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**“ AN ASSOCIATION OF CARDIORESPIRATORY AND PHYSICAL
FITNESS AMONG SEDENTARY WORKERS ”****Samiksha vasant shedge¹ , Shyam D. Ganvir²****BPT.h (Intern)¹ ,Principal² at DVVPF'S college of physiotherapy
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ABSTRACT : Background –Nowadays due to increased competition and shift from manual labour jobs to office jobs sedentary lifestyle is increased .This sedentary lifestyle have impact on flexibility and maximum capacity of lungs to exhale .

Objectives : To correlate BMI and flexibility between genders .To correlate BMI and PEFR between genders .

Method: The BMI ,flexibility ,PEFR was measured in 30 sedentary workers in the age group of 20 to 50 years in DVVPF'S institute using weighing machine ,sit and reach equipment and

mini Wright's peak flow meter respectively .In case of PEFr best of three trials were recorded .Correlation of BMI with PEFr and flexibility was calculated .

Results : Result shows the linear correlation between peak expiratory flow rate and body mass index of sedentary workers of both genders ($p=0.0205$ which is considered as significant.)In case of body mass index and flexibility the p value is 0.2258which is considered as non-significant.

Conclusion : This study concludes that there is a strong relation between cardiorespiratory and physical fitness of sedentary workers of both the genders.

Key words –Physical fitness , Peak expiratory flow rate ,flexibility ,Body mass index

INTRODUCTION :

Physical fitness refers to the ability of your body systems to work together efficiently to allow you to be healthy and perform activities of daily living. There are 11 different features of physical fitness; out of them 6 features are health related and 5 features are skill related. The health related features are body composition, cardio-respiratory endurance, flexibility, muscular endurance, power and strength. The testing order should follow the order which includes Blood pressure and heart rate, body mass index, cardio-respiratory part and after that, flexibility.

Fitness refers to being physically as well as mentally fit. If a person is bodily fit but emotionally in poor health, he or she will not be able to perform at optimum level. Physical fitness plays very important role in children and youth as it reduces depression, hyperactivity disorders, learning disorders, juvenile delinquency, develops character and manages stress and anxiety. It also plays

an important role in elderly patients as it improves cognitive function, social engagement and decreases risk of falls and certain conditions like obesity, Alzheimer's disease and osteoporosis.

Physically fit people are also healthier and able to sustain their most optimum weight and are also safe and secure from cardiac and other health related complications. In order to have a healthy state of mind, a person should be physically vigorous. A person having physical fitness is tough enough to face the fluctuating situations in life, and not disturbed easily by severe changes. Physical fitness is also important to prevent the type 2 diabetes and to reduce the risk of some cancers.

The cardio-respiratory fitness (CRF) refers to the ability of the circulatory and respiratory systems to supply oxygen to skeletal muscles during sustained physical activity. The primary measure of CRF is VO_2 max. In 2016, the American Heart Association published an official scientific statement denoting that Cardiorespiratory fitness be categorized as a clinical vital sign and should be routinely assessed as a part of clinical practice. In this project, PEFr is used to assess the cardio-respiratory fitness. The peak expiratory flow rate (PEFR) is defined as the maximum or peak flow rate that is attained during a forceful expiratory effort after taking a deep inspiration. The average PEFr of healthy young Indian males and females is around 500 and 300 L/ min, respectively. The PEFr test measures how fast a person can exhale properly. PEFr test can help to discover the need to adjust the medications.

The body mass index (BMI) is an important method for diagnosing overweight and obesity. It evaluates the relationship between the body weight and height. The BMI is the major indicator for high blood pressures and heart disease. A normal range of body mass index is between 18.5 to 25. The body mass index can be easily measured and frequently used in epidemiologic studies.

Flexibility can be defined as the ability of joints and body parts to execute their full range of motion. Flexibility is required in all our day to day activities such as bending, walking, lifting etc. Being flexible allows your muscles to remain mobile and also flexible joints require less energy to move through a greater range of motion. This decreases overall risk of injury in humans. A sedentary lifestyle is a type of a lifestyle involving little or no physical activity. A person living a sedentary lifestyle is often sitting or lying down while engaged in an activity like reading, watching television, using mobile phone /computer for much of the time. Screen time is a modern term for the amount of time a person spends looking at a screen such as the computer monitor or the mobile devices or television. A sedentary lifestyle can contribute to or be a risk factor for:

- 1) Anxiety
- 2) Migraines
- 3) Colon cancer
- 4) Diabetes
- 5) Gout
- 6) Scoliosis
- 7) Spinal disc herniation
- 8) Skin problems such as hair loss etc.
- 9) Computer vision syndrome only for computer and tablets.

