EFFECT OF PHYSICAL ACTIVITY AND EXERCISE PROGRAMME TO STRENGTHEN IMMUNITY AND PREVENT COVID 19

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Abstract

COVID-19 is an infectious disease caused bythe severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).It's all over the news and there is an inescapable sense of anxiety, stress, and uncertainty due to COVID19 pandemic. Hence this review paper focus on impact of COVID-19 and related physical inactivity on human health, and to offer some physical activity guidelines to individuals suffering from the adverse outcomes during the pandemic and those recovering from an infection. The public health recommendations like stay-at-home orders, closures of parks, gymnasiums, and fitness centers to prevent SARS-CoV-2 spread have the potential to reduce daily physical activity. These recommendations are unfortunate because daily exercise may help combat the disease by boosting our immune systems and counteracting some of the co-morbidities like obesity, diabetes, hypertension, and serious heart conditions that make us more susceptible to severe COVID-19 illness.Exercise affects the immune system and its anti-viral defenses.At this time, we know very little about how exercise might interact with the immune system to affect SARS-CoV-2 infectivity and COVID-19 disease susceptibility. As the pandemic proceeds, it will be important to perform retrospective studies to determine whether physical activity status had any bearing on SARS-CoV-2 infection or COVID-19 outcome.A goal of any beginning exercise program is to progressively work toward completing at least one-half hour of moderate physical activity every day or at least twenty minutes of vigorous physical activity every other day of the week. Ideally, strengthening-type activities are included in daily activities at least twice a week.Hence this review paper explore the advantages of regular exercise programme during COVID pandemic situation as a solace to the victim.

Introduction

COVID-19 is an infectious disease caused bythe severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first detected in December 2019 in the city of Wuhan, China. And from wuhan china the corona virus has travelled over 213 countries without VISA and braking all security check-ups and emigration clearance and it continues to spread worldwide with lakhs of new cases popping up daily. It's all over the news and there is an inescapable sense of anxiety, stress, and uncertainty.There are mainly three symptoms like fever, cough and fatigue.

As a major journal of sport medicine and health in the world, the Editor-in-Chiefs and the Editorial Board share a strong sense of obligation to provide an overview on the impact of COVID-19 and related physical inactivity on human health, and to offer some physical activity guidelines to individuals suffering from the adverse outcomes during the pandemic and those recovering from an infection. Thus, the goal of this review article is to address the harm of physical inactivity associated with the virus outbreak to the body.

Lack of exercise and impact of COVID-19 on the immune system

SARS-CoV-2 causes COVID-19 characterized by the major symptoms of fever, dry cough, myalgia, and fatigue. Currently, there are neither vaccines nor clinically proven effective therapeutics. As this virus strain is novel to the human immune system, we are dependent on aspects of our innate immunity to deal with the initial infection. Like most viral infections, if we survive the infection, over the course of weeks we develop antibody and cell-mediated immune responses specific to the virus. In most instances, this exposure-related 'training' of our immune systems offers us long-lasting protection from re-infection or, if we are re-infected, disease symptoms are much milder. Along with tests for the presence of viral particles and plasma antibodies, a clear need exists for research related to vaccine development and research to determine whether our immune response is adequate to protect us.

The public health recommendations like stay-at-home orders, closures of parks, gymnasiums, and fitness centersto prevent SARS-CoV-2 spread have the potential to reduce daily physical activity. These recommendations are unfortunate because daily exercise may help combat the disease by boosting our immune systems and counteracting some of the co-morbidities like obesity, diabetes, hypertension, and serious heart conditions that make us more susceptible to severe COVID-19 illness.

Exercise affects the immune system and its anti-viral defenses. Animal experiments administering influenza and herpes simplex viruses 1 (HSV-1) in the respiratory tract, have shown that moderate exercise, performed before or after infection improves morbidity and mortality to the infection.Conversely, preclinical studies have also shown that intense exercise leads to poorer outcomes in response to respiratory viral infections.Follow-up studies have elucidated some understanding of the mechanisms responsible for these observations.An early epidemiological study suggested that intense, prolonged exercise was associated with an increase in upper respiratory tract infections. This work led to the concept that moderate exercise reduces, and prolonged, high intensity exercise increases susceptibility to infection.

Despite this, whether exercise-induced changes in the immune system affect respiratory virus susceptibility in people is unclear.Indeed, controversy remains whether intense, prolonged exercise can alter immunity that leads to infectious disease risk or whether moderate exercise-induced improvements in immune response reduces it. Definitive studies where both exercise and infection are manipulated and controlled are needed and yet scarce due to ethical concerns. In one such study, moderate exercise training with 40 minutes duration at 70% heart rate reserve for 10 days was initiated after nasal rhinovirus administration to determine its effects on the severity and duration of infection. No differences were found in self-reported symptoms or mucus weight and concluded that physical activities and exercise moderately are safe during a rhinovirus-induced upper respiratory tract infection.

At this time, we know very little about how exercise might interact with the immune system to affect SARS-CoV-2 infectivity and COVID-19 disease susceptibility. As the pandemic proceeds, it will be important to perform retrospective studies to determine whether physical activity status had any bearing on SARS-CoV-2 infection or COVID-19 outcome. Current practical advice dictates that people follow social distancing and hygiene practices, and we propose exercise can be safely incorporated. Disruption of exercise routines and reducing physical fitness may increase susceptibility to infection A good practice is to start exercising at lower intensities and duration and build up slowly. For example, walking is the most natural and practical form of exercise and beneficial to many organ systems. For those who have underlying health conditions, consultation with a primary care provider is warranted before beginning an exercise program.

