Impact of COVID-19 Pandemic on Obese and Asthma Patients: A Systematic Review

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1 Introduction

COVID-19 was declared as a "Global Pandemic" by WHO (World Health Organization) on 11 March 2020 [1]. The COVID-19 pandemic challenges the health systems across the world to an unprecedented stage. The SARS-CoV-2 virus first emerged in the Wuhan city of China from December 2019 and has spread throughout the world with the initial model of transmission to humans as shown in Fig. 1 [2]. It is vulnerable to severely comorbid patients causing higher mortality rates. Various comorbidities are found with COVID-19 infection. Some of the comorbidities include obesity, diabetes, asthma, cardiovascular diseases, migraine, and throat infections. About 20% of the positive cases do not record any symptoms [3]. The most sensitive patients are the older age groups, children, and adults with inadequate health conditions.

There is a serious concern about whether the prevailing treatments for asthma and obesity may worsen the immunology of the COVID-19 patient. COVID-19 generally results from respiratory infections and other respiratory diseases. Its ill effects and severity are being studied by scientists for providing prevention and control. Patients with long-term respiratory diseases seem to be more vulnerable to COVID-19 infection [5, 6]. For the progression of COVID-19, old age, obesity, chronic cardiac disease, and high blood pressure are some of the reported symptoms

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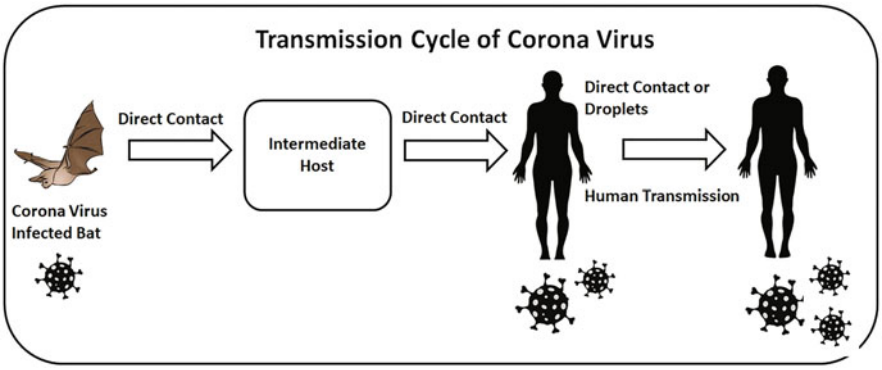

Fig. 1 Mode of transmission to humans

for identifying the risk. However, the licensed biologics for asthma treatment may target add-on experiments to maintain and reduce steroid uses. This study can help in determining the present status of the correlation of asthma and obesity with other commodities for the prevalence of contagious COVID-19. Evidence from several works of literature [9] supports that air pollution, lung inflammations, asthma, and obesity are predisposing factors for the progression of coronavirus infections.

2 Conjunction of COVID-19 and Asthma

Asthma is a respiratory viral disease with acute exacerbations and it needs hospitalizations. Asthma patients are more alert and conscious in fear of having high risk from the pandemic. According to the Global Asthma Report [10] 2018, about 1150 deaths have occurred due to asthma, and no measures were taken to address this disease before the COVID-19 outbreak. It is a state from which an individual's airway becomes narrowly swollen and produce. Asthma might be less or it could restrict day-to-day tasks. Sometimes, it might result in a life-threatening stroke.

Asthma can lead to chest pain, difficulty breathing, and cough. The symptoms can appear severe. Infection can usually be handled with saving inhalers to deal with ailments (salbutamol) and control inhalers (steroids) which avert symptoms. Severe cases might call for longer acting inhalers that help keep the airways open (e.g., formoterol, salmeterol, and tiotropium), in addition to inhalant steroids. Asthma can be a minor nuisance for some people. It is sometimes a problem that could result in a life-threatening asthma strike and disrupts our daily tasks. Infection cannot be cured, but its symptoms may be manipulated. Asthma patients have to consult a physician to track symptoms and signs, as asthma usually affects time.

Effects of COVID-19 in Asthma Patients

Asthma patients are continuing with the exacerbations in this COVID-19 epidemic. Studies say that the inhalation of corticosteroids to treat asthma attacks reduces the ability of the SARS-CoV-2 virus to some extent. It is also reported that people with asthmatic inflammation are not at high risk from the epidemic COVID-19 [21]. As steroids degrade the immunity of the patients and can worsen the cause, it is not clarified whether the steroids have a positive or negative impact on the COVID-19. Asthma patients are more inflammatory to other severe asthma inflammation – eosinophilic asthma. This raises the level of white blood cells causing nasal, sinus, respiratory, and airway inflammation which lead to more severe risk of COVID-19. Additionally, for the ingress of SARS-CoV-2 virus, various enzymes present in the lung cells are beneficial for respiratory viruses to expand. However, the role of enzymes in aiding the ability of these viruses to infect asthma patients is unclear [17].