METHODS :

Participants and Design :

There were 30 sedentary workers from DVVVPF'S institute .the study design was cross sectional study and with simple random sampling technique. The sedentary workers were from age group of 20 -50 years with duration of work 6 to 8 hours and minimum work experience of 3 years .The participants having any skeletal deformity ,cardiorespiratory problem ,any previous history of fall or trauma ,history of smoking ,History of COPD ,asthma or serious cardiorespiratory problem ,subjects with neuromuscular disorder were excluded from the study .Informed consent was obtained from the participant .All subjects were evaluated by physical examination and their anthropometric parameters like height in centimeters ,weight in kilograms were measured. Body mass index were calculated by weight in kg /height in meter square.The method of holding the PEFR and breathing technique was shown to them .Three such readings were taken .The highest value was taken as PEFR .The flexibility was calculated by using sit and reach equipment . the demo of sit and reach test was shown to participants .The insructions of avoiding any jerky movements and quick movements were given .The recording of final hold was done.

Statistical test :

Subjects were classified according to gender and and PEFR and flexibility were taken .t – test was used for analysis .p value <0.05 was considerd as significant.

RESULT :

In this study, we focused to establish the relation between BMI, PEFr and flexibility. The result was analyzed separately for both male and female as gender is an important component for variation in PEFr. Total 30 individuals participated in the study out of which 10 were female workers and 20 were males.

Table 1 depicts the mean and standard deviation (SD) of different parameters parameters .

Table no.1

	MALE (n =20)	FEMALE(n=10)
BMI	24.7 \pm 2.5	22.3 \pm 3.9
PEFR	320.5 \pm 82	197 \pm 52
FLEXIBILITY	24.7 \pm 6	28.3 \pm 4.6

Table 2 shows the correlation between BMI and PEFr in male and female .It shows linear correlation between PEFr and BMI of sedentary workers of both genders. (The *p* value is considered significant where $p=0.0205$)

Table no.2

	(r)	(p)
BMI VS PEFr	0.4 212	0.0205
BMI VS FLEXIBILITY	-0.2279	0.2258

In case of BMI and flexibility, the value of p is 0.2258 which is considered as non-significant. There is a linear correlation between the BMI and flexibility of both the genders.

BMI and PEFR in males and females:

