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ANALYSIS OF VITAL AIR CAPACITY ON DIFFERENT BMI LEVELS OF SEDENTARY FEMALE TEACHERS

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ABSTRACT

Women tend to sedentary life and become prone to diverse respiratory ailments with the progression of BMI. The present study was aimed to compute the changes in vital air capacity on different BMI levels of sedentary female teachers at Delhi NCR. The purpose was to compare the vital air capacity among the sedentary teachers in relation to the teacher's body mass index (BMI) levels. For this study, 60 sedentary female teachers ranging in age from 35 to 50 years (Mean ± SD; Age 43.05 ± 4.72 years, Height 1.73 ± 0.70 metre, Weight 77.27 ± 16.15 kg) were studied. Their body measurements like weight, height, and body mass index were taken; vital air capacity was checked as per standardized methods. Subjects were divided into three groups (each group consists of twenty teachers) on the basis of their body mass index (BMI) like; Normal BMI Category Teachers (BMI value =18.5-24.9), Obese Category-1 Teachers (BMI value =30-34.9) and Obese Category-2 Teachers (BMI value =35-39.9). Purposive sampling method was used for the study. Statistical technique i.e. one way Analysis of Variance (ANOVA) was employed to find out the inter-group differences and post-hoc test i.e. LSD was used for further analysis. To test the hypothesis, the level of significance was set at 0.05. The results revealed that there was significant difference found between Normal BMI Category Teachers and Obese Category-2 Teachers, Obese Category-1 Teachers and Obese Category-2 Teachers on their in terms of means of vital air capacities is significant at 5% level, as the p-value for this mean difference is 0.00 which is less than 0.05. However, there was insignificant difference between the means of the Normal BMI Category Teachers and Obese Category-1 Teachers because the p-value is more than 0.05. Finally, it was revealed that the lower mean values of these variables with advancing BMI indicate higher chances of respiratory ailments in sedentary teachers.
Keywords: *Obesity, BMI, respiratory parameter, female teachers.*

1. INTRODUCTION

As we live in the period of current science and innovation, our way of life has become exceptionally quick. Today, life generally depends on science and development. In such circumstance, people need greater action to keep the body and mind fit to execute the activities capably. The rising number of overweight and hefty people is a serious general medical condition that has suggestions for society on a worldwide scale (Mohammad, 2015; 2017). Declining actual work levels and expanded caloric admission are significant ecological elements adding to stoutness (Manna & Jain, 2015). Obesity is characterized as overabundance body weight or fat gathering in the body to the degree that wellbeing might be hindered. Around the world, corpulence has arrived at scourge extents with more than 1 billion grown-ups being overweight and something like 300 million are clinically obese (Ligibel, 2011; Mohammad, & Tareq, 2016). On progressing in years, the metabolic rate dials back and body needs less calories than in more youthful ages. In ladies entering the

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menopause, their metabolic rate diminishes powerfully, such countless ladies begin putting on weight during menopause. Ladies become the weak gathering due to hormonal changes happening with propelling age. Heftiness, an undeniably common and challenging to-treat condition, influences a greater number of ladies than men.

The Pulmonary Function Tests are significant for estimating the wellness of a person according to a physiological perspective. Lung work boundaries will more often than not have a relationship with way of life. The impacts of obesity on the respiratory framework have been progressively considered. There is a significant pandemic of obesity, and numerous large patients endure with respiratory side effects and sickness. The powerful lung volumes are for the most part gotten from Vital Capacity. The fundamental limit of the lungs is how much air which can be breathed out after the most profound conceivable inspiration. Vital capacity is the amount of tidal volume, inspiratory reserve volume and expiratory reserve volume. Vital capacity of ordinary grown-ups ranges between 3 to 5 litres. Various physiological elements like age, orientation, level and nationality impact lung volumes. In any case, there is no obvious proof that obesity increments or diminishes the pace of lung capability decline with Body Mass Index (BMI). The pneumonic capability limits of ordinary stationary people have been concentrated on broadly in India (Aggarwal, Gupta, Chaganti, & Jindal, 2000) but less with regards to examination with sedentary female population teaching in school. So, the purpose was to compare the vital air capacity among the sedentary teachers in relation to the teacher's body mass index (BMI) levels.