The coronavirus 2019 outbreak (COVID-19) is frightful for all individuals, however, for all those with asthma, there is a tremendous fear that they will have severe side effects or may get SARS-CoV-2 disease. It is important to be aware that there is no evidence of an escalation in the range of infections in people with asthma. Although the Centers for Disease Control and Prevention (CDC) [10] says that patients having asthma may be at greater risk for serious illnesses, no published statistical data aid this decision currently. There has been a report indicating that asthma might increase the threat of hospitalization due to COVID-19 for adults aged 18–49 years. Yet, this is contingent upon a few of the patients. In contrast, data from New York by which asthma had been expressed were lower (more protective) in those exterminated by COVID-19. It is important to stay informed about the epidemic that is emerging, as advice could change the situation in the future.

Considering the changing ideas on using steroids and also on COVID-19, the majority are planning about exactly what to do when their prescription can be just actually a steroid (inhaled or oral). The data show that the SARS-CoV-2 might raise hails from damaging patients using steroids for viral disease [16]. Using steroids for curing different disorders (such as asthma) had not been considered. Individuals with asthma have been put to track their asthma. From the existing outbreak, the very best thing that someone with asthma could perform (about asthma) will be always to get and track asthma. By halting a regulator medicine, the person will be set in peril of building asthmatic conditions. From the outbreak, treatment will require heading to urgent care or the emergency department, where the patient has a threat to become vulnerable with COVID-19 from someone. Thus, as it were, by going to track asthma, the patient with asthma is diminishing the chance of vulnerability to COVID-19 [20].

It is very crucial to not forget that there are assortments. The SARS-CoV-2 illness does not appear to bring about asthma exacerbations. No matter it is always vital for asthma patients to maintain their asthma under the very greatest potential control. Similarly, their lungs will probably be prepared if an allergen or any disorder results

in a worsening of asthma [25]. The main concern for people with allergies in this outbreak is to keep on doing exactly what you are doing from first – maintain taking your controller medication and inform your health provider regarding any indications which you could develop. Furthermore, make sure to maintain social distancing and wash your hands.

Symptoms of COVID-19 in Asthma Patients

COVID-19 spreads rapidly from person to person through contact with contaminated droplets. An individual may likewise have the option to pass onto the disease before symptoms develop. Others may remain asymptomatic yet pass on the infection. According to the CDC, manifestations of COVID-19 might appear 2–14 days after contact with the illness. Symptoms may include:

- Fever
- Dyspnea
- Dry cough
- Aching muscles
- Pharyngitis (sore throat)
- Headache
- Chills
- Anosmia and hypogeusia (loss of smell or taste)

As stated by the United Nations, the majority of people recover with no special cure from COVID-19. They also judge that one in every six people who contract COVID-19 will become gravely sick and can suffer difficulty in breathing. Individuals with asthma should watch out for the following symptoms:

- An increase in chest tightness or wheezing
- Dyspnea
- Early morning or nighttime coughing
- More repeated use of rescue inhaler

Precautions and Measures to Be Taken by Asthma Patients Against COVID-19

People with allergies might possess concerns regarding the way they are influenced by COVID-19. The way to reduce the probability of fabricating asthma is by keeping illness avoidance habits up and curbing the illness. People with allergies have to play it safe once any form of the disease is dispersing inside their area. Precaution measures are described in the following subsections.

Taking All Asthma Medications as Directed Individuals should have all asthma prescriptions, for example, steroid inhalers, saving inhalers pills, and biologics as coordinated. Uncontrolled asthma can be a very severe medical hazard for those who have asthma. The Asthma and Allergy Foundation of America (AAFA) implies that people will have a 14–30-day distribution of their prescriptions [18]. An asthma task program is just really a personalized plan which individuals may apprehend to regulate their asthma. This includes the following:

- Having a good supply of medication
- Knowing how to use an inhaler correctly
- Avoiding asthma triggers
- Disinfecting and cleaning touched surfaces, such as door countertops and handles
- Avoiding any cleaning products that could trigger asthma
- Following measures to decrease tension, which might cause asthma attacks

Individuals ought to oversee intense asthma scenes with an inhaler, for example, albuterol. A report in the Journal of Allergy and Clinical Immunology debilitates and points out that the utilization of nebulizers is recommended only when it is an emergency. The reason is that nebulizer can build the danger of spreading infection droplets noticeable all around, conceivably circulating the infection to others close by.

