

Short Communication

Effect of Covid-19 on People with Chronic Diseases

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Abstract

SARS-CoV-2 is the organism that causes the COVID-19 infection whose include pneumonia, fever, dry cough, fatigue and diarrhea. Most people who contract COVID-19 do not get very sick. However, being infected with the Coronavirus could pose a life threatening danger and be of colossal damage to patients with compromised immune systems or chronic diseases. Chronic diseases are diseases that persist for a long time and are characterized by slow development. Generally, chronic diseases cannot be prevented by vaccines or cured by medication. This paper provides tips to help people with chronic illnesses protect themselves against the virus since they have increased susceptibility to contracting the virus. This would encourage them to take highly drastic measures in protecting themselves and also foster their efforts positively towards managing whatsoever chronic ailment it is that they are suffering from. People should also be advised to adopt disease prevention measures against endemics like malaria and other diseases in areas where they are prevalent. This is to enable easy management and control of COVID-19 in cases of infection.

Keywords: COVID-19; SARS-CoV-2; Coronavirus; Chronic disease; Diabetes mellitus; Angiotensin converting enzyme

Introduction

In December 2019, a novel Coronavirus called Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) caused a pneumonia epidemic in Wuhan, Hubei province of China [1]. In the following months, it spread rapidly to many other countries. The World Health Organization (WHO) officially declared SARS-CoV-2 to be a Public Health Emergency of International Concern (PHEIC) on January 31, 2020 and on March 11, 2020 the WHO declared SARS-CoV-2 to be a global pandemic [2]. Since the twenty-first century, there have been three human pathogenic coronavirus outbreaks which have caused global transmissions, posing great challenges to global public health and economic development [3]. They are the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) in 2003, the Middle East Respiratory Syndrome coronavirus (MERS-CoV) in 2012 and the new coronavirus (Severe Acute Respiratory Syndrome coronavirus-2, SARS-CoV-2) in 2019 [3]. SARS-CoV-2 can be transmitted from one person to another *via* direct contact and respiratory droplets which are spread while breathing, sneezing, talking and coughing. Also, current researches have shown that aerosol and fomite transfer may enhance the spread of the virus [4]. Aerosolized virus may be procreated by respiratory and surgical procedures [5]. General preventive measures against the disease include regular washing of hands, use of a nose mask, use of an alcohol-based hand sanitizer and proper personal hygiene. Most people who contract COVID-19 do not get very sick. However, being infected with the coronavirus could pose a life threatening danger and be of colossal damage to patients

with compromised immune systems or chronic diseases. Chronic diseases are diseases that persist for a long time and are characterized by slow development. Generally, chronic diseases cannot be prevented by vaccines or cured by medication.

Discussion

Patients with coronavirus suffering from chronic diseases are at a higher risk of developing severe COVID-19 complications and may easily die from the illness compared with other healthy COVID-19 patients. This is because with any disease, people suffering from any chronic ailment or who have an immune system which does not function properly are at a higher risk of suffering from the disease as the disease has more time to cause problems in their system before their immune system reacts. Such patients usually develop other complications which may or may not be seen in other patients suffering from the same disease. Patients who stand a chance of suffering from severe COVID-19 complications include those with chronic lung diseases, severe asthma, serious heart conditions, severe obesity, diabetes mellitus, chronic kidney diseases, liver diseases, amongst others [6]. Also, people undergoing chemotherapy, smokers, transplant patients, those with poorly controlled HIV/AIDS and those who experience prolonged use of corticosteroids or other immune-weakening medications also stand such risks [7]. The SARS-CoV-2 attacks its target cells by binding to ACE-2 (Angiotensin Converting Enzyme 2) and epithelial cells in the kidney, lungs, intestines and blood vessels express ACE-2 on their epithelial cell surfaces [8]. People who are on ACE inhibitors or Angiotensin II type-1 receptor blockers may have a higher expression of ACE-2, hence more binding sites would be provided for the SARS-CoV-2 and tendencies for developing fatal COVID-19 would be high. Effective therapy for COVID-19 has been believed to not only be restricted to the viral pathogen as a target but also on its microangiopathic and thrombotic effects [8]. Cardiac injury is a usual and widespread complication common in COVID-19 patients with heart disease [9]. The mRNA and ACE-2 expression levels are higher in these patients, causing an increased risk for severe complications, especially heart failure. It has

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also been suggested that the human heart infected with SARS-CoV-2 attacks pericytes, resulting in microvascular disorders, which in turn cause dysfunction in capillary endothelial cells, low microvascular reactivity and high vascular permeability [9].

Current clinical findings have shown that cancer patients receiving treatments inhibiting the development of tumors are highly vulnerable to the effects of COVID-19, similar to immune-suppressed patients and patients older than 60 years. Patients suffering from neutropenia, haematological malignancy, lymphopenia, as well as those receiving multiple doses of chemotherapy are at a higher risk for hospitalization (4 times) higher and death (10 times) higher compared to the healthy population of COVID-19 patients [9]. Such patients with COVID-19 also tend to have a poor prognosis so treatment has to be done more meticulously than in others who are not suffering from any chronic ailment.

A demographic data from Italy revealed that among 3000 reported COVID-19 cases, 20% of the patients who died had a medical history of malignancy in the last five years [9]. These deaths were due to acute myocardial infarction, acute respiratory syndrome, septic shock and pulmonary embolism [9]. Such patients require ICU administration and or mechanical ventilation than other COVID-19 patients. Patients with diabetes mellitus, obesity and/or hypertension and COVID-19 have increased rates of death susceptibility and morbidity. In a study that included 52 ICU-admitted COVID-19 patients, about 22% of them were diabetic and of the 52 patients being admitted, 32 died [9]. This alludes that diabetes mellitus is the prevalent co morbidity with COVID-19. Recent findings have shown that certain mechanisms explain the high susceptibility of diabetes mellitus patients to COVID-19 pathogenesis [8]. These include having an efficient cellular binding and easy entry of the virus, weakened T-cell function, low chance for viral clearance and being highly prone to cytokine storm and hyper-inflammation [7]. Also, administration of insulin weakens ACE-2 expression [9], while hypoglycemic agents like ACE inhibitors, Angiotensin-receptor blockers, anti-hypertensives, statins, glucagons like peptides-1 and thiazolidinediones upregulate ACE-2 expression [9].

In order to comprehend the correlation between ACE-2 expression in diabetes mellitus patients and COVID-19 infection, it is important to be familiar with the mechanism of ACE-2 action. ACE-2 catalyses the conversion of angiotensin-II to angiotensin-I -an anti-inflammatory enzyme and antioxidant vital against lung Acute Respiratory Distress Syndrome (ARDS) [7]. Upon binding with ACE-2, SARS-CoV-2 degrades it, making the free angiotensin-II to induce acute lung injury [9,10].

Conclusion

There is a pressing need to tackle the menace of COVID-19, conspiracy theories available, and its seemingly horrendous impacts on the lives of the global populace. People with chronic illnesses should be informed about their easy disposition to contracting the virus. This would encourage them to take highly drastic measures in protecting themselves and also foster their efforts positively towards managing whatsoever chronic ailment it is that they are suffering from. People should also be advised to adopt disease prevention measures against endemics like malaria and other diseases in areas where they are prevalent. This is to enable easy management and control of COVID-19 in cases of infection.

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