2. METHODS AND MATERIALS

2.1 Participants and Sampling

To facilitate the study, sixty sedentary female teachers ranging in age from 35 to 50 years (Mean ± SD; Age 43.05 ± 4.72 years, Height 1.73 ± 0.70 metre, Weight 77.27 ± 16.15 kg) were studied. Their body measurements like weight, height, body mass index were taken; vital air capacity was checked as per standardized methods. Subjects were divided into three groups (each group consists of twenty teachers) on the basis of their body mass index (BMI) i.e.; Normal BMI Category Teachers (BMI value =18.5-24.9), Obese Category-1 Teachers (BMI value =30-34.9) and Obese Category-2 Teachers (BMI value =35-39.9). Purposive sampling method was used for the study.

2.2 Data Collection and Procedure

Their body measurements like height, weight, were taken as per standardized methods. With the help of Stadiometer, the height of the students was measured and weighing machine was used for taking weight. Body mass index (BMI) is utilized to classify obesity. BMI is easily obtained from clear anthropometric apportions and has laid reference rules (Kuczmarski et al., 2000). BMI is determined as the proportion of weight in kilograms to the square of level in meters, communicated in units of kg/m2. In grown-ups, overweight is characterized as a BMI more noteworthy than 25 kg/m2 and obesity more prominent than 30 kg/m2. The Vital Air Capacity test was completed in a very much ventilated extensive room with encompassing temperature going from 28°C to 35°C separately. The tests were conveyed by a thoroughly prepared specialist acquainted with Medspiror (modernized spirometry). Spirometry helps in separation among obstructive and prohibitive respiratory illness. Further, concentrate on subjects going through the tests were very much informed about the instrument and the method of test by showing the procedure.

2.3 Data Analysis

Descriptive statistics were calculated for all measures. Data screening was used to ensure all dependent variables met the assumptions necessary for the use of parametric statistics before data analysis. In addition, one way Analysis of Variance (ANOVA) was employed to find out the inter-group differences. To test the hypothesis, the level of significance was set at 0.05.

For further analysis, LSD test was used as the post-hoc test. Statistical Package for Social Science (SPSS) version 20.0 was used.

3. RESULTS

Table 1: **Descriptive statistics for the data on vital air capacity of sedentary female teachers on different BMI levels**

BMI Levels	N	Mean	Std. Deviation
Normal BMI Category Teachers (BMI value=18.5-24.9)	20	1.75	0.26
Obese Category 1 Teachers (BMI value =30-34.9)	20	1.86	0.34
Obese Category 2 Teachers (BMI value =35-39.9)	20	1.46	0.16
Total	60	1.69	0.31

Table 1 show that the mean value and standard deviation of Vital Air Capacity of Normal BMI Category Teachers group is 1.75, Obese Category 1 Teachers group is 1.86, and Obese Category 2 Teachers group is 1.46. It is clear the mean value of Vital Air Capacity is least among the Teachers in the Obese Category 2 Teachers group in comparison to that of Normal BMI Category Teachers and Obese Category 1 Teachers group.

Table 2: **Analysis of Variance (ANOVA) results with regard to Vital Air Capacity and different BMI levels among the sedentary female teachers**

Vital Air Capacity	Sum of Squares	df	Mean Square	F-value	Sig. (p value)
Between Groups	1.67	2	0.84	11.97	0.00*
Within Groups	3.99	57	0.07		
Total	5.66	59			

*Significant at the 0.05 level.

It is evident from Table 2 that results of Analysis of Variance (ANOVA) among different BMI levels (Normal BMI Category Teachers, Obese Category 1 Teachers and Obese Category 2 Teachers group) with regard to Vital Air Capacity and the p-values of variables Vital Air Capacity of the Teachers is 0.00, was found statistically significant as less than 0.05; the obtained *F*-ratios of Vital Air Capacity of the players is 11.97, was found greater than critical value i.e. $F_{(0.05;\, 2,57)} = 3.16$.