Avoiding Potential Asthma Triggers Usual asthma triggers include:

- Smoking tobacco
- Pollen, pets, dust mites
- Air pollution
- Extreme weather conditions
- Intense exercise
- Mold
- Acid reflux
- Stress
- Strong odors
- Food additives or alcohol such as sulfites

Following COVID-19 Infection Prevention Recommendations

- Cleaning hands regularly by utilizing an alcohol-based hand sanitizer when water and soap are not available
- Avoid touching the eyes, nose, and mouth with unwashed hands
- Covering the nose and mouth with tissue paper along with perhaps even a sleeve after coughing or sneezing
- Washing hands after throwing used tissues in the garbage
- Avoid touching surfaces which others have touched
- Disinfecting and cleaning touched surfaces, such as door countertops and handles
- Avoid contact with individuals who are sick especially if they have a cough, fever, or both
- Practicing social distancing from others in public places
- Getting vaccinated for the flu if at all possible

Keeping the Immune System Strong An individual desires a healthier immune system to fight any illness, notably COVID-19. Practicing these policies helps fortify the immune system:

- Aspire for not less than 7 h sleep per night
- Reduce stress levels as much as possible
- Eat a diet rich in vegetables and fruits
- Get regular physical exercise
- Maintain a healthy weight

From the observational studies in Spain, exploration of 2,034,921 patient's data using natural language processing (NLP) and artificial intelligence (AI) techniques found 71,192 (about 1.4%) patients suffering from asthma and it shows that the frequency of COVID-19 infections is low in asthma patients [19]. Hospitalization of the suspected case is needed only for the older age groups.

A recent analysis of 1590 COVID-19 patients in China shows the absence of asthma patients which speculates that the use of TH2 asthma medication minimized the susceptibility to COVID-19 in patients. Contrarily, over 12% of hospitalized 393 COVID-19 cases were chronically documented for asthma. A study on 1298 patients ailing from coronavirus declares that both non-asthmatic and asthmatic patients were observed to be nonassociated with the adverse effects of COVID-19 irrespective of obesity, age, and various comorbidities [9]. Among 376 patients in Spain who were found SAR-CoV-2 infected on RT-PCR tests, some of the infected patients did not require to be hospitalized with previous records of mild asthma symptoms and were under medications [13]. A larger data sample can yield the correlation decision on dependencies of asthma and its susceptibility to COVID-19 [2].

Angiotensin-converting enzyme (ACE) 2 can somewhat contribute to the treatment against the widespread impact of COVID-19 inflammation since it acts as an inhibitor of lung cells [2]. Two mediators of asthma like transmembrane protease serine 2 (TMPRSS2) and angiotensin-converting enzyme 2 (ACE2) were treated with IL-13, and it is found that inflammation decreases ACE2 and increases TMPRSS2 in asthma [7, 8].

Based on Poisson regression models of classification, records of 1526 COVID-19-positive patients were classified to diagnose the asthma medications in them (until April 2020). Only 14% of positive patients are found to be using corticosteroids for treating asthma. It is noted that mild asthma patients are not subjected to hospitalization in COVID-19 prospects [3].

During the epidemic, while keeping a space of 2 meters has been proposed, regular visits to health care and medical centers might be postponed or handled through telemedicine. But patients with asthma need to carry facial visits even during the COVID-19 outbreak to maintain control of asthma. However, there is no consensus on how to prioritize medical services for patients. South Korea's government has designated 'Public Relief Hospitals' throughout the length of the COVID-19 epidemic to stop the virus from spreading and also to ensure overall

