Impact of Diabetic Medications in Minimizing Fatalities throughout the COVID-19 Pandemic

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Introduction

The COVID-19 pandemic, caused by the novel coronavirus SARS-CoV-2, has presented an unprecedented challenge to global healthcare systems. While it has affected people from all walks of life, individuals with pre-existing conditions, particularly diabetes have faced a significantly higher risk of severe illness and death. The pandemic has led to extensive research on the impact of diabetic medications in minimizing fatalities in COVID-19 patients with diabetes. This article delves into the interaction between diabetes, COVID-19, and diabetic medications, with a focus on their potential to reduce fatalities. Diabetes mellitus, a chronic metabolic disorder characterized by high blood sugar levels, is a well-established risk factor for severe illness and complications in COVID-19 patients. Studies have consistently shown that individuals with diabetes are more susceptible to contracting the virus and have a higher risk of developing severe respiratory distress and Acute Respiratory Distress Syndrome (ARDS) when infected.

Description

Diabetes can weaken the immune system, making it less effective in combating viral infections. This reduced immune response can lead to uncontrolled viral replication and increased lung inflammation. Individuals with diabetes often experience chronic low-grade inflammation. When combined with the hyper inflammatory response induced by COVID-19, it can lead to a dangerous cytokine storm, further worsening disease severity. SARS-CoV-2 primarily enters human cells by binding to the Angiotensin-converting Enzyme 2 (ACE2) receptor. Diabetic individuals may have increased expression of ACE2 receptors in their lungs and other tissues, providing the virus with more entry points. Diabetes is frequently associated with other comorbidities, such as cardiovascular disease, obesity, and hypertension, which independently increase the risk of severe COVID-19 [1].

Diabetic medications encompass a wide range of drugs used to manage blood sugar levels in individuals with diabetes. These medications can be categorized into several classes, including Insulin used to replace or supplement the body's insulin production. These include biguanides, sulfonylureas, DPP-4 inhibitors, SGLT2 inhibitors, and more. These slow down the digestion of carbohydrates and reduce blood sugar spikes. Research on the relationship between diabetic medications and COVID-19 outcomes is still on-going, but there is a growing body of evidence suggesting potential benefits.

Metformin, a widely used biguanide, is one of the most studied diabetic medications in the context of COVID-19. Several studies have shown that metformin may have a protective effect against severe COVID-19 outcomes.

It is believed to modulate the immune response, reduce inflammation, and improve endothelial function, potentially mitigating the adverse effects of COVID-19 in diabetic patients. Dipeptidyl Peptidase-4 (DPP-4) inhibitors, such as sitagliptin and linagliptin, are oral ant diabetic medications [2]. These drugs have been shown to reduce inflammation and improve immune responses. Some studies have suggested that they may have a protective effect against severe COVID-19 outcomes in diabetic patients.

GLP-1 receptor agonists like liraglutide and semaglutide have shown promise in reducing inflammation and promoting endothelial function. These properties make them potential candidates for mitigating the effects of COVID-19 in diabetic individuals. Sodium-glucose Cotransporter 2 (SGLT2) inhibitors like dapagliflozin and empagliflozin have been investigated for their potential to reduce the risk of severe COVID-19 outcomes. These drugs have shown beneficial effects on heart and kidney health, which are particularly relevant in the context of COVID-19. The potential protective effects of diabetic medications in the context of COVID-19 can be attributed to several mechanisms.

Some diabetic medications, such as DPP-4 inhibitors and GLP-1 receptor agonists, have been shown to modulate the immune response, reducing excessive inflammation and cytokine release. Medications like metformin and SGLT2 inhibitors possess anti-inflammatory properties, which may help mitigate the inflammatory cascade associated with severe COVID-19. Several diabetic medications also offer cardiovascular benefits, such as reducing the risk of heart failure and improving endothelial function [3]. These benefits are important, as COVID-19 can lead to cardiovascular complications. One of the challenges in studying the impact of diabetic medications on COVID-19 outcomes is the diversity of available drugs. Diabetic patients often take multiple medications simultaneously, making it difficult to isolate the effects of a single drug. The interactions between these medications and their cumulative impact on COVID-19 outcomes are complex and require further investigation.

Individual responses to diabetic medications can vary significantly. Factors like genetics, comorbidities, and the stage of diabetes may influence how a person responds to a particular drug. Consequently, it's challenging to develop a one-size-fits-all approach to using diabetic medications in the context of COVID-19. The timing of medication use in relation to COVID-19 infection and the duration of treatment are important factors to consider. Some medications may be more effective when administered before infection or in the early stages of the disease, while others may provide benefits throughout the course of the illness. While there is promising research on the potential benefits of certain diabetic medications, more extensive and robust clinical trials are needed to establish their efficacy definitively [4]. Researchers continue to collect data and analyze the outcomes of diabetic patients with COVID-19 to draw more conclusive findings.

Real-world data from electronic health records and hospital databases have also contributed to our understanding of the impact of diabetic medications. For instance, studies have shown that metformin use was associated with a lower risk of severe COVID-19 outcomes in diabetic patients. This information underscores the value of analysing data from actual clinical practice. The field of personalized medicine may play a crucial role in optimizing the use of diabetic medications in the context of COVID-19. Collaboration between researchers, clinicians, and pharmaceutical companies is essential to advancing our understanding of how diabetic medications can mitigate the impact of COVID-19 in diabetic patients. Joint efforts can lead to more comprehensive clinical trials, faster drug development, and improved patient outcomes [5].

Conclusion

The impact of diabetic medications in minimizing fatalities throughout the COVID-19 pandemic is a complex and evolving field of research. While there is growing evidence to suggest that certain diabetic medications may have a protective effect, additional studies and clinical trials are needed to confirm these findings and determine the most effective treatment strategies. Diabetes remains a significant risk factor for severe COVID-19 outcomes, but the potential benefits of diabetic medications in mitigating this risk offer hope for diabetic individuals. As the medical community continues to investigate the interactions between diabetes, COVID-19, and diabetic medications, the ultimate goal is to develop personalized treatment approaches that can save lives and improve the prognosis of those affected by both conditions.

Acknowledgement

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Conflict of Interest

None.

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