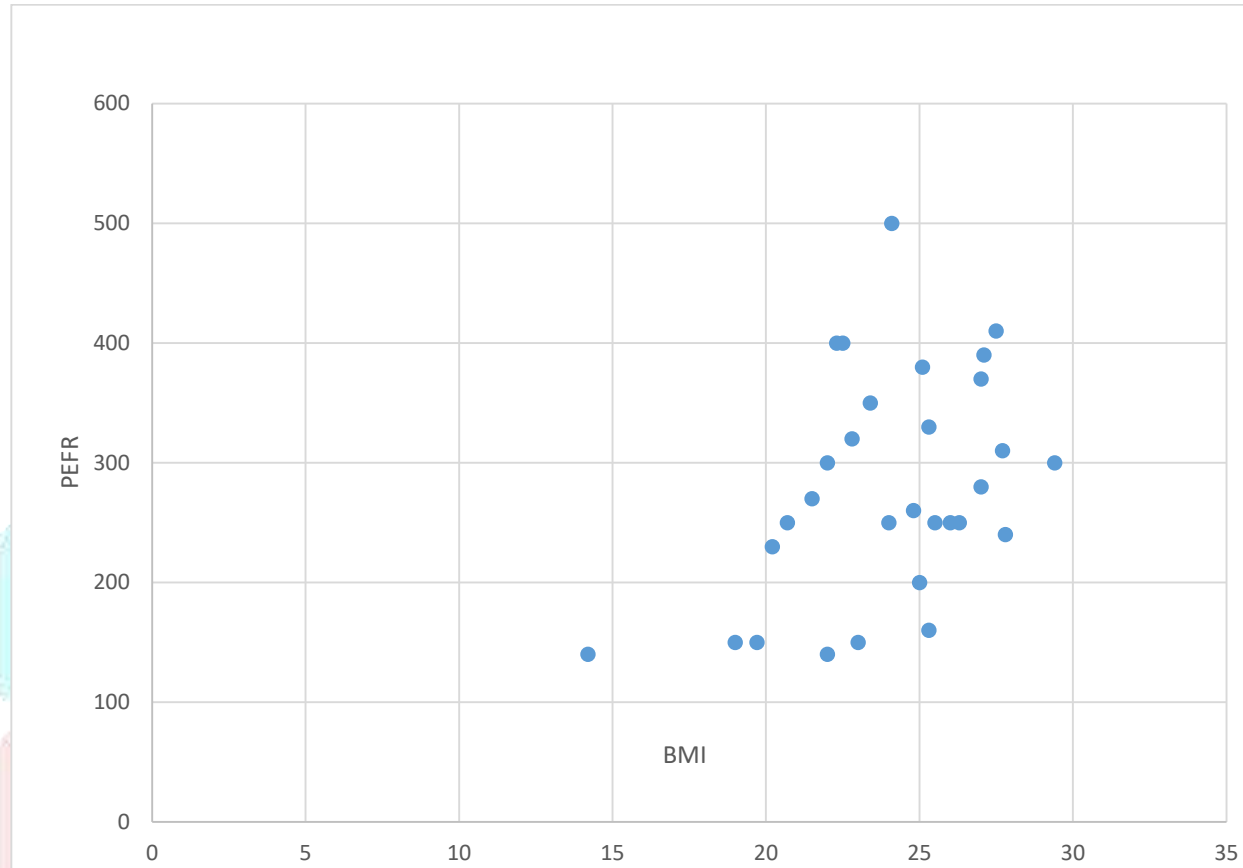
	(r)	(p)
BMI VS PEFR(In male)	<0.0001	0.2145
BMI VS PEFR (In female)	<0.0001	0.4808

Table no .3

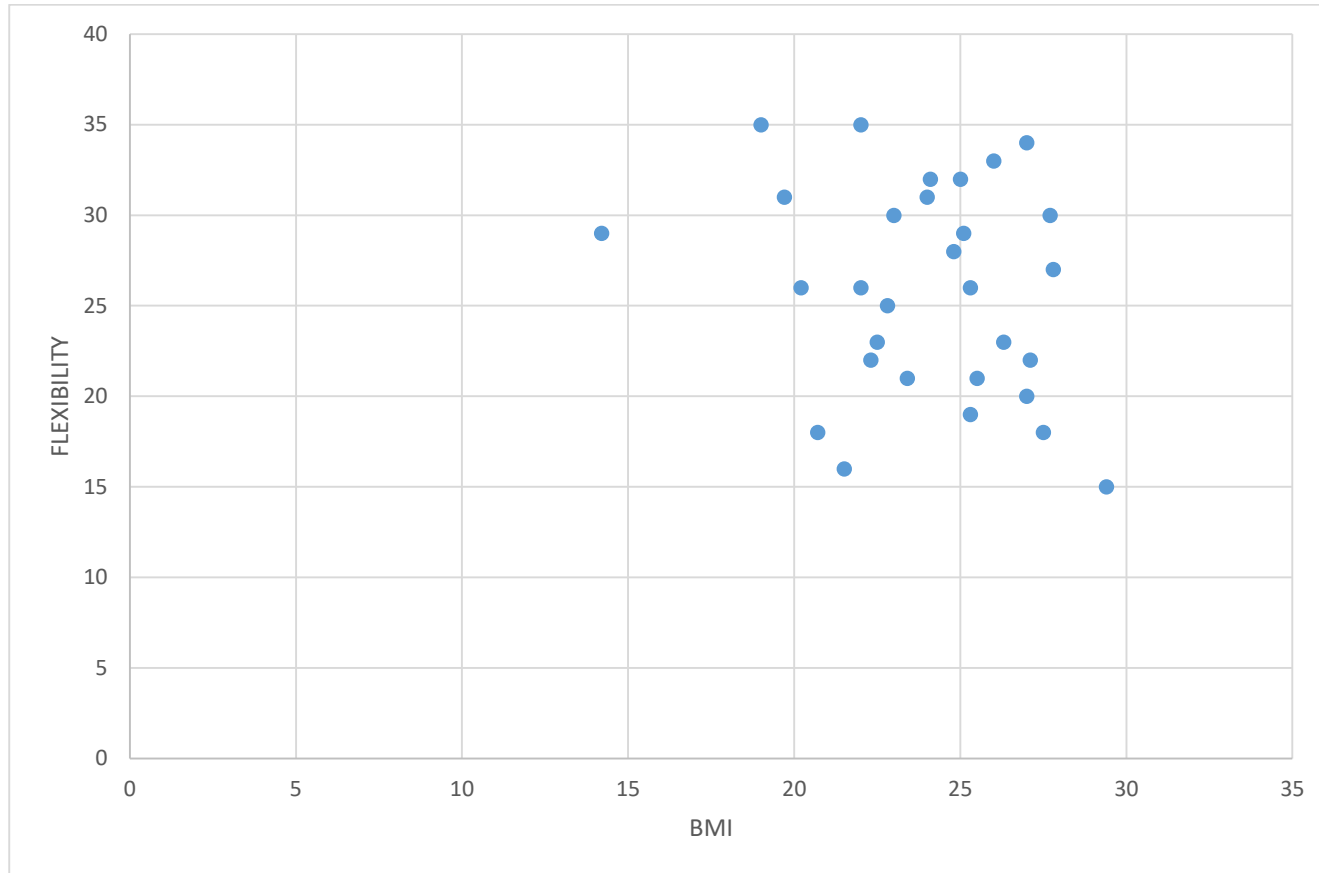
The p value in case of BMI and PEFR of both the genders is considered extremely significant.

