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A comparative analysis of body composition and health status among male and female teachers of Delhi University

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Abstract
Body composition is an important component to assess the nutrition, health status and physical fitness profile of human body. It provides valuable details which can be helpful in determining desirable body weight. An ideal body weight is very significant for humans because the risk for diseases is greater for those who are overweight and underweight. Thus, this study assesses the body composition and health status of male and female teachers and provide them information for better health conditions.
The study was carried out in University of Delhi, on a random basis consisting of 100 teachers from different colleges. The age of the subjects was 25 years and above. Body mass index and waist to hip ratio were used to assess the body composition of the subjects. On the basis of data collected, tables and figures were constructed. Significant trends were observed for both the genders with BMI and WHR. The trends of the study show that significant variation was observed in height, weight and WHR of male and female teachers of similar age group but a little or no variation was observed in BMI of two groups. Teachers were not aware about their health status and some of them suffered from diseases like thyroid, uric acid, hypothyroidism, and asthma.

Keywords: Body composition, health status, BMI, WHR

1. Introduction
Body composition is a significant aspect of nutrition and health status in humans. It is defined as "the make-up of the body in terms of the absolute and relative amounts of adipose tissue, muscle mass, skeletal mass, internal organs and other tissues". It may also be defined as the proportional amount of different body components in terms of water, masses, bones and tissues relative to the total body mass or body weight. In the early childhood period, there is very less difference or almost no difference in body composition of males and females. But with the advancement in age a significant difference can be seen between the body compositions of two groups. Male group usually have more lean mass and they accumulate adipose tissue around the trunk and abdomen whereas female group have more fat mass and accumulate adipose tissue around the hips and thighs.
With respect to health and fitness, body composition refers to the % of body weight that is composed of fat as compared with fat-free or lean tissue. Having a high % of body fat is a serious disadvantage to fitness and health. Height and weight tables have been conventionally used to determine desirable body weight. Individuals whose body weight exceeds set standards for their age, sex and physical structure are considered over weight, obese, and morbidly obese or super obese. Such individual are clearly at higher risk for heart disease, hypertension, type 2 diabetes (non- insulin- dependent diabetes), and stroke.

2. Methodology
A total of 100 teachers from University of Delhi were selected from different colleges on a random basis. The age of the subjects was 25 years & above. Both male and female teachers were selected as subjects. For this study, a short survey was conducted. It assessed the body composition and health status of both male and female teachers. The survey had some questions on demographic profile of the respondents and rest regarding their body composition

and health status. The selected subjects were asked to give information about various variables like weight, height, waist circumference and hip circumference. Based on this information the body mass index and waist to hip ratio was calculated which was used to assess the body composition. To assess the health status, the subjects were asked to give information about certain diseases. One open ended question regarding any other disease which wasn't included in the survey was kept. Due to COVID-19, the researcher requested the subjects to send their data online via google forms after explaining them how to conduct the measurements for body composition assessment. The researcher explained the study to the subjects & asked for their support & sincere participation in the study.

2.1 Participant demographics

A total of 100 teachers participated in the survey out of which 51% were female and 49% were male. A majority of the respondents belonged to age group 31-50 years i.e., 63%. 21% respondents were above the age of 50 years and 16% of the total respondents were up to 30 years.

Table 1: Showing demographic details for teachers

Demographic Details (n=100)			
Gender	**Male: 49% (n=49)**		**Female: 51% (N=51)**
Age	Up to 30yrs: 16%	31-50yrs: 63%	Above 50yrs: 21%

3. Data Analysis

The purpose of the study was to draw a comparative analysis of male and female teachers' on the basis of body composition and health status. The responses received from subjects were tabulated and analysed. A descriptive approach for data analysis was considered. Analysis of the percentage response for various variables and questions were presented through bar diagrams.

4. Results

4.1 Body Composition: To compare the body composition of male and female teachers' variables like height, weight, Body Mass Index (BMI) & Waist & Hip ratio (WHR) were used. For this purpose, the subjects were asked, through questionnaire, to provide measurements related to their height (in cm.), weight (in Kg.), waist circumference (in cm.) & hip circumference (in cm.). Through this information, the Body Mass Index (BMI) and Waist & Hip ratio (WHR) was computed and classified and displayed through tables and also graphically represented through figures.

