisol and adrenaline are believed to cause this elevation, which may subside when the patient recovers or may leave the patient permanently diabetic.There is no doubt that severe COVID can impose the kind of stress that raises blood glucose in patients who have no history of diabetes.

According to a new study, positive patients who hadhypertension andtype-2 were more likely to experience the neurological complications, including bleeding in the brain and stroke, that come with the virus.chronic conditions could play a role in which patients are impacted by more than just lung inflammation that comes with viral infection. "COVID-19 is associated with neurological manifestations, and hypertension and type 2 diabetes mellitus are common in individuals who develop these manifestations,a role for high blood pressure and type 2 diabetes in the neurological impact of the virus, investigators still do not know exactly what causes those complications.The mechanisms could be multi-factorial, and the generally accepted belief is that infection-associated inflammation is responsible, they said. In this study, in particular, they reported blood markers for inflammation were high in patients who had critical results."When your body is in an inflammatory state, it produces all these molecules called cytokines to help recruit the immune system to perform its functionCOVID-19-positive patients on extracorporeal membrane oxygenation (ECMO) – a pump system that circulates and replenishes oxygen in the blood – experience neurological complications. Understanding precisely how the coronavirus disrupts glucose metabolism could help resolve longstanding questions about the role other infections play in diabetes. Viruses such as Coxsackie B and rubella are known to be associated with some cases of type 1 diabetes, but small data sets have made it difficult to pin down a mechanism.

## CONCLUSION

Patients with diabetes who are hospitalized for COVID-19 infection may or may not require scheduled insulin doses, which is defined as basal, prandial, and correction doses of insulin. Patients who were well controlled on noninsulin therapies or those with newly identified hyper glycemia may not require scheduled insulin doses. Clinicians may consider discontinuing insulin if the patient's blood glucose remains lower than 180 mg/dL for 24 to 36 hours. it is extremely important to ensure that patients control their blood glucose at home to prevent severe COVID-19 infection, there are also considerations with medication use in the outpatient setting. Patients with diabetes should be educated about the importance of regular exercise, blood glucose monitoring (potentially utilizing remote technologies for the provider to review), and sick-day management.

## REFERENCES


1. CDC. Novel Coronavirus Disease2019 (COVID-19). www.cdc.gov/coronavirus/2019-ncov/cdcresponse/about -COVID-19.html. Updated June 16, 2020.Accessed August 31, 2020.
2. CDC COVIDDataTracker. www.cdc.gov /coronavirus/2019-ncov/cases-updates/cases-in-us.html. Updated August 31, 2020.Accessed August 31, 2020.
3. Coronavirus Disease 2019 (COVID-19) Frequently Asked Questions. www.cdc.gov/coronavirus/2019-ncov/faq.html#People-at-Higher-Risk-for-Severe-Illness. Updated August 27, 2020.Accessed August 31, 2020.
4. How COVID-19 Impacts People with Diabetes.American Diabetes Association (ADA). www.diabetes.org/coronavirus-covid-19/how-coronavirus-impacts-people-with-diabetes.AccessedOctober20, 2020.
5. Razzaghi H, Wang Y, Lu H, et al. Estimated county-level prevalence of selected underlying medical conditions associated with increased risk for severe COVID-19 illness—United States, 2018. Morb Mortal Wkly Rep., 2020; 69: 945-950.
6. Zhong J, Tang J, Ye C, Dong L. The immunology of COVID-19: is immune modulation an optionfortreatment? LancetRheumatol, 2020; 2(7): e428-e436.
7. CDC. SymptomsofCoronavirus. www.cdc.gov /coronavirus/2019-ncov/symptoms-testing/symptoms.html. Updated May 13, 2020.Accessed August 31, 2020.

8. Muniyappa R, Gubbi S. COVID-19 pandemic, coronaviruses, and diabetes mellitus. Am J PhysiolEndocrinolMetab, 2020; 318(5): E736-E741.
9. CDC. National Diabetes Statistics Report, 2020. www.cdc.gov/diabetes/data/statistics-report/index.html. Updated August 28, 2020.Accessed October 20, 2020.
10. Rao S, Ali K, Dennis J, et al. Analysis of glucose levels in patients hospitalized with COVID-19 during the first phase of this pandemic in West Texas. J Prim Care Community Health, 2020; 11: 2150132720958533.
11. Apicella M, Campopiano MC, Mantuano M, et al. COVID-19 in people with diabetes: understanding the reasons for worse outcomes. LancetDiabetesEndocrinol, 2020; 8(9): 782-792.
12. American CollegeofCardiology. HFSA/ACC/AHA Statement Addresses Concerns Re: Using RAAS Antagonists in COVID-19. www.acc.org/latest-in-cardiology/articles/2020/03/17/08/59/hfsa-acc-aha-statement-addresses-concerns-re-using-raas-antagonists-in-covid-19. UpdatedMarch 17, 2020.Accessed October 20, 2020.
13. Hall G, Laddu DR, Phillips SA, et al. A tale of two pandemics: how will COVID-19 and global trends in physical inactivity and sedentary behavior affect one another? Prog Cardiovasc Dis., 8 April 2020. [Epub ahead of print].
14. Rajkumar RP. COVID-19 and mental health: a review of the existing literature. Asian J Psychiatr, 2020; 52: 102066.
15. Selvin E, Juraschek SP. Diabetes epidemiology in the COVID-19 pandemic. Diabetes Care, 2020; 43(8): 1690-1694.
16. Maddaloni E, Coraggio L, Pieralice S, et al. Effects of COVID-19 lockdown on glucose control: continuous glucose monitoring data from people with diabetes on intensive insulin therapy. DiabetesCare, 2020; 43: e86-e87.
17. Hartmann-Boyce J, Morris E, Goyder C, et al. Diabetes and COVID-19: risks, management, and learnings from other national disasters. DiabetesCare, 2020; 43: 1695-1703.
18. Mary Korytkowski, Kellie Antinori-Lent,Andjela Drincic, et al.A pragmatic approach to inpatient diabetes management during the COVID-19 pandemic.J Clin Endocrinol & Metab, 2020; 105(9): 342.
19. Solerte SB, D'Addio F, Trevisan R, et al. Sitagliptin treatment at the time of hospitalization was associated with reduced mortality in patients with type 2 diabetes and COVID-19: a multicenter, case-control, retrospective, observational study [published online ahead of print, 2020 Sep 29]. DiabetesCare, 2020; dc201521.
20. Bornstein SR, Rubino F, Khunti K, et al. Practical recommendations for the management of diabetes in patients with COVID-19. Lancet Diabetes Endocrinol, 2020; 8(6): 546-550.
21. Diaz-Ramos A, Eilbert W, Marquez D. Euglycemic diabetic ketoacidosis associated with sodium-glucose cotransporter-2 inhibitor use: a case report and review of the literature. Int J Emerg Med, 2019; 12(27).
22. CDC. Coronavirus Disease 2019 (COVID-19) and Diabetes: the importance of prevention, management, and support. Centers forDiseaseControl and Prevention. www.cdc.gov/coronavirus/2019-ncov/cdcresponse/about-COVID-19.html. Updated July 28, 2020.AccessedAugust31, 2020.
23. CDC. How to Protect Yourself and Others. Centers for Disease Control and Prevention. www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html. Updated September 11, 2020.Accessed October 20, 2020.