



## Impact of COVID-19 on Patients with Diabetes

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### DESCRIPTION

The relationship between COVID-19 and diabetes is complex and bidirectional. On the one hand, diabetes is one of the most important risk factors for the severe course of COVID-19. Several factors commonly present in diabetes can contribute to this risk. Older age, pro-inflammatory and hypercoagulable states, hyperglycaemia and underlying comorbidities (hypertension, cardiovascular disease, chronic kidney disease and obesity). On the other hand, severe COVID-19 infection and its treatment with steroids have certain adverse effects on diabetes itself and can exacerbate hyperglycaemia through increased insulin resistance and decreased  $\beta$ -cell secretory function. Second, worsening hyperglycaemia can adversely affect the course of COVID-19. As the pandemic progresses, more knowledge is beginning to surface, but challenges remain in understanding the interrelationship between COVID-19 and diabetes. Early studies showed an increase in the severity of coronavirus disease 2019 (COVID-19) caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARSCoV2) infection in patients with diabetes mellitus. In addition, individuals infected with COVID-19 may also be more susceptible to hyperglycaemia. Interacting with other risk factors, hyperglycaemia can regulate immune and inflammatory responses, thereby predisposing patients to severe COVID-19 and possible fatal consequences. Angiotensin Converting Enzyme 2 (ACE2), which is part of the Renin-Angiotensin-Aldosterone System (RAAS), is the major entrance receptor for SARSCoV2. However, Dipeptide Peptidase 4 (DPP4) may also serve as a binding target. However, preliminary data do not show the perceptible effect of glucose-lowering DPP4 inhibitors on SARSCoV2 susceptibility. Due to their pharmacological properties, Sodium-Glucose Transporter 2 (SGLT2) inhibitors can cause side effects in patients with COVID-19 and are therefore not recommended. Insulin should now be the primary approach to controlling acute blood glucose. Most of the evidence available does not distinguish between the major types of type 2 diabetes and is associated with type 2 diabetes due to its high prevalence. However, there is currently limited evidence of type 1 diabetes and COVID-19. Most of

these conclusions are preliminary and require further investigation into the optimal management of diabetics.

COVID-19 is that we are still learning and continuing to learn. One of the things we know is that people with diabetes seem to have more severe COVID-19 disease. People with diabetes are not susceptible to COVID-19, but when they develop COVID-19, the disease becomes much more severe and appears to progress faster. This seems to occur in both types 2 and type 1 diabetes, both of which are more likely to be more serious, but type 1 patients may be successful because they are young. Type 1 diabetes is a disease in which most of the insulin-producing cells in the body are destroyed by the immune process. Because type 2 diabetes involves an interaction between genetic predisposition and the environment, the environment in the sense of increased food intake, decreased physical activity, and weight gain interacts with the family history of gene donation.

In people with diabetes there is more inflammation in the body. And so, with COVID-19, that inflammatory state gets worse much more quickly, so that could be one reason. The second reason is people with diabetes may be more prone to having problems with their circulation. They may already have had a bypass or a stroke or low blood flow to the legs or something like that. And then this was since that, because there's an addition circulatory problem on top of a background of circulatory issues. Blood flow due to coagulation problems can be exaggerated by COVID-19. Small reasons can be nested within each of these big reasons. This study shows that diabetes is a risk factor and contributes to the severity and mortality of patients with COVID-19. This paper also provides recommendations and guidelines that may help prevent and treat diabetic patients affected by COVID-19.

In summary, patients suffering from diabetes do not appear to be at increased major risk of COVID-19 infection, but due to several factors such as differences in social distance behaviour and preparation for SARSCoV2 testing, it is difficult to make a firm conclusion. Patients with both type 1 and type 2 diabetes

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**Received:** 02-Mar-2022, Manuscript No. JPC-22-16025; **Editor assigned:** 04-Mar-2022, Pre QC No. JPC-22-16025 (PQ); **Reviewed:** 18-Mar-2022, QC No. JPC-22-16025; **Revised:** 24-Mar-2022, Manuscript No. JPC-22-16025(R); **Published:** 31-Mar-2022, DOI:10.35248/2573-4598.22.8.183.

**Citation:** Jamialahmadi T (2022) Impact of COVID-19 on Patients with Diabetes. J Pat Care. 8:183.

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are at greater risk for a severe course of COVID-19 and mortality. This poorer prognosis is likely additionally linked to the comorbidities and other risk factors that are often concomitantly present with diabetes mellitus, but also to glycemic control. The interrelation between diabetes and COVID-19 is complicated and bidirectional, with COVID-19

causing hyperglycaemia on the one hand, but hyperglycaemia causing worse outcome of COVID-19 on the other hand. Diabetes itself, as well as the comorbidities often associated with diabetes additionally contributes to this risk of a severe outcome of COVID-19.