The height data represented through figure 1 clearly showed that there was a vast variation in the height of the male and female teachers. No female teacher had height greater than 175cm whereas 39% male teacher had height above 175cm. Majority of the female teachers i.e., 53% had height in between 155-165cm. No male teachers had height less than 155 cm whereas 27% female teachers fall in this category. 43% of the male teachers had height in between 165-175cm. Therefore, a significant variation was observed in the height data of male and female teachers' and it shows that body composition of male and female differs from one another.

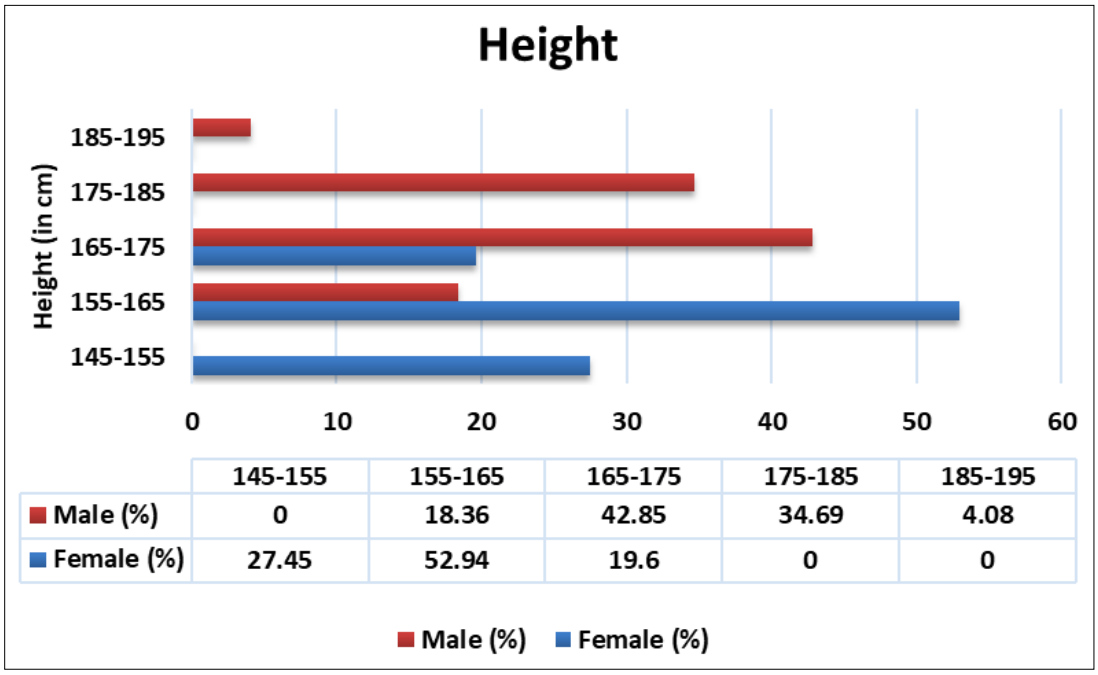

Fig 1: Showing height data of teachers

The weight data of the respondents was represented through figure 2. It showed that only 6% of the male teachers have their weight below 60kg while 35% females fall in this category. Almost equal percent of male and female teachers i.e., 59% and 57% respectively had body weight between 60-80 kg. Only 8% of the female teachers have their weight above 80kg while 35% males fall in this category. Therefore, in terms of comparison between the weight data of male and female teachers' a significant variation was observed and it clearly shows that body composition of male and female differs from one another.