Since; the *F*-value is significant, the null hypothesis of no difference among the means of three groups is rejected. Therefore, Post-hoc test (LSD) is applied to find out differences between paired means on different BMI levels (Normal BMI Category Teachers, Obese Category 1 Teachers and Obese Category 2 Teachers group) with regard to Vital Air Capacity of sedentary female teachers. The results of post-hoc test have been presented below.

Table 3: **Comparison of mean values of vital air capacity in post-hoc test (LSD) on different BMI levels**

Categories of Obesity	Categories of Obesity	Mean Difference	Std. Error	Sig. (*P*-value)
Normal BMI Category Teachers	Obese Category 1 Teachers	-0.11	0.08	0.21
	Obese Category 2 Teachers	0.29*	0.08	0.00
Obese Category 1 Teachers	Normal BMI Category Teachers	0.11	0.08	0.21
	Obese Category 2 Teachers	0.40*	0.08	0.00
Obese Category 2 Teachers	Normal BMI Category Teachers	-0.29*	0.08	0.00
	Obese Category 1 Teachers	-0.40*	0.08	0.00

From Table 3 it can be seen that the difference between Normal BMI Category Teachers and Obese Category 2 Teachers groups on their Vital Air Capacity is significant at 5% levels, as the p-value for this mean difference is 0.00 which is less than 0.05. Similarly, the p-value for the significance of difference between Obese Category 1 Teachers and Obese Category 2 Teachers groups on their Vital Air Capacity is significant at 5% level; the p-value is 0.00, which is less than 0.05. However, there is no significant difference between the means of the Normal BMI Category Teachers and Obese Category 1 Teachers groups as far as Vital Air Capacity are concerned because the p-value is more than 0.05.

From the above findings it can be very easily understood by looking to the graphics in Figure 1 Vital Air Capacity on the Y axis and the categories of obesity on the X axis. From Figure 1, it is clear the mean value of Vital Air Capacity is highest among the teachers in the Obese Category 1 Teachers group in comparison to that of Normal BMI Category Teachers and Obese Category 2 Teachers groups.

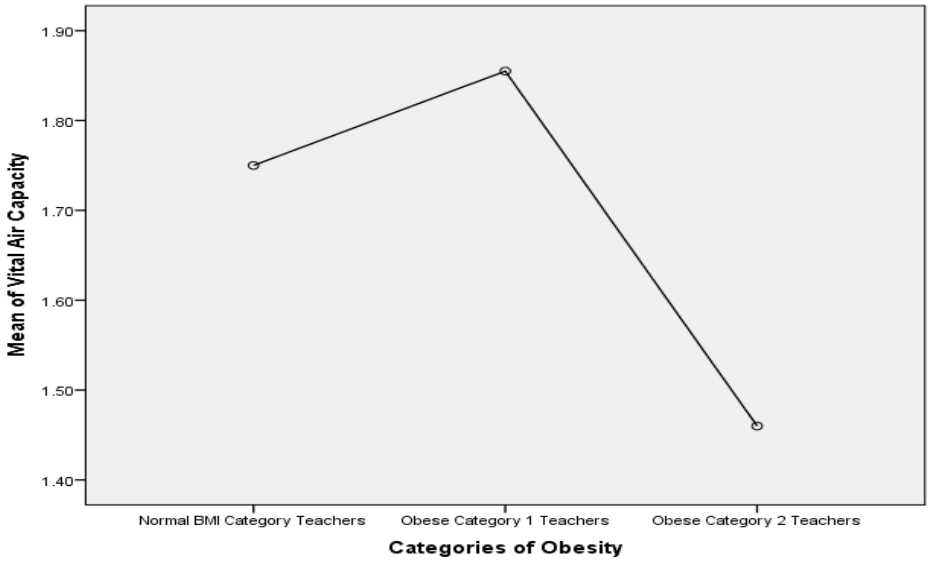

Figure 1: **Means Plot showing a visual representation of the group means of Vital Air Capacity in three different groups**

