



COMPARATIVE ANALYSIS OF POST-COVID EFFECTS AMONG SPORTSPERSONS AND NON-SPORTSPERSONS THROUGH PEAK EXPIRATORY FLOW

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ABSTRACT This study “Comparative analysis of Post-COVID effects among Sportspersons and Non-sportspersons through Peak Expiratory Flow” was done to determine the effects of novel corona virus (COVID-19) on pulmonary function (PEFR) of sportsperson and non-sportsperson. To fulfill the purpose of the study total 60 COVID-19 recovered samples were selected randomly on the basis of their activity. For sportsperson category 20 female basketball players, for yoga category 20 female yoga players and for non-sportsperson category 20 sedentary females were selected randomly. The variable through which the effects were observed was peak expiratory flow rate (PEFR) measured in L/min. t-test statistic was used to compare the difference in means of samples. The average values of PEFR is 320-470 L/min as per national center for biotechnology information (NCBI) in healthy adults. This study found the average values of PEFR as follows: The average PEFR of sportsperson was observed 400 L/min, the average PEFR of yoga players was observed 325 L/min, and the average PEFR of sedentary non-sportsperson was 280 L/min. The Peak Flow of sportsperson was significantly higher than the yoga players and non-sportsperson whereas there was no significant difference in Peak flow of yoga players and sedentary non-sportsperson. Therefore the effects of COVID-19 on pulmonary functions of sportsperson and non-sportsperson were significant. Hence it can be concluded that the pulmonary function of yoga and sedentary people were remarkably affected by novel corona virus and there were no significant change observed in sportsperson.

KEYWORDS : COVID-19, pulmonary functions, peak expiratory flow rate (PEFR), sportsperson, non-sportsperson.

INTRODUCTION:

COVID-19 is a novel disease highlighted in late December 2019 when outbursts of thousands cases were reported.¹ It got its roots from the food market of Wuhan, China. Novel corona-virus caused by newly identified virus SARS-CoV-2 (severe acute respiratory syndrome-Corona virus -2). It was declared a global pandemic on 11th march 2020 by the World Health Organization. As reported by WHO globally there have been around 634 million confirmed cases of covid-19 including 6 million deaths as of November 2022. After the USA, India has been reported 2nd globally with 44million confirmed cases of COVID-19 with 5 lakhs death from January 2020 to November 2022.² The lungs are the most affected organ by COVID-19 with different pathophysiological events with abnormal lung functioning.³ The early symptoms reported were fever, malaise, dry cough, and dyspnea, which were eventually diagnosed as viral pneumonia.⁴ Interstitial lung disease (group of chronic lung disease), pulmonary fibrosis and hypertension may develop or intensify in post-covid-19 patients.⁵ Almost 50% of COVID-19 recovered patients with moderate or severe infection had impaired pulmonary diffusion 6 months after discharge.⁶ Severe covid-19 survivors were observed to have abnormal CT post 3 months of infection and impairment of diffusion capacity.⁷

Physical activities and sports are a fun way of maintaining fitness and helpful in adopting a healthy lifestyle. Several studies have been done on the relationship between respiratory functioning and exercise. Physical activities have positive effects on aerobic capacity, pulmonary function, and respiratory muscle strength.^{11,16} The effect of yogic practices and pranayama on pulmonary functions is significantly higher as compared to athletically active and sedentary people.¹² Exercise produces better outcomes especially regarding pulmonary functions and respiratory muscle strength.¹³ The data evidently claims that pulmonary functions improve with a change in sedentary to active lifestyle. Sporting activities develops respiratory musculature and strengthen different pulmonary parameter.⁹ In a five year controlled cross-sectional study, the data of both men and women reflects better cardio-respiratory fitness and high lung functions in accordance with regular physical activity.¹⁸

The peak expiratory flow rate (PEFR) test measures how fast a person can exhale. Young Indian males have a PEFR of about 450-550 lpm, while in young females it is a little lower (320-470 lpm).⁸ The peak expiratory flow rate of outdoor game players is significantly higher than indoor game players, attributed to the duration, intensity, and nature of the outdoor games. It requires more amount of oxygen and a high level of respiratory functioning.⁹ Sports activities and training improve respiratory functioning complemented by the development of respiratory muscles.¹⁰ Patients with chronic obstructive pulmonary disorder (COPD), under supervised physical activity and other rehabilitative care for one year showed a significant spike in improvement of respiratory functions.¹⁹

In this study an attempt has been made to understand the difference in pulmonary functions of Covid-19 recovered basketball players and yoga players, through peak expiratory flow rate monitoring. This study may also reflect whether there is any impact of Covid-19 on lungs functioning of recovered patients or not.