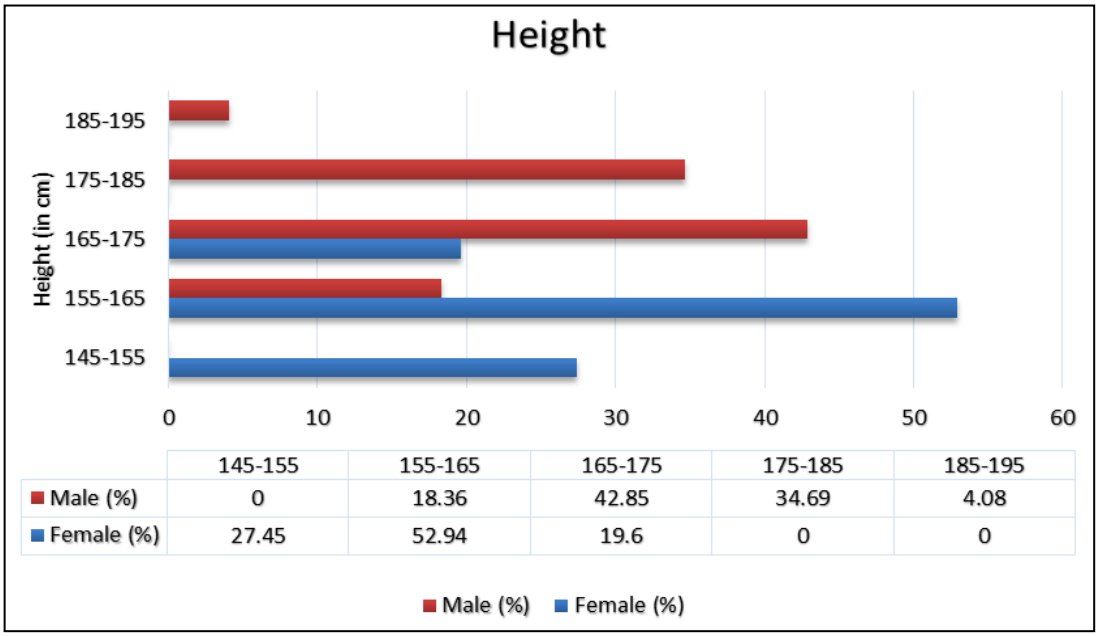

Fig 2: Showing weight data of teachers

Table 2 showed that comparison BMI of the male and female teachers. Almost equal percentage of male and female respondents falls in the different categories of BMI. Around 51% females and 47% males occurred in the acceptable category of BMI. Around 4% male respondents were at a very high disease risk which comes under obesity II category. 6% female and 4% male respondents had a high disease risk which comes under obesity I category. Thus, BMI calculation of male and female teachers clearly showed the increasing risk of diseases according to their body composition.

Table 2: Showing BMI and its classification (classification according to Werner WK Hoeger and Sharon A Hoeger, 2011) [8]

BMI	Male (%)	Female (%)	Total (%)	Disease Risk	Classification
<18.5	2.04	0	1	Increased	Underweight
18.6-21.99	14.29	15.69	15	Low	Acceptable
22.0-24.99	32.66	35.29	34	Very Low	Acceptable
25.0-29.99	42.85	43.14	43	Increased	Overweight
30.00-34.99	4.08	5.88	5	High	Obesity I
35.0-39.99	4.08	0	2	Very High	Obesity II

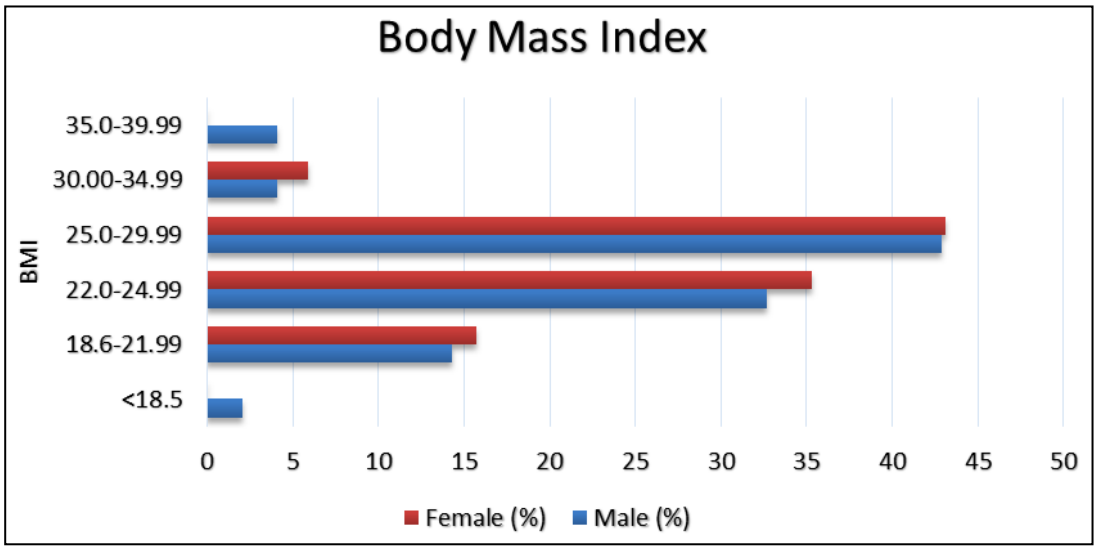

Fig 3: Showing BMI of teachers

Table 3 showed that females had greater waist to hip ratio as compared to males. 84% male teachers had WHR less than 0.95 while only 24% females had WHR below 0.8. Females were at high risk of diseases as compared to males according to their waist to hip ratio. Around 84% of males and only 24% females occurred in the low disease risk category. 51% female respondents came under the high-risk category. Only 10% male respondents had high disease risk according to their waist to hip ratio. Therefore, a significant variation was seen in WHR of male and female teachers.

