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COVID-19 among Physically Active and Physically Inactive Individuals

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ABSTRACT

Introduction: *COVID-19 was first reported in Wuhan, China, and subsequently spread worldwide. There were numerous restrictions on daily life activities, including lifestyles, social distancing, isolation and access to many forms of exercise and home confinement. All these activities have health benefits, as they enhance the immune system, which is the need of the hour during the COVID-19 pandemic. There is little data regarding the occurrence of COVID-19 among marathon runners, cyclists and yoga practitioners. The aim of the present study was to find the prevalence of COVID-19 among physically active and physically inactive individuals and to compare it among those groups.*

Material and methods: *Physically active individuals were selected as per the Global Recommendations on Physical Activity for Health 2010, in the age group of 18-60 years, and included runners, yoga practitioners and cyclists from the Hyderabad club. A prevalidated questionnaire was circulated among the study groups through Google form. The data was analyzed statistically.*

Results: *There was a high proportion of persons affected by COVID-19 in the physically inactive group (75.75%) when compared to the active group (17.17%). The percentages of subjects who tested positive for COVID-19 were as follows: 16.16% cyclists, 29.29% runners and 27.27% yoga practitioners among the physically active individuals, and 51.51% of physically inactive subjects.*

Conclusion: *Physical activity acts as a barrier against COVID-19 infections and enhances the immune system. Therefore, it has to be prioritized by public health agencies and incorporated into routine medical care.*

Keywords: COVID-19, yoga, cyclist, runners, physically inactive, physically active.

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INTRODUCTION

After the flu of 1918, COVID-19 is the fifth documented pandemic. It was first identified in Wuhan, China, and has since expanded worldwide. The International Committee on Taxonomy of Viruses designated the coronavirus as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) after conducting phylogenetic research. The first reported symptoms included fever, lethargy, dry cough and dyspnea, which was categorized as viral pneumonia (1). The first symptoms were reported in December 2019. It was further named as Wuhan pneumonia. The disease later spread to almost all parts of the world. (2). There were numerous restrictions on daily life activities including lifestyles, social distancing, isolation, access to many forms of exercise like closed gyms, no gatherings and home confinement. All these were the governmental measures and recommendations by the World Health Organization (WHO), which were adapted to the scenario of the disease (3).

Physical activity is one of the best ways to keep our selves away from all diseases. The WHO advises at least 150 minutes of moderate physical exercise, 75 minutes of strenuous activity, or a combination of the two each week. By 2030, the WHO hopes to lower the global prevalence of physical inactivity by 15% (4). Dr. Steven Blair quotes Dr. Ken Powell: "Some activity is better than none, and more is better than less". The goal should be to perform at least 30 minutes of moderate physical activity per day or at least 20 minutes of vigorous physical exercise every other day. COVID-19 public health limitations affect physical activity, seating time and screen time (5). Along with physical activity, cycling, jogging and yoga asana, pranayama techniques may be a useful supplementary means of treating and/or preventing SARS-CoV-2 infection (6). Yoga provides a tool for risk reduction. It also ameliorates stress and anxiety and strengthen the immune system (7). There is very little data regarding the occurrence of COVID-19 among marathon runners, cyclists and yoga practitioners. But with the fear of getting infected with the virus, almost few of the marathon events, cycling, yoga schools and gyms have been stopped.

This study aims to find the occurrence of COVID-19 among physically active and physically inactive individuals. Running is a popular sport around the world. About 12.5% of the Dutch population participates in regular running activities. These workouts have several health benefits, including a stronger immune system, which is especially vital during the COVID-19 outbreak. The immune system has several layers of defense against viral infections (8). Most runners did not change their jogging habits. A small percentage of this otherwise healthy group (0.4%) tested positive for COVID-19 and 0.08% required a brief (one-day) hospital stay. The runners train on a regular basis and interrupting their daily routine will reduce their fitness level, health and mental status. Continuous moderate-intensity interval training, but not high-intensity interval training, enhances immune function biomarkers in healthy young men (9). With significant infectivity and fatality rates, COVID-19 had a global psychological impact, creating public hysteria, economic burden and financial loss (10). The widespread fear of COVID-19, known as "corona phobia", has resulted in mental manifestations across all levels of society. It was fueled by an "infodemic" distributed through various social media channels (11). Almost all the people in the world have been restricted to their homes, owing to nationwide lockdowns and home-confinement strategies which were framed by the government. In an article entitled "Exercise as a prescription for patients with various diseases", Xin Luan *et al* mentioned that less physical activity would affect the wellbeing of the individual (12). This coronavirus disease has also closed gyms and parks, and affected many mass events like marathon runs, cycling races and so on. The main reason for the decline of national physical fitness is the lack of physical activity in modern life. It also decreases the work efficiency of adults (13) and increases the prevalence of chronic diseases, which raises medical costs and places an economic burden on the state and its people. International and national sporting activities were cancelled or postponed to reduce the danger of viral transmission. Everyday routines of athletes and trainees were not identical. Some of them were trained and monitored independently at home. A lengthy stay at home would result in unsuitable behaviors that promote inactivity and contribute to anxiety and sadness; it would also lead to a sedentary lifestyle, which has been linked to a va-

riety of chronic health issues (14). Thus, we must maintain ourselves by frequent physical activity and habitual exercise in a safe home environment, which is the slogan of healthy living during the coronavirus crisis. ❑

MATERIALS AND METHODS

This is a cross-sectional study conducted by the Department of Physiology, AIIMS Bibinagar, India. It was conducted in Hyderabad, India, between January 2021 – January 2022, after obtaining the approval from the Institutional Ethical Committee.