	(r)	(p)
BMI Vs. FLEXIBILITY(FEMALES)	0.06292	0.0113
BMI Vs. FLEXIBILITY (IN MALES)	-0.2629	0.9878

The p value in case of female gender is considered significant which is 0.0113. The p value in case of male gender is 0.9878 which is not significant.



Scatter graph showing relation between body mass index and peak expiratory flow rate



Scatter graph showing relationship between body mass index and flexibility.

DISCUSSION :

Flexibility is one of the important components of physical fitness. It reflects the ability of the muscle tendon units to elongate within the physical limitations imposed by the joint and refers to the looseness of the joint. Flexibility of the joint is controlled by a number of morphological factors such as geometry of the joint capsule, adipose tissue, the muscles that surrounds the joint, the tendons and ligaments around the joint and the skin. In this study we have compared flexibility in males and females and tried to find out the relationship between BMI and flexibility of sedentary workers. PEFr is well-defined as the principal expiratory flow rate achieved with maximum forced effort. It predicts variations in airflow. Factors affecting the PEFr are as follows: Elastic recoil of lungs, The airway resistance, Strength of expiratory muscle, the mechanical effect on diaphragm due to deposition of fat. Our aim is to find out whether there is any relation between BMI and PEFr in sedentary workers.

The study of Ayesha Anjum and Vijay Krishnan k. titled 'Correlation of PEFr with BMI in the men of age group 25-40 years at RIMS, Raichur, concluded that both age and BMI do affect PEFr. All the factors like decrease in elastic recoil of lungs, weakness of respiratory muscles and the compression caused by the extra fat on thorax and lungs result in decreased PEFr. Thus it proves that the obesity is a risk factor for lung functioning and needs to be arrested.

The study of Sanaa Jarral, Sushil Karim and Iram Shehzadi titled 'Association of Body Mass Index with Flexibility in Adults', concluded that there is an association between body mass index and flexibility and the frequency of underweight person was greater than that fat. Our aim is to find out whether there is any relation between BMI and PEFr in sedentary workers.

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peak expiratory flow rate. All the factors like decrease in elastic recoil of lungs, weakness of respiratory muscles and the compression caused by the extra fat on thorax and lungs result in decreased peak expiratory flow rate (PEFR). Thus it shows that the obesity is a risk factor for lung functioning and needs to be arrested.

The study of Sanaa Jarral ,Sushil Karim and Iram Shehzadi titled ‘Association of Body Mass Index with Flexibility in Adults’, concluded that there is an association between body mass index and flexibility and the frequency of underweight person was greater than that of the obese and it is not necessary that obese individuals have decreased range of motion as compared to individuals with normal weight. Age was an independent whereas gender was a dependent factor. Males were more flexible as compared to females due to high level of physical activity. Except hip flexion All the ranges of the underweight individuals were normal .