METHODOLOGY:

For the study purposive sampling method has been used to collect data. Total 60 random subjects from basketball, yoga and non- sportsperson category were selected between 18-25 years. Each category consisted of 20 subjects respectively. 20 elite female (Covid-19 recovered) athletes were selected who has won/participated in state or national level. The subjects of non-sportsperson category will be those who are sedentary and never participated in any sports. Peak expiratory flow rate (PEFR) was the selected variable for this study measured by Mini Wright Peak flow meter, manufacturer: Peso Medicare Private Limited (2006).

RESULTS:

Table -1 Descriptive Data For Peak Expiratory Flow Rate Of Basketball Yoga Player And Non-sportsperson

Category	Mean M_1	Mean M_2	S.D. σ_1	S.D. σ_2	t-ratio
Basketball v/s Yoga	409.25	361	54.39	56.83	2.74*
Yoga v/s Non-sportsperson	361	327	56.83	55.31	0.985
Basketball v/s non-sportsperson	409.25	327	54.39	55.31	4.712*

*significant at 0.05% level



Figure 1 Descriptive representation of Peak Expiratory Flow Rate values of basketball, yoga and non-sportsperson

DISCUSSION OF RESULTS:

In this study an attempt has been made to examine the post covid-19 effects on the lungs through peak expiratory flow rate as a variable of study. The subjects of this study were classified under sports (basketball and yoga players) and non-sports categories. The findings of this study concluded that, the values so obtained reflects that there exists a statistically significant difference between recovered basketball players and recovered yoga practioners for peak expiratory flow rate (PEFR). The basketball players showed notably high PEFR than yoga practioners. A similar study has been done over pulmonary functions of players belonging to different sports. The study found that PEFR of football players was highest among all the other sport followed by basketball then volleyball, regular exercises have facilitating effects on lungs. The games like volleyball, basketball and football being aerobic in nature strengthens the respiratory muscles Bostanci O et al.(2019), Mehotra P K et al. (1998) Another study supports and claims that respiratory muscles are strengthened by the effect of training, improving and achieving better pulmonary functions Orhan S (2018). S maziac et al (2015) claims that specific physical activity and sports helps in rehabilitation and improvement of lungs capacities. A study on elite male and female swimmers and land based athletes in comparison with sedentary individuals are in agreement with our study by concluding an increase in lung capacities due to exercising regularly M doherty, L dimitriou (1997) and I gracia (2015). Similar results have been observed by other researchers in this field that "The Forced vital capacity, Forced expiratory volume and the Peak expiratory flow rate of all the subjects and the controls has been given. It was evident that all the players had a higher value of lung volumes compared to the lung volumes of the controls."

The PEFR of basketball players to recovered non-sportsperson differs outstandingly through statistical analysis. It is clear from the that basketball players showed high observed values of peak expiratory flow rate than non-sportsperson. The basis behind high PEFR is physical activity, which has remarkable effects on the lungs. In this study difference may be accompanied by the reason that basketball being extreme sport in nature majorly involves aerobic exercises which has direct impact on the lungs. Whereas Yoga being less intensive activity (in nature) can also be the reason for existing difference in PEFR. Possibly the yoga practioners might be practicing asanas only which has little or no impact on the lung functions.

Followed by statistical analysis of PEFR between yoga and basketball recovered subjects, this study came to a conclusion that sport like basketball or similar nature sports improves pulmonary functions even after recovery from a respiratory tract infection. The findings of our analysis discloses that the PEFR values of yoga practioners and recovered non-sportsperson does not differ remarkably. Similarly a study emphasizes on Pranayam in yoga improves and develops the pulmonary function. They also evidently claimed that performing yoga regularly leads to higher pulmonary functions as compare to athletes and those with sedentary lifestyle Prakash S et al. (2007). Further more studies are needed in this dimension.

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