Physically active individuals were recruited as per the recommendation quoted in the Global Recommendations on Physical Activity for Health 2010 (16), in the age group of 18-60 years, as follows: group 1 (runners) included healthy individuals who used to run at least 5 km *per* day for at least five days a week; group 2 comprised healthy individuals who were practicing yoga at least 30 minutes *per* day for five days a week; group 3 included healthy individuals who did cycling at least 30 minutes *per* day for five days a week; and group 4 comprised physically inactive people – healthy individuals who were not involved in any kind of physical activity like recreational or leisure-time physical activity, transportation (eg, walking or cycling), occupational (ie, work), household chores, play, games, sports or planned exercise (16-19). The vaccination status was thoroughly screened.

Individuals who took two doses of vaccine were included in the study. People with metabolic disorders, endocrine diseases and who were using any type of medicine for chronic disease, those who are unwilling to participate, individuals with psychiatric illness and health care personnel were all excluded from the study. Also, the vaccination status was one of the important criteria for exclusion. People who did not take two doses of vaccine were excluded from the study.

A prevalidated questionnaire was generated through Google form and distributed among Hyderabad's runners, yoga and cycling clubs as well as to subjects eligible for group 4.

Some important points in the questionnaire included the name, age, sex, occupation, comorbidities (hypertension, diabetes, cancer, asthma), physical activity involving cycling, yoga and running, physically inactivity (non-involvement in any activity like cycling, yoga or running), history of COVID positivity or negativity, history of hospitalization (duration of hospital stay), vaccination history with either Covishield or Covaxin [first dose (Yes/No); second dose (Yes/No); booster dose (Yes/No)], home isolation [(Yes/No)], and treatment received. ❑

RESULTS

Data was extracted from the Google form. Participants' responses were collected and statistical analysis was done using SPSS. A chi-square test of independence was performed to examine the relation between physical activity and COVID-19 positivity, which was shown to be significant.

The present study included responses from 400 participants (59.6% males and 40.4% females) (Table 1). Four responses were excluded because they were incomplete. The remaining 396 participants were allocated to four equal groups of 99 subjects each, including cyclists (group 1), runners (group 2), yoga practitioners (group 3) and physically inactive persons (group 4). Out of all participants, 31.06% were COVID-19 positive, with 72% of subjects in the physically inactive group but only 17.17% of

TABLE 1. Demographic data

Total number of participants (n=396)		
Gender distribution		
Males	236 (59.6%)	
Females	160 (40.4%)	
Distribution of participants among four groups		
Physically active (297)	Group 1(cyclists)	99
	Group 2 (runners)	99
	Group 3 (yoga)	99
Physically inactive (99)	Group 4 (inactive)	99
No. of participants diagnosed with COVID-19		
COVID-19 positive		31.06% (n=123)
COVID-19 negative		69.69% (n=276)

TABLE 2. Distribution of participants into various age groups

Age group (years)	Cyclist group (n)	Runner group (n)	Yoga group (n)	Physically inactive group (n)
18-30	57	54	36	30
31-40	27	11	32	18
41-50	10	17	10	28
51-60	5	17	21	23

	COVID-19 positive	COVID-19 negative	Chi square test	P value
Physically active	17.17% (51)	75.75% (225)		
Physically inactive	72% (72)	51.51% (51)	7.733	0.005

TABLE 3. Comparison among physically active, physically inactive and COVID-19 infectivity

	COVID-19 positive	COVID-19 negative	Chi square test	P value
Cyclists	16.16% (n=16)	83.83% (n=83)		
Runners	29.29% (n=29)	70.70% (n=70)	30.414	0.05
Yoga practitioners	27.27% (n=27)	72.72% (n=72)		
Inactive	51.51% (n=51)	48.48% (n=48)		

TABLE 4. Intercomparison of COVID-19 status among all groups

those included in the physically active groups (Table 3). The majority of physically active individuals (57 cyclists, 54 runners and 36 yoga practitioners) were in the age group of 18–30 years (Table 2). Most of the study participants were vaccinated with two doses of Covishield. There were clinical signs and symptoms of COVID-19 in 11.4% of physically active individuals and 25.8% of physically inactive ones. The number of participants with diabetes mellitus and hypertension was greater in the physically inactive group than the three active groups. Among the COVID-19 positive participants, steroids for the management of COVID-19 symptoms were required by 18.2% of subjects of the physically inactive group and only 4.7% of those included in the physically active groups. Hospitalization was greater among the physically inactive individuals when compared to the physically active ones. Comparison between physically active individuals showed that the percentage of positivity was 16.16%, 29.29% and 27.27% among cyclists, runners and yoga practitioners, respectively (Table 4). ❑