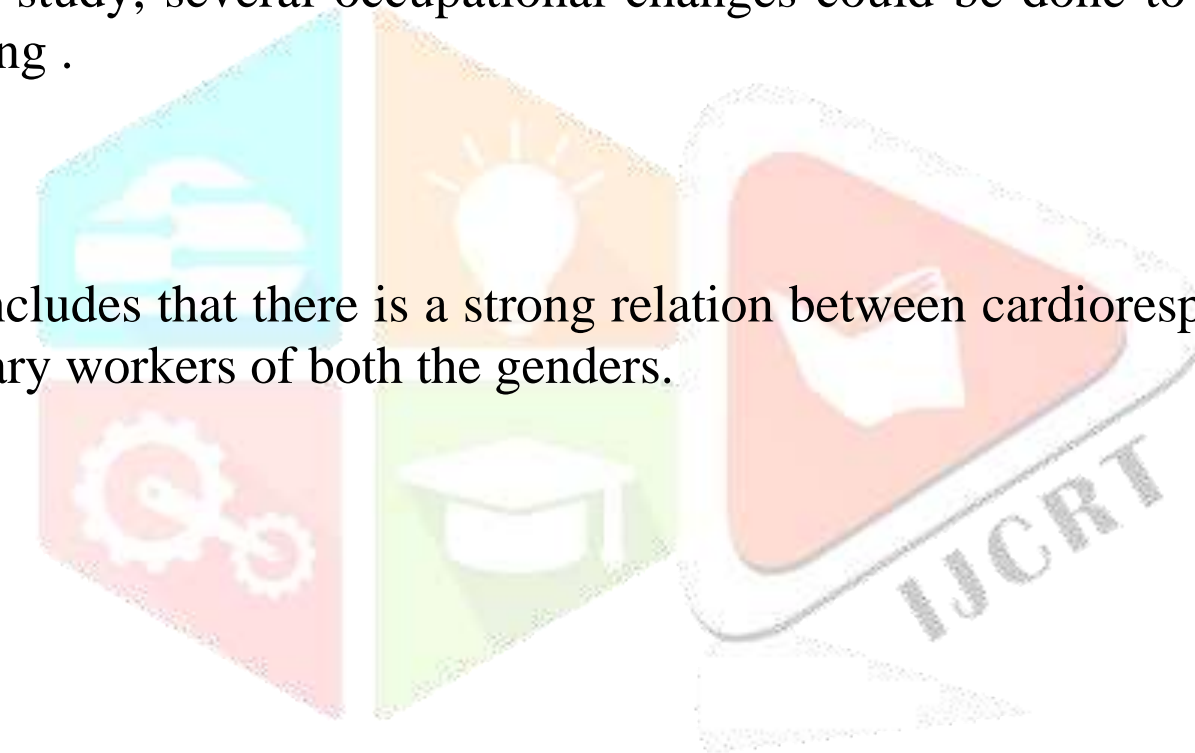
The study done in the past conducted by Sushma Kumari and Ashok Kumar Deo titled ‘Association of BMI, peak respiratory flow rate and sympathetic reactivity in youth’ concluded that increase in BMI and WHR(waist hip ratio) had an inverse relationship with PEFR in obese when compared to the normal weight subjects .They also found out that the sympathetic reactivity decreased with increasing BMI and WHR. Thus it is proved from the present study that obesity significantly affects the pulmonary functions as well sympathetic activity which may give rise to long term complications and may lead to early morbidity and mortality.

The sample size of this study is comparatively small. The study is limited to one single institute from Ahmednagar. The future study should include more institutes and a big sample size .Thirdly, factors other than BMI, such as air pollution and food, also influence PEFR. Therefore, future studies should take into account these factors also so as to remove their effect on the relationship between BMI and PEFR rate .

Epidemiological studies have identified body mass index as a risk factor for an expanding set of chronic diseases, including respiratory disease like Asthma etc. Lung function was significantly influenced by body composition specially the BMI. Therefore, this study is very important as it will help us to find out the outcome of BMI and PEFr in sedentary workers. This study will be of a great help in future to prevent the effect of sedentariness on workers. Due to the result of this study, several occupational changes could be done to improve the lung and muscle functioning .

Conclusion

This study concludes that there is a strong relation between cardiorespiratory and physical fitness of sedentary workers of both the genders.



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