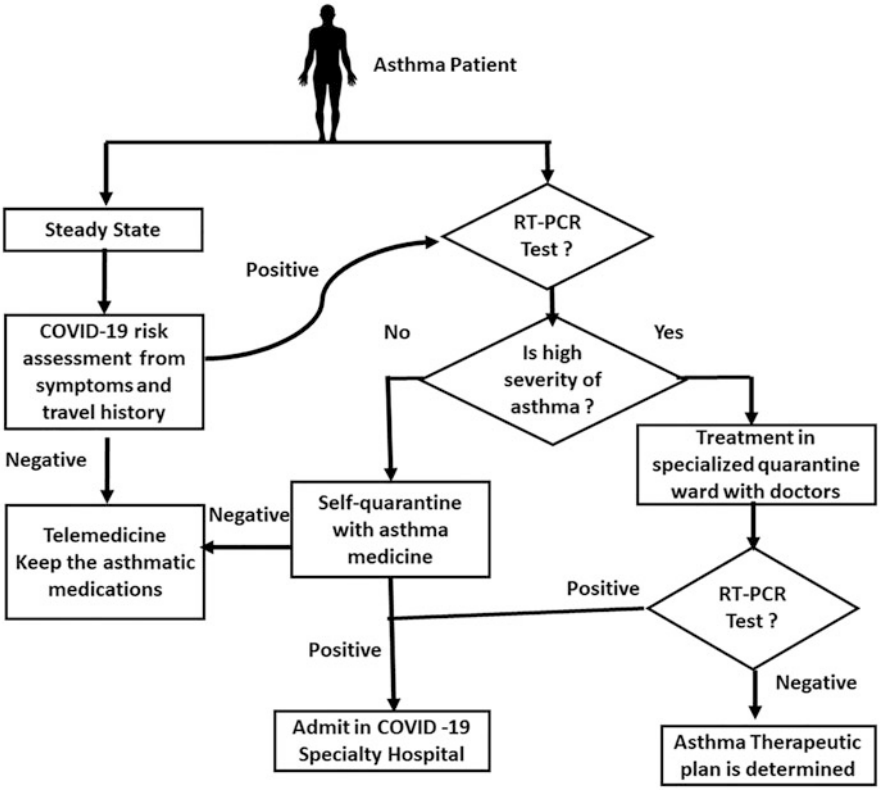

Fig. 2 Specialized clinical plan for the management of asthmatic patients during the COVID-19 pandemic [43]

services. The goal of this system is to separate areas for general patients from COVID-19 patients to prevent infection in the hospital as shown in Fig. 2 [43]. Therefore, general patients without risk of COVID-19 or some other suspicious symptom of COVID-19 might be permitted to visit health institutions. Ironically, under the Public Relief Hospitals system, although patients with asthma should be prioritized for face-to-face care, optimal medical services cannot be given until a negative result of the COVID-19 RT-PCR evaluation is confirmed since they generally pose respiratory symptoms like cough, sputum, and dyspnea, which are difficult to tell apart from COVID-19.

Asthma is considered to be one of the chronic diseases that can increase the critical symptoms with COVID-19 [14]. Though the symptoms of asthma and COVID-19 seem to converge in terms of shortness of breath and dry cough, there exists a distinction in the occurrence of discomfort in chest, and fever which is considered a common symptom for COVID-19 to occur. However, the behavior of

the Severe Acute Respiratory Syndrome Coronavirus 2 virus is found to be different from that of asthma respiratory viruses.

Assessing the risk factors, the prevalence of asthma is lower in COVID-19 adult patients. However, various studies on the group of pandemic-affected patients suggest that asthma is common in several patients [15]. No incidence of severe asthma occurrence is seen in COVID-19-positive cases [16]. According to the American College of Allergy, Asthma, and Immunology (ACAAI), there is no evidence of upsurge of deaths, attacks, or infection rates from COVID-19 in individuals facing severe asthma. Also, there is no proof that allergic medication, especially inhaled corticosteroids, increases the risk of COVID-19 contamination. Overlapping of the symptoms can mislead to the diagnosis of COVID-19.

The question arises of managing the COVID-19-infected individual with serious asthma background. The Global Initiative for Asthma recommends continuing of medications for asthma control [16]. American Academy of Allergy, Asthma & Immunology (AAAAI) declares that there is no clear proof that treating asthma patients with anti-*IL4/IL13*, anti-*IgE* or anti-*IL5Ra* medicines will make the asthma patients somewhat immune to COVID-19 reactions. American College of Allergy, Asthma, and Immunology (ACAAI) states that inhalation of corticosteroids does not escalate the risk of COVID-19 [17]. Also, other national societies such as British Thoracic Society (BTS) and the Italian Society of Allergy, Asthma & Clinical Immunology (SIAAIC), European Respiratory Society (ERS) and European Lung Foundation (ELF) are rigorously aiming and working toward the eradication of this epidemic [18].

According to the Children's Hospital of Philadelphia (CHOP), there is a drastic decline in requirements for emergency departments for treating asthma patients as observed because of the COVID-19 pandemic [19]. The order of stay at home, work from home, mandating covering of mouth and nasal with masks, and social distancing has dropped the average number of people visiting the emergency department or hospitalizing on acute asthma attacks [20]. Since there is no clear evidence that asthma patients are more prone to COVID-19 infection. There is a need for an epidemiologic study for analyzing the risk of COVID-19 in severe asthma patients.

3 A Conjunction of COVID-19 and Obesity

Obesity is considered to be a silent pandemic in many countries. In western countries, obesity is at pandemic levels. Adults of age above 20 years with obesity are detrimental [5]. 34% of the US population being obese, one ceases to be at higher risk of infection. Obesity and overweight are defined as immoderate fat accumulation, so they represent a hazard to health [16].