DISCUSSION

The results of our study highlight that physical activity is linked to a lower incidence of COVID-19 and a milder infection presentation, suggesting that physical activity may have a preventive effect against infections. Hospitalizations related to COVID-19 are likewise less common in physically active people. Similar results are found in a study by Collie *et al*, which links physical activity to higher vaccination efficacy and fewer COVID-19-related hospitalizations (20). Pre-pandemic physical activity levels were connected to a lower incidence of both COVID-19 and SARS-CoV-2 infection (21). According to the literature, people who engage in physical exercise have a reduced incidence of respiratory disorders like influenza or pneumonia and bacterial or viral infections during their entire lives (22, 23). When compared to individuals who were physically inactive, study participants who engage in regular physical activity, such as cycling, running or yoga required fewer steroids to manage their COVID-19 symptoms. This suggests that engaging in any physical activity may have either offered some degree of protection against the infection or lessened the severity of the infection in them. Less steroid use, which is associated with milder forms of infection and inflammation and less severe infection overall, may be related to stronger immune systems and anti-inflammatory mechanisms in physically active people. Most of the times, physical inactivity is invariably associated with a greater risk of obesity, metabolic syndrome, diabetes mellitus and hypertension; therefore, these comorbidities along with inactivity could be the probable cause for greater number individuals with COVID-19 infection of the physically inactive group. Hyperglycemia is a major risk factor for the severity and mortality of COVID-19, which directly induces SARS-CoV-2 replication and proinflammatory cytokine production (24, 25). Previous studies demonstrated that comorbidities such as diabetes, chronic obstructive pneumonia disease (COPD), hypertension and malignancy may lead to poorer prognosis (26). Physical inactivity is identified as a risk factor for multiple conditions like sarcopenia (27), decreased muscle function and functionality (28, 29), cardiovascular and metabolic diseases, impaired immune function (30), immunosenescence (31) and increased total body and abdominal fat content. Physically active indivi-

duals have improved T cell responses, reduction of toll like receptor-4 (TLR-4) expression on monocytes (32, 33), decreased levels of lung inflammation and bacterial pneumonia (34, 35), improved lung function (36), stronger and long-lasting antibody responses to the influenza vaccine, decreased immunosenescence (37, 38), increased anti-inflammatory capacity and decreased upper respiratory tract infection (URTI) incidence and symptoms. Acute exercise is an efficient stimulus to improve CD34+ hematopoietic stem cells and mobilize cell-mediated immunity and increase in the circulating leukocytes (39). Episodes of exercise also tend to raise the mobilization of natural killer (NK) cells, improved neutrophil chemotaxis and phagocytosis, and the modulation of inflammatory/alternative activated macrophages in the adipose tissue (40). Proliferation and migration of adaptive immunity cells, such as viral specific CD4 and CD8 T cells, and discrete responses in memory T cells was also reported by episodes of acute exercise. Acute exercise also improves humoral immunity by production of myokine by muscle contraction due to muscle regeneration (41). Engaging in physical activity might mitigate the likelihood of mental stress and sickness, which could pose a significant risk during lockdown throughout the COVID-19 pandemic. Therefore, encouraging consistent, appropriate physical activity can enhance mental health and in turn, an individual's general well-being. Promoting and recommending regular physical activity to patients is crucial, especially for those with chronic illnesses, as the majority of studies have shown that the COVID-19 lockdown reduced the physical activity and had a negative impact on both the physical and mental health. Physical activity impacts well-being, lifestyle, physical and mental health of an individual. As physical activity is emphasized as a prevention strategy and key strategy for ongoing health promotion, keeping up a regular physical activity regimen will be crucial for preparing for the era of COVID-19 variants and similar pandemics in the future.

Study strengths

The findings of the present study displayed a positive impact of physical activity on COVID-19 infection.

Study limitations

The present study was done through online Google link, which meant there was no direct contact with participants. The subjects' consent was also taken through questionnaire only. ❑

CONCLUSION

Since physical inactivity is one of the strongest and most important modifiable risk factors for people with non-communicable diseases like diabetes mellitus, hypertension, obesity and also various infections, especially COVID-19 in the recent times, it is beneficial for those individuals to modify their physical activity levels. Practicing regular physical activity might help them not only recover from long term effects of COVID-19 but also improve their lung function. Incorporation of physical activity as an important tool to lower the risk of infections as well as associated comorbidities has to be emphasized by the physicians/medical community and public health agencies. Pandemic control recommendations or guidelines also should include regular physical activity across all age groups. ❑

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