Table 3: Showing Waist to Hip Ratio (WHR) & Its Classification (classified according to WHO criteria)

Male (%)		Female (%)		Disease Risk
<0.95	83.67	<0.8	23.53	Low
0.96-1.0	6.12	0.81-0.85	25.49	Moderate
>1.1	10.21	>0.86	50.98	High

4.2 Health Status: The table 3showed that around 22% of female and 14% of total male respondents always get a regular medical examination according to age recommendations. It indicated that around 24% of male and 20% of female respondents never got a medical examination done according to their age recommendations. It also showed that around 53% of female and 45% of total male respondents were aware of warning signs of heart attack, cancer and stroke. While a very low percentage of male and female respondents were unaware of these signs.

Table 3: Showing Percentage responses of teachers about question related to health

	Always		Nearly Always		Often		Seldom		Never	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Percentage response about regular medical examinations	21.57	14.29	21.57	22.45	25.49	18.37	11.76	20.41	19.61	24.49
Percentage response of awareness about warning signs of heart attack, stroke and cancer	52.94	44.90	17.65	12.24	9.80	18.37	7.84	16.33	11.77	8.16

Table 4 showed that 10% of male and 10% of total female respondents suffered from elevated blood pressure disease, and 4% male and 4% of female respondents suffered from diabetes, while 2% of female respondents suffered from coronary heart disease and 6% of female respondents suffered from arthritis. No male respondents suffered from coronary heart disease and arthritis.

Table 4: Showing Percentage responses of teachers suffering from different diseases

Diseases	Male (%)		Female (%)		Total (%)	
	Yes	No	Yes	No	Yes	No
Coronary Heart Disease	0	100	1.96	98.04	1	99
Elevated Blood Pressure	10.2	89.80	9.8	90.20	10	90
Diabetes	4.08	95.92	3.92	96.08	4	96
Arthritis	0	100	5.88	94.12	3	97

5. Discussion and Conclusion

All the responses of Delhi University teachers belonging to different colleges, collected through Google form, were analysed through percentage method. The total response of the subjects indicates that there is a difference in responses of male and female respondents on the selected variables of the study.

The comparison of the Body Mass Index (BMI) of male and female respondents showed that almost equal numbers of male and female respondents fall in the increased disease risk category (overweight). 51% females and 47% males have a normal Body Mass Index (BMI). 4% male respondents are at a very high disease risk which comes under obesity II category. 6% female and 4% male respondents have a high disease risk. Females are at high risk of diseases as compared to males according to their waist to hip ratio. 84% of males and only 24% females fall in the low disease risk category. 51% female respondents fall under the high-risk category. Only 10% male respondents have high disease risk according to their waist to hip ratio.

Thus, the analysis indicates that majority of the Delhi University Teachers come under the overweight category, which is an alarming situation as far as their health is concerned. The analysis of body composition through WHR, like BMI, also indicates that a very small population of Delhi University teachers falls in normal category of disease risk. A large number of female teachers compared to male teachers, are in high risk category which indicates that female teachers are not able to maintain their health may be due to many reasons like less time available for taking care of their health, work pressure due to multi-tasking etc.

Thedata on health status shows that only few respondents reported to have diseases like coronary heart problems, elevated blood pressure, diabetes and arthritis. 10% respondents have elevated blood pressure problems out of them around 7% female and 2% male fall in the age group 51-60. And only 4% have diabetes. Around 61% respondents (55% of total male and 67% of total female respondents) are not seeing any specialists (doctors who specialize in a particular field of medicine, such as a cardiologist). Some respondents suffer from diseases like thyroid, uric acid, hypothyroidism, and asthma.

It seems to be good news that although the analysis of the data of majority of the teachers does not indicate a healthy body composition & lifestyle, most respondents are not suffering from hypokinetic or other diseases. The reason for this outcome may be due to under reporting of diseases by the respondents due to one or the reason. Also, most of the respondents were less than 50 years of age so they might not have shown symptoms of diseases but they may be falling in high-risk category as per their body composition.

From the above-mentioned points, we can conclude that teachers are not very aware about their health status and do not follow a very good healthy lifestyle to maintain their health.

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