Obesity is a perplexing disease including an unnecessary amount of fat. It is not merely a cosmetic concern. It is an issue that builds the risk of ailments and issues, for example, heart disease, hypertension, diabetes, and certain cancers. Most

of the world's population lives in countries where overweight and obesity kill a larger number of people than underweight. One gets fat because of the intake of an excessive number of calories to be utilized by the body. This happens as a result of eating foodstuffs abundant in sugar and fat and reduction in athletics. Overweight disrupts the physical activity causing variations in Renin Angiotensin Aldosterone System (RAAS) [22, 23].

There are many reasons why some people find it difficult to avoid obesity. Often, obesity is caused by a composition of genetics, weaved with nature and a personal diet, and a choice of exercise. The fantastic thing is that moderate weight loss can improve or prevent issues related to obesity. Physical exercise, dietary modifications, and changes in eating behavior will allow you to shed weight. Drug and weight loss procedures are extra means to deal with obesity.

Effects of COVID-19 in Obese Patients

Dyslipidemia, cold, cough, fever, fatigue, diarrhea, and hyperuricemia are some of the SARS-CoV-2 viral infections in obese children [4]. Obese people are more susceptible to the current pandemic leading to the two pandemics in coalition [24]. Adiponectin which has high anti-inflammatory properties gets reduced in obesity turning to a higher risk of developing pneumonia which is near to the symptoms of COVID-19. The variations in adipokines disturb the immune cells causing airway injury, dysregulating the metabolism creating a bidirectional link for the decline in lung functioning [1]. Higher angiotensin-converting enzymes 2 (ACE2) in adipose tissue increases vulnerability to COVID-19 infection [25].

The comorbidities associated with obesity place a challenge to verdict the answer based on evidence. The dysregulation of immune hormones by lower adiponectin or higher cytokines gives the impaired prediction of whether obesity is highly sensible to COVID-19 or not [26]. In literature, there are no data reporting that patients with obesity are having a higher risk of infection with COVID-19. However, the Intensive Care National Audit and Research Center (ICNARC) reports that about 72% of 776 COVID-19 confirmed cases in the UK were obese [27].

A Case study in Mexico on datasets from Health Ministry Database comprising the verbal records responded by the hospitalized 32,583 COVID-19 patients reveal that about 35% of patients with a history of obesity (males of average age 38 and females of average age 32) and associated comorbidity are more likely to have affected by the COVID-19 infection [28]. Comorbidities of obesity and Type 2 diabetes contribute to the mortality and severity of COVID-19 risk [29]. Investigations from 1,77,133 patients predicted that the mortality rate is high for severely obese patients of age above 65 years [30]. According to the CDC, severe obesity is the risk of coronavirus diseases. It increases the risk of type 2 diabetes, dysglycemia, metabolic syndrome (MetS), hypertension, blood pressure, heart failure, and arterial disease [31].

Alterations in lifestyle and diet are usually because of environmental modifications, which are apparent during this age of the epidemic, curfew, and quarantine [32]. Quarantine may lead to changes in adolescents and obese children and result in insulin resistance, hypertension, low nutritional food intake, dysregulation of hormones, disrupting the functioning of organs of the body. This contributes to the increased factors related to the severity of COVID-19 risk [33]. The obesity was neglected in consideration of the risk factors of COVID-19. But the quarantine and lockdown ailments lead to obesity generating two pandemic conjunctions [34, 35].

Governmental actions under COVID-19 in different nations included a curfew until further notification. This prompts an adjustment in the way of life and a decline in exercise practice in their population. In this way, aside from embracing work-from-home concepts, the individuals in these nations ceased visiting parks and gyms to exercise. Many people may turn out to be nervous, stressed, or unable to do any form of physical work along with many others becoming obese and consuming more foodstuffs without any sort [11]. As the COVID-19 outbreak keeps reaching worldwide, it appears that it is not only having an impact on health. It has an impact on mental health through the panic of coming down with the virus, worrying about rumors about the disease, social isolation, and financial pressure, family, obsessive beliefs, and information overload on mental health. These may lead to stress and discomfort levels, which will cause physical health problems including cardiovascular disease. A study reported a relationship between incessant worry with obesity and energy intake and diet quality. Human body weight can be influenced by stress through behavioral mechanics that are psychological [12].

Biological Mechanisms During Obesity

- Actuation of the hypothalamic-adrenal-pituitary axis, which contributes to discharging cortisol, that can impact mass by simply boosting the stimulating ingestion by itself, eating brain sensitivity into potentiating reward.
- Inciting reward centers in brain-like striatum and nucleus accumbent, which increase the inclination to eat up food having a high content of sugars, that is, fat.
- Stress influences brain areas responsible for self-regulation, which is crucial to restrain an individual's functions like eating and exercising which are necessary to get a handle on fat loss.

