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REVIEW ARTICLE

COVID-19 Pandemic: Physical Activity as Prevention Mean

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Abstract:

Background:

The consequences of the new pandemic caused by the Coronavirus Disease 2019 (COVID-19) have ruined the whole world. To date, more than 180 countries have been affected with more than 13 million people afflicted of all categories (young people, the elderly, athletes, and children) and more than 500,000 deaths around the globe. Moderate-intensity physical activity should be recommended as a non-pharmacological, low-cost, and feasible mean to cope with the COVID-19 virus

Objective:

The first objective is to provide an overview of the COVID-19 pandemic along with the evolution of this disease, the modes of inter-persons transmission, and the symptoms. The second objective is to suggest means of prevention for people, including the practice of regular physical activity.

Conclusion:

No drugs or treatments exist until today. The solution remains confinement in order to minimize contact between people (social distancing) and the strengthening of the immune system through a healthy lifestyle (healthy food and regular physical and sports practice) in addition to the recommended preventive measures.

Keywords: COVID-19, Pandemic, Prevention, Nutrition, Physical activity, Exercise.

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1. INTRODUCTION

From birth until death, our bodies fight against any disturbances to keep a well-being state. This mandate is chaired by the immune system. As a defense system, it has to recognize foreign invaders called pathogens (*e.g.*, viruses, bacteria, parasites…), discern them from the body's own healthy cells by neutralizing, eliminating or metabolizing them [1]. In some circumstances, many diseases can be caused if the immune system shows any dysfunction in his shielding response. Due to pathogens evolution and mutation, diseases will never stop to emerge and re-emerge. The emergence of the Coronavirus Disease 2019 (COVID-19) was dramatically a testimony. This editorial seeks to investigate this ongoing outbreak with an emphasis on the ways to reduce the risk of being infected.

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2. COVID-19 PANDEMIC

At the end of 2019, Chinese authorities alerted the World Health Organization (WHO) confirming the outbreak of a novel strain of coronavirus. It originated in Wuhan, the capital of Hubei, China, where most of the initially reported cases either shopped or worked at the local Huanan wholesale seafood and live animal market [2]. The environmental samples taken from this market were tested positive, which raised more doubt about the possibility of the market being a point of origin or a dominant contributor to the initial amplification of the outbreak [3]. Coronaviruses (CoV) are large family viruses including Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). At a microscopic level, CoV are single-stranded positive-sense RNA (ribonucleic acid) viruses [4]. The spike proteins around its lipid envelope [5] give the viruses a coronal shape, from which it took its name. COVID-19 is one of the several zoonotic coronaviruses, caused by severe acute respiratory syndrome coronavirus 2 (SARS-

CoV-2) [5]. The virus crossed the species barriers from its natural hosts, bats or pangolins, to humans [5]. This spillover event became a global health threat due to the rapid increase in the worldwide number of cases.

On 30th January 2020, the WHO agreed that the COVID-19 outbreak fulfills the requirements of a public health emergency of international concern [6]. In March 2020, the infection spread was more far-reaching. Thereby the outbreak was officially declared as a pandemic by the WHO [6]. Data published on the interactive web-based dashboard to monitor COVID-19 in real-time, developed by the Johns Hopkins University Center for Systems Science and Engineering, indicate that as of July 16, 2020, a total of 13 494 771 people have been infected by COVID-19 and 582 547 have died from the disease [7].

The above evidence highlights that SARS-COV2 is alarmingly a high virulent virus with strong infectious capacity. The Centers for Disease Control and Prevention (CDC) confirm that the virus is typically spread during contact with infected secretions. As such, Human-to-human transmission occurs through respiratory droplets. When an infected person coughs, sneezes or talks, viral particles can land in the respiratory tracks of those nearby, who are within a gap of 1.8 meters around [8]. There's one other way from which SARS-COV2 can be caught, namely contact transmission. Contaminated droplets of an infected person land on surfaces. The National Institute of Health (NIH) confirms that the virus can survive up to 4 hours on copper, up to 24 hours on cardboard, and up to 72 hours on plastic and stainless steel [9]. By touching these objects and then touching one's mouth, nose or eyes, the virus creeps in the organism's healthy cells. People of all ages can be infected by COVID-19. The disease severity depends on the virus carrier's immunological response strength. Taking that into consideration, all immuno-compromised people like older adults and folks with serious underlying medical conditions such as heart or lung diseases, severe obesity, AIDS, and diabetes are at high risk for adverse outcomes from COVID-19 illness.

The seriousness of COVID-19 ranges from a mild cold to severe pneumonia until death. The common symptoms include fever (82%), cough (61%), muscle aches and/or fatigue (36), dyspnea (26%), headache (12%), sore throat (10%) and gastrointestinal symptoms (9%) [10]. The incubation period is typically around 2 -14 days. Despite the low viral load in asymptomatic carriers, they are still contagious and can spread the virus [11]. Currently, there is neither the vaccine to forestall nor the treatment to cure the disease. Given this, avoidance of being exposed to the virus is a unique effective measure to prevent infection. In an effort to contain the virus by slowing its spreading, authorities worldwide impose travel restrictions, quarantine, curfews, and ban on public gatherings. Citizens themselves should strictly obey to the mandated instructions except for the most urgent reasons. The recommended preventive measures include regular hand washing, social distancing, surface disinfecting, and respiratory hygiene [11].

