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## Impact of COVID appropriate behaviour on physical activities and exercise

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### Abstract

In almost a century, COVID-19 is the most infectious and deadly disease which has left no part of the world with its impact. There are many theories floating regarding the origin of the virus. Nonetheless, the virus has hurt the human kind in many ways which are unthinkable and unimaginable. The world has been categorized into pre and post COVID. Our lives have changed in several ways. There is not a single one who hasn't lost any known one due to COVID. Also, we still don't know how long this phase will continue. As the third wave is on the onset with the new variant Omicron. The governments of the day are trying their level best to vaccinate the masses at a faster rate to avoid the third wave. COVID appropriate behavior is must to avoid this deadly infectious virus. The guidelines regarding the safety protocol are issued by W.H.O. and other concerned bodies from time to time. Social distancing was promoted and human-to-human contact was discouraged to control the spread of the virus. Every nation has imposed lockdown and all the economic and social activities were put on hold. The World was brought to a standstill with this deadly virus. Participation in Sports activities was also discouraged and the Tokyo Olympics had to be postponed for a year as large no. of spectators is well known to act as potential virus spreaders. In order to follow corona protocols of COVID appropriate behavior wearing of face mask was mandatory for all. This has led to a discussion on the issue of wearing facemask during outdoor physical activities. A sample of hockey and football players was analyzed to investigate the physiological effect of wearing a facemask during physical activities.

To find out the physiological effect of wearing a facemask during exercise, a controlled laboratory study of 20 players of various sporting backgrounds was conducted. They underwent graded treadmill walking at 6 km per hour for 5 min with and without wearing a N-95 mask in a randomized order with sufficient resting time in between the trials. The heart rate and the rate of perceived exertion (RPE) were recorded.

**Results:** The heart rate and RPE of subjects wearing a facemask was 143.3 beats per minute and 7.05 respectively. In those without a facemask, the results were a heart rate of 129.7 beats per minute and a RPE of 5.75.

**Conclusion:** The laboratory study to investigate the physiological effect of wearing a facemask found that it significantly elevated heart rate and perceived exertion. Those participating in exercise need to be aware that face-masks increase the physiological burden of the body, especially in those with multiple underlying comorbidities.

**Keywords:** COVID appropriate behaviour, Physical and exercise

### Introduction

COVID-19 is a droplet-transmitted potentially fatal coronavirus pandemic affecting the world in 2020. The coronavirus (COVID-19) was first identified in December 2019 in Wuhan (China) and caused clusters of respiratory illness. The highly transmittable viral infection is caused by the virus known as the severe acute respiratory syndrome corona-virus 2 (SARS-CoV2), which genomic analysis revealed that it is genetically related to the SARS outbreak which infected thousands of individuals across nations (United Nations, 2020) [6]. Within months, the World Health Organization (W.H.O.) has declared the COVID-19 as a pandemic on March 11, 2020. The number of cases and affected countries rapidly increased with more than 6 million confirmed cases across the entire world. This shows that the transmission rate of COVID-19 is much higher than the SARS outbreak almost two decades ago or for that matter any other outbreak in the recent decades, and has caused the majority of sporting events to be suspended and/or postponed. The International Olympic Committee (IOC), along with the Japanese government, announced on 30 March 2020 that the 2020 Tokyo Olympics will be

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Rescheduled to July 2021, without changing the name of 2020 Tokyo Olympics.



**Fig 1:** Shows the Ice hockey players are using face masks to avoid COVID

#### **COVID-19 transmission and clinical characteristics**

Although as of date there were two theories propagated regarding the spread of the virus, whether the virus was manmade or a natural phenomenon. The first cases of COVID-19 before January 2020 were linked to the Wuhan Seafood Wholesale Market and zoonotic (animal-to-human) transmission was believed to be the main source of the spread of the virus. The emergence of the virus coincided with the Chinese New Year Holiday, in which a large human migration took place as city workers travelled back to their home-towns. The main mode of human-to-human transmission occurs through close contact with an infected individual and exposed to droplets or aerosols. When the infected individual is coughing or sneezing, these aerosols are believed to enter the lungs via inhalation through the mouth or nose. The virus was detectable in stool samples despite the course of illness. The contaminated environment may cause transmission through contact with mucosal membranes, such as the eyes, mouth, and nose. Studies have shown that the virus is viable up to hours as aerosols and days on surfaces. The average median incubation period was estimated to be around 5 days, majority of those who will develop symptoms will do so within 14 days (Kumar, Kumar, Christopher, & Doss, 2020) [3]. The most common symptoms are high fever, body ache, sore throat and cough. Also, in several cases it was found that infected person was asymptomatic and did not present any of the symptoms. The viral load detected in symptomatic and asymptomatic patients were of similar levels and the viral nucleic acid shedding pattern of infected individuals was more similar to influenza rather than SARS, implying that asymptomatic infected individuals are as infectious as those that are showing symptoms.