Behavioral Mechanisms During Obesity

- Stress may lead individuals to consume higher amounts of food that is exceptionally palatable with a greater trend.
- Stress reduces the propensity for physical exercises.
- Stress can interrupt sleep schedule leading to shorter intervals of sleep accompanied by high chances of obesity.

Regrettably, obesity in a person with COVID-19 disease is certainly not a decent signal. Obesity, for this situation, can seed serious symptoms and inconveniences. Obese patient experiences a lot of health issues. It is inclined to be much more difficult to acquire diagnostic imaging (like on imaging machines, as you can find weight limits) [29]. It is more tedious for the medical team to move obese people

or place them. Also, researches indicate that obesity disturbs the immune system through various functions. A portion of these components is diminished, such as altered monocyte, lymphocyte function, natural killer cell dysfunction, cytokine production, reduced dendritic cell function, macrophage, and reduced reaction to antigen/mitogen stimulation.

In defending a virus, low degrees of resistance are not accepted. It has been found that 50% of people having COVID-19 are related to hypercytokinemia. Considerable scenarios have leukocytosis, lymphopenia, especially *T* cells, and growth in neutrophil lymphocyte levels (NLR), in addition to lower levels of basophils, monocytes, and eosinophils. Inflammatory cytokines were also raised in extreme cases, including *IL-6, IL-10, IL-2R, TNF-*α. The excessive production of those proinflammatory cytokines brings about what has been depicted as a cytokine storm causing an increased risk of multi-organ failure and vascular hyperpermeability with COVID-19 [30].

Besides, obesity is related to different comorbidities that are no less risky than obesity itself like type 2 diabetes mellitus, coronary artery diseases, hypertension, cerebrovascular strokes, osteoarthritis, and atherosclerosis. These diseases, without anyone else or nursing, influence body fitness. They make a person more defenseless to contract COVID-19 disease. Luckily, these comorbidities need quite a while to happen, that long period is not anticipated by specialists working for COVID-19 to disappear, thanks to the medical and scientific development in the future.

From a cardiovascular view, genetic and trial evidence conclusively demonstrates that obesity (and body fat mass) is causally linked to hypertension, diabetes mellitus, cardiovascular disease, stroke, diabetes, atrial fibrillation, cardiovascular disease, and cardiovascular failure. Obesity potentiates adverse cardiorenal outcomes, the premature development of cardiovascular disease, and multiple risk factors. There is also a metabolic difficulty. In individuals with diabetes mellitus, or at high risk of diabetes mellitus, obesity and excess ectopic fat cause disability of insulin resistance and diminished β-cell function. Both the latter limit the capacity to elicit an appropriate response to an immunologic challenge causing some patients with diabetes mellitus to require substantial amounts of insulin during illnesses. The regulation of the metabolic process required for host defense and also for the complex cellular interactions is lost leading to operational immunologic deficit. COVID-19 may also directly disrupt pancreatic β-cell performance through interaction with all angiotensin-converting receptor two. Furthermore, obesity enhances thrombosis, which is pertinent given the association between high rates of venous thromboembolism and severe prothrombotic and COVID-19-disseminated intravascular coagulation [36].

Beyond thrombotic along with cardiometabolic consequences, obesity has more detrimental impacts on lung function, decreasing forced vital capacity, and forced expiratory volume [37]. Higher relative fat mass can be connected to such adverse adjustments, perhaps pertinent to emerging reports of bigger serious disease from COVID-19 in some specific ethnicities such as Asians. Asians frequently display lower cardiorespiratory fitness and transmit more fat tissue in lower BMIs. Together

with extreme obesity (e.g., BMI > 40 kg/m^2), maintenance for men confessed to intensive therapy components can be impeded since these patients tend to be more complicated to picture, solidify, nurse, and even rehabilitate.

Related to the response, there is a distinct association between basal and also obesity inflammatory status characterized by higher circulating C-reactive protein amounts and also interleukin. Adipose tissue in obesity has been proinflammatory with increased expression of cytokines and especially adipokines. There is additionally dysregulated tissue leukocyte expression. Also, inflammatory macrophage (and inherent lymphoid) subsets replace tissue regulatory (M2) phenotypic cells. Obesity can be an independent and causal risk factor for the development of a disease, for example, psoriasis, suggesting that adipose state may have consequences on other environmental provocation. In terms of host defense, obesity wreaks adaptive immune responses to the flu virus and conceivably could do in COVID-19 infection. Individuals may exhibit greater viral shedding, suggesting the prospect of great viral vulnerability. This could be aggravated in families, which are more common and more predominant in the socioeconomically deprived communities. These observations cause a possibility of obesity to give rise to a more adverse virus–host immune response relationship in COVID-19. Poorer supplements and hyperglycemia may further aggravate the situation in some individuals [5].