Can physical fitness protect from the consequences of infection?

There is currently no proven medicine to treat the viral infection, however the progress and severity of virus-induced diseases could vary greatly. The general observation is that under the age of 60 years, mortality rates and severity of symptoms of SARS-CoV-2 infections are much less then in advanced age. To date, no data is available whether the level of physical fitness affects the progress of SARS-CoCV-2 infections. However, it is well documented that regular exercise induced-adaptations enhance the effectiveness of immune system, which actual level could affect the severity of SARS-CoV-2 infection.

However, quarantine-associated decline in the immune system as a result of the development of depression or traumatic disorders can be prevented and/or attenuated. Indeed, the inflammatory process generated by ROS can be more effectively detoxified by antioxidant systems in various organs including the brain of well-trained individuals from adaptations to exercise training. In addition, exercise training can efficiently decrease depression, and is one of the power modulator of the neuroprotective and anti-depressive effects of exercise is the brain derived neurotrophic factor (BDNF). Present data suggest depression is closely linked to structural abnormalities and dysregulation of some neuroplastic mechanisms. Many brain regions are affected by depression, but the most consistently affected area in individuals with depression is the hippocampus, which is implicated in memory, emotion processing, and stress regulation.

The exercise effect on the brain can elicit systemic influences on the entire body, as exercise-induced euphoria is associated with the release of endogenous endorphins. Endorphins are identified as three distinct peptides termed alpha-endorphins, beta-endorphins, and gamma-endorphins. Euphoria is significantly increased after running and is inversely correlated with opioid binding in prefrontal and orbitofrontal cortices, the anterior cingulate cortex, bilateral insula, parainsular cortex, and temporoparietal regions. Thus, regular exercise can attenuate the symptoms and consequences of quarantine-induced depression and traumatic disorders with the systemic, complex, and powerful neuroprotective effects.

Physical activities and exercise programming during pandemic

Infectious and non-communicable diseases have always beset humans, but the recent appearance of COVID-19 has refocused public health perspectives to infectious disease. In the early part of the 20th century, advances in the prevention and treatment of infectious disease was primary, but deaths caused by noncommunicable disease continued to rise. During the last part of the 20th century, higher global death rates shifted this focus from infectious to noncommunicable diseases and the scientific community sought to better understand prevention and treatment of these diseases.The impact of exercise on noncommunicable disease are welldocumentedand also impact the immune system and thus affects the bodies anti-virale defenses.

Unfortunately, modern lifestyle behaviors promote physical inactivity and sedentariness.These poor lifestyle behaviors are intensified by social distancing and self-imposed or government mandated quarantine measures intended to reduce COVID-19 spread. These circumstances pose significant challenges for remaining physically active. During periods of isolation, all socioeconomic groups, ethnicities, and ages should maintain good health by following the WHO physical activity recommendations of 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week, or a combination of both. Muscle-strengthening activities involving major muscle groups are recommended on two or more days a week.In children/adolescents the recommendations include at least 60 minutes per day of vigorous or moderate intensity physical activity.

To do or not to do exercise when COVID-19 symptoms are observed

Common COVID-19 symptoms are fever, cough, shortness of breath, and breathing difficulties. In severe cases, infection causes pneumonia, ARDS, organ failure, and even death. Symptoms usually appear within two to 14 days and are difficult for the non-health professional to differentiate between flu or COVID-19. In either case, the exercising individual should seek medical diagnosis and discontinue exercise immediately. Present data suggest the median time from onset to clinical recovery for mild COVID-19 cases is approximately two weeks and is three to six weeks or longer for patients with severe or critical disease.

Starting an exercise program during a pandemic

When starting an exercise program while in the midst of a pandemic, public health recommendations for social distancing and hygiene practices are paramount considerations when starting a physical activity or exercise program. Becoming physically active and reducing sedentary behavior is easily accomplished by avoiding sitting for long time periods, taking short movement or activity breaks, utilizing online exercise classes, and using mobile technologies such as telephone applications and wearable sensors to encourage movement. Examples of home exercises not requiring large spaces or equipment while easily practiced at all times of the day include walking, stair climbing, lifting and carrying groceries, chair squats, pushups, sit-ups, rope jumping, aerobics, yoga, etc. A beginning exercise program should start at low intensities for short durations and progress slowly to more intense physical activity or exercise periods of longer durations. Because these activities are easily performed at home, difficulties in finding facilities with proper space and specific equipment is reduced or eliminated.

A goal of any beginning exercise program is to progressively work toward completing at least one-half hour of moderate physical activity every day or at least twenty minutes of vigorous physical activity every other day of the week. Ideally, strengthening-type activities are included in daily activities at least twice a week.Individuals susceptible to chronic diseases such as cardiovascular or pulmonary disease should seek advice from health care providers regarding safe exercises. Recommendations for children and youth aged five to 17 years are the accumulation of at least 60 minutes of moderate - to vigorous-intensity daily physical activity. In addition, vigorous-intensity activities that strengthen muscle and bone are recommended at least three times per week.

If engaged in regular exercise and wanting to further enhance cardiovascular and muscle fitness, suddenly beginning an intense aerobic and resistance exercise training program or performing unaccustomed highly intense prolonged exercise is not prudent, because such physical activity training can lead to reduced immune function. Thus, if you are already physically active or have a regular exercise programme but want to become more physically active, adjust exercise programming slowly and progressively to obtain new fitness goals to reduce the likelihood of any negative impact on the immune system.

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