#### **Immunity and Sports**

Exercise can boost overall immunity. Most studies suggest exercise significantly influences immunity.

#### **Research Methodology**

Investigation on the effects of exercising with a facemask To maintain physical activity during COVID-19, various centers of physical activities were closed to avoid the spread of virus. However, individuals were encouraged to use facemasks and go on walks or outdoor running, even children were encouraged to play outdoor leisure games such as badminton using face masks. This issue of wearing facemasks during outdoor activities became a topic of interest. The objective of this experiment was to investigate the effects of a facemask during exercise. This was a controlled laboratory, within-subject, repeated measures study of 20 healthy individuals of hockey and football sporting back-grounds. The participants underwent graded treadmill (10% slope) walking at 6 km per hour for 3 min and consequently increasing the pace to 8 km per hour for 2.5 min (total run for 6 mins) with the intention of simulating outdoor physical activity on an uphill slope at a comfortable pace. Heart rate (HR) was continuously monitored using a chest strap and rate of perceived exertion was charted through-out the run. The rate of perceived exertion (RPE CR) rating is based on a 0 to 10 rating scale which was measured at rest and also the end of each minute interval with a total of 5 min. All participants repeated the test with and without wearing a surgical mask (in a randomized order); sufficient rest was given between trials. Informed consent was obtained from all participants prior to the testing. Twenty participants (10 Football and 10 hockey players) with a mean age of 22.30 (range 19 - 24) were recruited. Paired t-test showed significant ( $p < 0.01$ ) differences among the heart rate and RPE between wearing a mask and without a mask. The present finding demonstrated that both heart rate and RPE were significantly increased with wearing of facemasks during graded treadmill running. Based on this pilot data, we believe that exercising with face-masks at a submaximal level induces higher physiological responses possibly due to restricted air for ventilation, heavy and obstruction during breathing.

Comparing with subjects who did not wear masks (RPE 7.05 vs. 5.75 at 6th min), subjects wearing masks reported subjectively higher physiological demands. RPE 7 refers to moderate-intensity activity according to the Borg Scale level of “somewhat hard”. Some volunteers reported having an uncomfortable feeling of dyspnea during the assessment with facemasks on, which in comparison is relevant with the previous studies. An irritation on skin and moisture accumulation inside the masks also negatively impacts respiratory and radiation process. With the increased cardio-respiratory pressure with masked exercise, it is important to stay within safe zone. In general, it will be wise to rest when the heart rate exceeds 150 beats per minute and or 70% of age-predicted maximum heart rate. Masked exercises increase physiological demands; therefore, activities should be adjusted according to the individual’s physiological demands and performance ability.

Repeated measure t-test showed the heart rate responses (HR) and rate of perceived exertion (RPE CR10) during 6-min graded (10%) treadmill walk/run between wearing masks and without masks.

**Table 1:** Data statistics for average age

	Without Face Mask	With Face Mask
No. of Players	20	
Average Age	22.30	
Standard Deviation	1.73	

Table 1 represents the mean age of the players and the variation in the age. The average age of the players was 22.30 however the standard deviation of the group was 1.73

**Table 2:** Statistical analysis of heart rate

Group	Without face mask	With face mask
Mean Heart Rate	129.7	143.30
Standard Deviation	6.44	6.68
SEM	1.44	1.49
N	20	20
T-Value	31.507	
DF	19	

**Table 3:** Statistical Analysis of Rate of Perceived Exertion

Group	Without face mask	With face mask
Mean (RPE CR 10)	5.75	7.05
Standard Deviation	0.64	0.69
SEM	0.14	0.15
N	20	20
T-Value	10.177	
DF	19	

## Conclusion

The impact of the COVID-19 pandemic on sports and exercise is huge and is visible cannot be determined at this stage, however, the information that we gathered may provide valuable guidance to athletes and governing committees to move forward safely. COVID-19 is highly transmittable in sporting environments due to its viability, long incubation period, and milder symptoms; especially in contact sports. The essential preventive measures include minimizing human-to-human contact and practicing proper personal hygiene. Athlete’s on-field own risky behaviour should be avoided to minimize unnecessary infection as close contact with others is unavoidable during contact sports. Exercise with a facemask definitely has a toll on the human body and it is advised to adjust the exercise intensity when masked.

Sports and exercise may be important, especially for competitive athletes, but safety is still paramount. Everyone should practice safe sports with the appropriate measures and prevent the further transmission of the COVID-19 pandemic. The Results of the study coincide with the research work (Soni, 2021) <sup>[5]</sup>, ((Rawat, Dixit, Gulati, Gulati, & Gulati, 2021) <sup>[4]</sup>, (United Nations, 2020) <sup>[6]</sup>, (Burrows, Maiyegun, Rhind, & Rozga, 2020) <sup>[1]</sup>.

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