Much of COVID-19's attention was around elderly people. It is crucial to keep in mind that muscle reduction and weight tissue start to decline in people who have comorbid diseases like cardiovascular and respiratory ailments especially at old age relative mass gains. Age can be correlated with diabetes mellitus and hypertension as a result of metabolic efficacy and vessels. Individuals who are elderly (>70 years), very similar to younger obese individuals, have a less cardiorespiratory reserve to deal with COVID-19 illness. Immune senescence is recognized, as is the idea of inflammation, and virus–host dynamics at the outcomes that are older and infection may be influenced by both [41].

It is preferable to avoid obesity as much as possible, particularly in this time of the COVID-19 epidemic. Trying to keep smart dieting food habits like numerous salads and green nourishments. Day-to-day moderate intensity athletics at home is prudent. Watching online recordings of exercise can help in motivation for doing gym and yoga from home. It is smarter to start decreasing long hours of using cellphones and increase doing different physical exercises. Getting adequate rest is vital for the circadian rhythm of hormones and the immune system. Attempting to have an ordinary sleep cycle by zoning out early and getting up right on time each day and not switching rest hours.

Obesity can cause alterations in the renin-angiotensin-aldosterone system (RAAS) that promotes derangement. Adipocytes might substantially result in the creation of circulating angiotensinogen which, later through metabolic process from renin and angiotensin-converting enzyme 2(ACE2), produces angiotensin II (Ang-II). Therefore, obesity may lead to hyperactive RAAS [42]. In a smaller study, patients having COVID-19 illness were proven to possess Ang-II levels related to the severity of lung injury. High Ang-II levels within the gut may cause

damage in addition to pulmonary vasoconstriction resulting in ventilation/perfusion mismatch along with hypoxemia, boosting severe kidney disease. In people who have type 2 diabetes mellitus, Ang-II levels were proven to correlate with body fat loss reduction. The baseline Ang-II levels in the fat can overtake COVID-19-caused Ang-II amount to grow, which may lead to lung disease. Ang-II levels decreased in response to fat reduction. Therefore, physical activity and dietary modification could be effective in reducing this mechanism of disease in obesity [9].

Obesity is related to diminished pulmonary function together with expiratory reserve volume, operational breathing compliance, and capacity. Increased abdominal fat impairs pulmonary role at supine patients by the diminished trip, whereas the bottom of this lung venting can be diminished leading to low oxygen-saturated blood flow by degrees. Additionally, long-term inflammation and elevated amounts of circulating proinflammatory cytokines related to obesity, like leptin, tumor necrosis factor α, and interleukin, can hamper immune reaction and influence both the lung parenchyma and bronchi, consequently leading to the increased morbidity related to obesity in COVID-19 disease [38]. Ultimately, obese individuals require exceptional supervision in their ordinary life and also in this uncommon time of the epidemic. Future researches about the connection between Body Mass Index (BMI) and COVID-19 disease are expected to be announced if obese individuals are at a higher risk of contracting the infection or not. Furthermore, a study assesses whether obesity intensified the distress in hospitals during the epidemic is expected to avoid potential risk.

Symptoms of COVID-19 in Obese Patients

In two cohorts of Chinese grown-ups with COVID-19, those with obesity were at least three times more likely to have a serious instance of the infection than those with typical weight, as indicated by two studies published in Diabetes Care. Furthermore, the increase in obesity was related to increased chances of severe COVID-19 and the relationship between obesity and symptom seriousness was stronger for men than for women.

- Fever
- Dyspnea
- Dry cough
- Aching muscles
- Pharyngitis (sore throat)
- Headache
- Chills
- Anosmia and hypogeusia (loss of smell or taste)

Precautions and Measures to Be Taken by Obese Patients Against COVID-19

It is not astonishing that individuals with a preexisting condition of obesity may feel more restless than normal. It is common and reasonable. The infection quickly grasped control of the world, leaving specialists scrambling to see how it functions, who can be in most peril, and how to control its spread. It is just right that individuals have the data they need to remain healthy and safe. Many people struggle with weight management. Being diagnosed as overweight or to have clinical or hereditary obesity is certainly not a shameful thing, nor does it mean that assistance is not available. Obesity can be hereditary or caused by disease or medication, yet it is likewise regularly connected to the absence of instruction in healthy eating, financial confinements, or psychological trauma, and mental issues. It is a widespread issue that deserves consideration and empathy.

