

# Patients with Asthma May Develop Cardiovascular Diseases during Covid-19 Lockdown Due to Physical Inactivity

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## Abstract

To abate the spread of coronavirus, decisions were made one of which is restrictions of movement and public gatherings. This has led to drastic increase in poor lifestyle behaviours that are detrimental to health such as physical inactivity, these behaviours augment the risk of cardiovascular diseases (CVDs) in individuals including patients with asthma. Asthma is well established as a risk factor for developing CVDs. Patients with asthma were physically inactive, limiting outdoor activities and regular physical activities during COVID-19 lockdown makes them more inactive. Therefore, these pandemic exposed individuals who are asthmatic to high risk of developing CVDs.

**Key words:** Asthma, CVDs, Covid-19, Poor lifestyle, Physical inactivity.

## INTRODUCTION

Coronavirus disease 2019 (COVID-19) is one of the large family of viruses that lead to respiratory viral infections, it ranges from a common cold to severe conditions, such as Middle East Respiratory Syndrome (MERS) and severe acute respiratory syndrome (SARS).<sup>[1]</sup> Covid-19 is a disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), it was first discovered in Wuhan city (Hubei, China) on the 31<sup>st</sup> of December, 2019,<sup>[2]</sup> and was declared a worldwide pandemic by the World Health Organization (WHO) on 11 March 2020.<sup>[3]</sup>

Asthma has been shown to be characterized by increased responsiveness of the human trachea and bronchi and reversible airflow restriction as a result of airway inflammation and/or airway constriction.<sup>[4]</sup> Chronic inflammations being a hallmark characteristic of asthma are likely the participants in the pathophysiology of asthma so also atherosclerosis and endothelial dysfunction.<sup>[5]</sup> The long-term airway remodelling from the inflammatory response and subsequent repair in asthma can produce irreversible airway obstruction and contribute to a decline in pulmonary function over time,<sup>[6]</sup> Decreased pulmonary function has been linked to an increase in CVD risk.<sup>[7]</sup> Medicines used in the treatment of asthma, such as beta-adrenoceptor agonists and oral or inhaled glucocorticoids, increases the occurrence of CVD events in patients suffering from asthma.<sup>[8]</sup>

Cardiovascular diseases (CVDs) on the other hand are known as group of diseases that affect the heart and blood vessels such as the coronary arteries dysfunctions, stroke, and heart attacks, and documented as the number one cause of global death. Cardiovascular disease risk factors are classified into modifiable (smoking, physical inactivity, unhealthy diets) and non-modifiable (age, gender, race, and hereditary). CVDs are preventable through modifying the modifiable risk factors.<sup>[9]</sup>

However, due to continuing spread of Covid-19, government authorities of different countries enforces lockdown to prevent their citizenries including asthmatics from exposure to the virus, and this was shown to be an effective

measure to reduce Covid-19 transmission.<sup>[10]</sup> As the result of the enforced movement restriction, limiting outdoor activities and regular physical activity and exercises might lead to sedentary behaviours and will affect the daily activities of most of the individuals including patients with asthma.<sup>[11]</sup> These habits may intensify the development of cardiovascular diseases since patients with asthma are at higher risk of CVDs. This article aimed at reviewing how COVID-19 lockdown exposes individuals suffering from asthma to physical inactivity and subsequently leading to development of cardiovascular diseases among.

## Main Text

Physical activity (PA) is known to be any bodily movement made by the skeletal muscles that necessitates energy expenditure above resting levels.<sup>[12]</sup> An increase in the PA level would possibly provide significant health benefits for all age groups in a population level, in terms of increased functionality, reduced risk of disease and overall better quality of life<sup>[13]</sup> but despite all the benefits of Physical activity individuals with asthma were found to be physically inactive.<sup>[4]</sup> Even though PA reduces cardiovascular risk factors, enhanced fibrinolysis, improved endothelial function, decreased sympathetic tone,<sup>[14]</sup> Government authorities of different countries enforces lockdown to prevent their citizenries including asthmatics from exposure to Corona virus, this lead to sedentary behaviours and affected their daily activities which increases risk of CVDs,<sup>[11]</sup> it was evinced in another study that COVID-19 lockdown has the capacities of increasing CVDs and its mortality rate by indirectly increasing CVD risk factors such as physical inactivity and unhealthy eating habits.<sup>[15]</sup>

Physical inactivity as a result of personal confinement in the COVID-19 lockdown era may hinder physical activity prophylaxis effects on CVDs.<sup>[16]</sup> Another study shows the existence of inverse relationship between leisure time physical activity and the risk of cardiovascular mortality regardless of age, sex, and the presence or lack of pre-existing cardiovascular disease.<sup>[17]</sup>

There have been several studies on the aetiology of asthma and CVD events, Chronic airway inflammation of the respiratory tract might contribute to systemic inflammation and increase vulnerability to vascular diseases. Established inflammatory biomarkers are increased in atherogenesis, such as high-sensitivity C-reactive protein (Hs-CRP), interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF- $\alpha$ ), interleukin-8 (IL-8), and fibrinogen, which are also seen to be elevated in asthmatics.<sup>[18,19]</sup>

Another study of a large multi-ethnic cohort showed that persistent asthmatics had a higher CVD event rate compared to intermittent and non-asthmatics, women with asthma experienced a higher risk of CVD than men with asthma.<sup>[20]</sup>

Since the emergence of the pandemic, an association between COVID-19 severity and chronic medical conditions such as cardiovascular disease, diabetes mellitus and high blood pressure has been proposed. However, the impact of COVID-19 in patients with asthma has been less evident.<sup>[21,22]</sup> On the contrary, the severity and mortality of COVID-19 has been strongly connected to age. Although the virus can infect individuals of all ages, most severe cases to date have been described in adults aged  $\geq 55$  years, and in patients with the aforementioned comorbidities.<sup>[23]</sup>

With the above documentaries, Patients with asthma are not exempted from the lockdown since the virus can be severe and even lead to death as a result of underlying respiratory condition.

In recent study that analysed the impact of the COVID-19 pandemic and lockdown in asthmatic children, the lockdown had an impact on children's approach to their upkeep therapy compared to the previous year, in fact, a bigger proportion of children took a daily therapy higher than prescribed. As far as asthma control is concerned, they found that the level of asthma control was meaningfully improved during the lockdown compared to the same period of the previous year,<sup>[24]</sup> because of the reduced exposure to typical asthma triggers due to confinement even though their level of physical activity was not ascertained.

## CONCLUSION

It was evident that COVID-19 lockdown has the capacities of increasing CVDs and its mortality rate. Patients with asthma were physically inactive, limiting outdoor activities and regular physical activities during Covid-19 lockdown makes them more inactive and prone to development of cardiovascular diseases. Physical activity reduces cardiovascular risk factors and improves endothelial function.

## ABBREVIATIONS

**PA:** Physical Activity; **CVDs:** Cardiovascular Diseases; **Covid 19:** Coronavirus disease 2019.

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