4. DISCUSSION

In the present study, significantly lower values of vital air capacity were observed among subjects of Obese Category 2 Teachers as compared to Normal BMI Category Teachers and Obese Category 1 Teachers sedentary subjects. The group Normal BMI Category Teachers exhibited better vital air capacity when compared with Obese Category 1 Teachers and Obese Category 2 Teachers sedentary subjects. It was observed that the mean of Normal BMI Category Teachers group is 1.75, Obese Category 1 Teachers group is 1.86, and Obese Category 2 Teachers group is 1.46. This clearly showed that the subjects who were Normal BMI level had better vital air capacity values than the other sedentary Teachers groups. The present study also showed that the Obese Category 2 Teachers group had lowest values of vital air capacity compared to other groups.

Obesity additionally altogether slows down respiratory capability by diminishing lung volume, Due to the insufficiency of the respiratory muscles, strength and opposition might be decreased. Jones and Nzekwu (2006), revealed that declines in ERV, FRC, and TLC seem to show a dramatic connection with expanded BMI and are straightforwardly related with the mechanical impacts created by fat statement in the chest and mid-region. Since obesity essentially influences numerous sicknesses of the lung, it appears to be conceivable to expect that it could likewise regulate the connection among maturing and pace of lung capability

decline. Asthma is likewise related with obesity. Obese individuals with asthma are bound to have hard to-control entanglements and illnesses, and people with a higher body mass index (BMI) have a more serious gamble of creating asthma (Lu et al., 2015). The frequency of asthma is 1.47 times higher in obese individuals than in non-obese individuals, people, and a three-unit expansion in BMI is related with a 35 % increment in the probability of asthma (Brumpton et al., 2013). The lung volumes increment consistently from birth to adulthood. Following 35 years, maturing is related with continuous changes in the lung volumes and other pneumonic capabilities (Zeleznik, 2003). Expanded complete muscle versus fat substance, consequently, appears to be preferable over high BMI as a sign of stoutness as well as indicator for diminished static lung volumes and limits (Kamal et al., 2015). Obesity makes significant changes the mechanics of the lungs and chest wall. The collection of fat in the body causes changes in respiratory physiology, with subsequent impedance of different lung capability boundaries. Various examples of muscle to fat ratio appropriation differentially and adversely influence the capability of the respiratory framework (Hodgson, Murphy, & Hart, 2015). A stationary way of life is especially connected with negative wellbeing results and constant illnesses like cardiovascular sicknesses, diabetes, and some malignant growth types (Alobai, Bari, Ansari, Parrey, & Mohammad, 2022; Biswas et al., 2015). It is suggested that sedentary teacher ought to embrace actual work for working on their wellbeing. Consequently, normal active work or exercise ought to be advanced among the sedentary subjects that might acquire positive changes the person.

5. CONCLUSION

This study concurs with past reports and supports the wellbeing status of sedentary people. The study uncovered that the inactive subject's presentation on vital air capacity of Obese Category 2 Teachers was poorer when contrasted with Normal BMI Category Teachers. Obesity is a significant threat factor and sickness modifier of numerous respiratory circumstances. The components behind these obesity actuated changes in lung capability are intricate, including mechanical changes, and impacts of inflammatory cytokines from fat tissue. This emphasizes the need to change their way of life and take on measures like Normal active work of moderate power to be specific strolling, cycling, or playing sports etc. regularly to be healthy. Regular physical activity creates a positive outcome on the lung that is reflected in progress of imperative air limit. The information so acquired of the vital air capacity through spirometry can be used for advancing Regular physical activity among the sedentary adults and the improvement of the populace. The present research serves as pointer to make the female sedentary teacher aware about maintenance of healthy body weight as well as Life threading diseases (i.e., High Blood Pressure, Diabetes, obesity etc.) can be avoided by knowing proper health status. Participating in standard actual work is one of the most outstanding ways of working on broad wellbeing.

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