CDC claims that patients with obesity who practice good physical conditioning and are metabolically healthy could be about the much lower risk end. People still need to practice distancing. Taking self-isolation and CDC precautions like cleaning hands well, especially after being with people, avoid touching the eyes, mouth, nose, or whatever else having unwashed hands, and next obstruction within 6 feet space out of people or in any parties of any type. Family members or housemates who have any traveling history must isolate them, as they may carry the virus if they do not have symptoms. This might appear difficult to display, but the spread is both rapid and highly contagious. The CDC believes that droplets created by coughs or sneezes easily pass from person to person [39].

Exercise In the meantime, it may be worthwhile to review the lifestyle to help a person stay fit even during the COVID-19 epidemic. Start a daily exercise routine or start a healthy diet while living alone, for example, these small changes in daily routine practice can benefit after a quarantine. It might be a good idea to look for a food-shipping agency or to begin adding foods. Also, you should not leave your house. The CDC pressurizes the continuation of all current drugs – including ACE inhibitors – that can carry other risks.

Recalibrate Patient's Diet If people are excited about exercise and diet, now is the time to reexamine your relationship with well-balanced meals. Easy alterations? Since one cannot go to the gym, they can make sure to spend more time walking rather than sitting. Spending 15 min on the stairs, doing push-ups, watching televisions, CDC offers. "Think about muscles as little factories one needs to keep churning and burning."

An increase in death rate and no success in vaccination have worsened the clinical dependencies. Contagiousness of infection when inhaled is more since the capacity to produce BMI gets reduced. Thus, the presence of obesity above the age of 60 years is now recognized as an independent risk for admission of a new infection [41]. Critical monitoring of severely obese patients is recommended [39]. Obesity is a poorly documented comorbidity in the COVID-19 epidemic and now identified

as a major risk component for serious COVID-19 infections, including those under 60 years of age. Obese people should be closely monitored because of the risk that the COVID-19 virus may increase. People should be concerned with regular excess weight check-up, mental and health care advice, nutritive food supplements, moral support, and guide for the isolation of obese and adolescent children with COVID-19 suspects [40].

4 Conclusion

With the coincidence of the allergy season with COVID-19, recently CDC has illustrated that muscle pain, loss of taste, headache, and sore throat are additional symptoms for COVID-19. Global Cooperation is mitigating the threat of COVID-19 Pandemic. World Health Organization is contributing as lead to a large extent with national actions playing the acute role in disease control. For now, as per the CDC guidelines, using sanitizers that contain 60% ethanol for at least 20–30 s, avoiding touching of eyes, nose, mouth, disinfecting frequently touched areas, maintaining social distancing of 6 feet are some of the preventive measures being followed for safety. People older than 65 years with underlying asthmatic medications and obesity (40 BMI or higher) are at higher risk of facing COVID-19 attacks. Strictly following the government's actions, caring for a daily exercise, a healthy lifestyle, nutritional food intake, optimized sleep, anxiety management, mindfulness and stress-relieving activities, moderating smoke and alcohol can supplement the prior solutions to boost up the immune system at a personal level [1].

The continuous study on affected communities is on an evaluation by pediatricians to diagnose the critical risk factors associated with the pandemic patients diseased with asthma or obesity. The occurrences of COVID-19 are higher in patients with comorbidities of asthma and obesity. COVID-19 causes other respiratory diseases to occur. Patients with chronic respiratory ailments seem to be more defenseless to COVID-19 infection [42]. For the progression of COVID-19, old age, obesity, chronic heart, and high blood pressure are some of the reported symptoms for identifying the risk. At present, there is no special vaccine for patients suffering from any disease. Many organizations have claimed that they have created vaccines but those vaccines are not particular for heart patients, but they are for other general diseases. Patients with asthma can lessen their odds of having a severe disease by keeping their asthma controlled by following disease control tips and by exercising. Individuals with asthma might well not be at risk of obtaining a COVID-19 contract. However, they could be at higher risk of complications.

There is no evidence that more issues are faced by individuals with asthma. A small quantity of evidence shows that people with COVID-19 and asthma are currently still also recovering. People who have asthma should proceed to carry their medication prescribed by their physician. Unchecked asthma may put individuals at an increased risk of complications and respiratory difficulties. There is a need to examine the effects of asthma and obesity patients being caught by

the COVID-19 virus. However, the licensed biologics for asthma treatment may target add-on experiments to maintain and reduce steroid uses. This survey can help in determining the present status of the co-relation of asthma and obesity with other comorbidities for the prevalence of contagious COVID-19. Evidence from several pieces of literature supports that air pollution, lung inflammations, asthma, and obesity are predisposing factors for the progression of coronavirus infections.

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