3. NUTRITION AS A PREVENTIVE MEAN

Another line of thought demonstrates that maintaining a healthy lifestyle is a powerful tool that may give the immune system the upper hand versus pathogens. It is a must to keep in mind that there is no scientific evidence that proves that any herb, dietary pattern or supplement may prevent, cure or lessen the effect of COVID-19. Nonetheless, a well-rounded diet may offer an edge in making the immune response more active and stronger. Therefore, a variety of fresh and unprocessed foods should be daily eaten in an attempt to afford required nutrients; carbohydrates (CHO), lipids (fats), proteins, vitamins, minerals, and water. Conventionally, meals must be rich in fruits, vegetables, foods from animal sources, cereals, whole grains, healthy fats (unsaturated fatty acids) as well as a small quantity of sugar, fat, and salt and without overlooking hydration. A dietary supplement can be additionally taken to guarantee an essential amount of vitamins, minerals, fiber, fatty acids, and amino acids that can be missed from nourishment. Furthermore, herbs like garlic, green tea, ginger, purple coneflower, black cumin, licorice, St. John's wort, and Astragalus can be included in diets to act as natural immune boosters [12].

4. PHYSICAL ACTIVITY AS A PREVENTIVE MEAN

For optimal health, sound eating guidelines must be combined with a physically active lifestyle. During quarantine, gyms and outdoor activities are no more available. Prolonged home-stay, presumably, has disrupted the regular activities schedules, leading to the increase of sedentary behavior. In fact, in the present condition, exercise is crucial more than ever.

Emotionally and physically, exercise benefits are ginormous. On one hand, physical activity enhances sleep quality, lifts the mood, and mitigates manifestations of perceived stress and anxiety that may be felt in the wake of the COVID-19 pandemic [13]. On the other hand, there is no certain effective pharmaceutical agent against this virus. This is the reason why the busting of the immune system seems to be of prime importance. Exercise with an appropriate intensity is associated with better immune system responses against viral respiratory infections [14]. The connection between physical activity and the immune system is a J-shaped one. The exercise intensity should be kept moderate otherwise, unaccustomed and prolonged high-intensity physical activity would have consequences such as immunosuppression [14]. These alterations are dependent on the intensity and duration of the exertion. Physiologically, high-intensity exercises result in a profound leukocytosis mediated by an increased number of neutrophils, T and B lymphocytes, and NK cells in the systemic circulation, blunting the immune responses against antigens [15]. This organism's response is explained by the activation of the hypothalamic-pituitary-adrenal axis [15]. As a matter of fact, the sympathetic nervous system stimulation is followed by the release of catecholamines and glucocorticoids [16]. Hence, the greater the exercise intensity, the greater the increase of the secretion rate of epinephrine and norepinephrine. Once circulating in the blood, Catecholamines recruit lymphocytes owing to the high cells density of β-receptors [16]. In contrast, moderate-intensity exercises are "immuno-enhancing" [15]. Low-intensity exertion is related to an increased NK-cell cytotoxic activity, a greater IL2 production, and an increased neutrophil phagocytic activity [15].

5. HOME EXERCISES

Home training program depends on the availability of equipment. . According to world fitness academy [17],

exercises may include, but not limited to:

- Body-mind exercises that combine body movement, mental focus, and controlled breathing such as yoga, Tai Ji Quan/Qigong, pilate…
- Aerobic exercises with a moderate intensity that elicits breath quickness but in an in breathing ease (talking is possible): stair climbing, walking the hallways, running on a treadmill, stationary bike, jump rope (30 minutes which can also be split into three 10 minutes sessions)
- Resistance exercises to perform work against gravity. These types of exercises are made through body weight, rubber bands, kettlebells, wrist weights, ankle weights dumbbells which can be replaced by bottles full of water or even small backpacks filled with objects of different weights. These include jumping jacks, high knees, squats, squat jump, pushups, mountain climbers, torso twist, alternating leg lunges, split jump, crunches, swing.. (at least 2 sets of 15 repetitions and 20 seconds recovery) planks, plank T twist… (at least 2 sets of 20 seconds and 20 seconds recovery)

The low-intensity combination of aerobic exercises and strength training is also strongly suggested. The American College of Sports Medicine (ACSM) recommends practicing 2 sessions of resistance training per week and 150–300 minutes of aerobic exercise training per week. Fortunately, many strength and conditioning coaches or exercise physiologists are offering online classes on their social media platforms. There is every possible way at your fingertips.

CONCLUSION

COVID-19 is a dire health crisis, which demands an urgent need for prevention. That is why staying home is the most substantial strategy to cut all the hypothesized routes of transmission, without ignoring the importance of maintaining a regular and moderate physical activity along with healthy eating habits. Of note, there is a strong rationale that exercise intensity should be kept moderate to preserve the immune system functions, especially in the current insecure circumstances.

CONSENT FOR PUBLICATION

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CONFLICT OF INTEREST

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