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Assessment of percent body fat among different age group men and women physical education teachers

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Abstract

The purpose of the study was to analyze the percent body fat among different age group men and women physical education teachers. To achieve the purpose of this study ninety school physical education teachers from kanyakumari district, Tamilnadu, India were selected, in which 45 subjects were men and remaining 45 subjects were women. The selected participants were the inhabitants of kanyakumari district, and they were in the age group of 31 to 60 years. The investigator administered standard tests and procedures to measure the selected variable percent body fat. Two-way analysis of variance was used to find out the influence of each factor independently and also their combined influence on the selected variable. The result of the study shows that significant difference exists between gender (men & women) irrespective of age group and also significant difference exists among age groups (31-40, 41-50 and 51-60) irrespective of gender on percent body fat.

Keywords: Percent body fat and physical education teachers

Introduction

Healthy men and women altogether constitutes wealthy mankind. The body of a woman is definitely very different from the body of a man as it has more duties to perform and greater weight to sustain. In fact, nature has given the woman's body a greater purpose to fulfill. A woman has to become a mother, and for that reason, nature has designed a special system for her. Men have more chances of going out, playing sports and games, and taking a morning or evening walk. Most women are completely tied to their household duties and remain in the same environment all the time. They do not get as much time or as many opportunities for exercise as men do. Moreover, the system of a man is less complicated than the system of a woman.

Good health means that all organs of the body are working efficiently. The important proverb is, 'Health is wealth', 'if health is lost everything is lost', and is realized more in its absence than by its presence. Middle age is not a time of life it is a state of mind. The importance of health is more than education, money and other material comforts. Happiness is intimately concerned more with good physical and mental health than other outside factors. At this stage, we need to know the essential conditions to keep ourselves healthy (Dev, 1999) [1].

Health practitioners universally agree that too much body fat is a serious health risk. Problems such as hypertension, elevated blood lipids (fats and cholesterol), diabetes mellitus, cardiovascular disease, respiratory dysfunction, gall bladder disease, and some joint diseases are all related to obesity. Also, some research suggests that excessive accumulation of fat at specific body sites may be an important health risk factor (Wilmore, Buskirk, DiGirolamo, & Lohman, 1986) [11]. For instance, it appears that extra fat around the abdomen and waist is associated with higher risk of diabetes, heart disease, and hyperlipidemia. Individuals who accumulate a lot of fat around the waist (apple-shaped) are worse off than those who tend to accumulate fat in the thighs and buttocks (pear-shaped).

The human body consists of several components including fat mass, lean muscle mass, skeletal bone mass and total body water. The proportions of each of these components have important implications for present and future health outcomes including cardiovascular, nutritional and psychological status as well as physical performance capability (Donnelly *et al.* 1996; Salbe *et al.* 2002; Ribeiro *et al.* 2003) [2, 9, 8].

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Changes in diet and exercise patterns are the primary ways for one to lose weight. A change in diet facilitates weight loss by restricting total caloric as well as fat intake. A change in exercise patterns also facilitates weight loss by increasing caloric and fat expenditure (Keim *et al.* 1990) [5]. Even though individuals may attempt to lose weight, many never meet their goals. Weight loss programs often lack the two major elements needed for long-term adherence enjoyment and results.

Methodology

To achieve the purpose of this study ninety school physical education teachers from kanyakumari district, Tamilnadu, India were selected, in which 45 subjects were men and remaining 45 subjects were women. They were further categorized into three sub-groups of 15 subjects each. The first one is 31-40 age groups of men and women separately and another one 41-50 age groups of men and women separately and third one 51-60 age groups of men and women separately. The selected participants were the inhabitants of kanyakumari district, and they were in the age group of 31 to 60 years. The investigator administered standard tests and procedures to measure the percent body fat.

Statistical Procedure

The experimental design used for this study was 2 × 3 factorial design. In this design the first factor was ‘gender’ and it consisted of two classifications namely men & women. The second factor was ‘age’ and it was classified into three age categories that is 31-40, 41-50 years and 51-60 years. The data collected from the different age group men and women were statistically analyzed by using two way (2 x 3) factorial ANOVA. Whenever the obtained ‘F’ ratio for interaction effect was found to be significant, the simple effect test was used as a follow up test. Whenever the obtained ‘F’ ratio value in the simple effect was significant the Scheffe’s test was applied as post hoc test to determine the paired mean differences, if any. In all the cases statistical significance was fixed at .05 level.

Result

The mean and standard deviation values on percent body fat among men and women of different age group of physical education teacher have been analyzed and presented in table-1.

Table 1: Descriptive Statistics on Percent Body Fat among Men and Women of Different Age Groups

| Gender | Different Age groups | Lean Body Mass | |
|--------|----------------------------|----------------|------|
| | | Mean | SD |
| Men | Group – I (Age -31 – 40) | 21.33 | 1.11 |
| | Group – II (Age -41 – 50) | 23.13 | 1.12 |
| | Group – III (Age -51 – 60) | 23.33 | 0.97 |
| Women | Group – I (Age -31 – 40) | 23.46 | 1.18 |
| | Group – II (Age -41 – 50) | 26.40 | 0.91 |
| | Group – III (Age -51 – 60) | 24.06 | 1.38 |

Table – 1 presents the mean and standard deviation values of men’s different age groups are 21.33 ± 1.11, 23.13 ± 1.12 and 23.33 ± 0.97 and women’s different age groups are 23.46 ± 1.18, 26.40 ± 0.91 and 24.06 ± 1.38 respectively on percent body fat.

The mean value on percent body fat of different age groups men and women are graphically represented in figure-1.

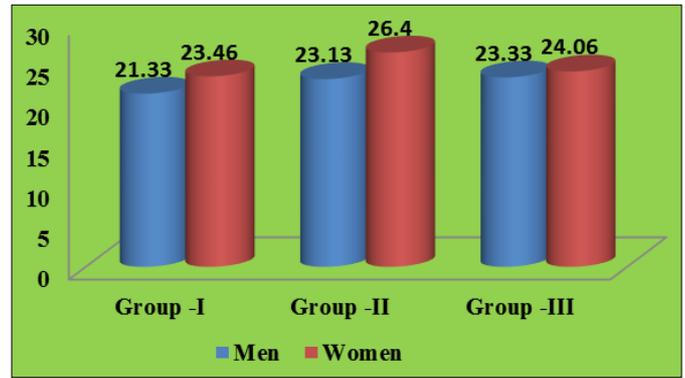


Fig 1: Cylinder Diagram Showing the Mean Value on Percent Body Fat among Men and Women of Different Age Groups

The two-way analysis of variance on percent body fat among men and women of different age group of physical education teachers have been analyzed and presented in table-2.

Table 2: Two-Way Analysis of Variance on Percent Body Fat among Men and Women of Different Age Groups

| Source of Variance | Sum of Squares | df | Mean Squares | Obtained ‘F’ ratio |
|----------------------------------|----------------|----|--------------|--------------------|
| Gender (Male & Female) | 94.04 | 1 | 94.04 | 74.06* |
| Age Groups (group-I, II and III) | 84.28 | 2 | 42.14 | 33.18* |
| Interaction (Gender & Age) | 24.15 | 2 | 12.07 | 9.51* |
| Error | 106.66 | 84 | 1.27 | |

(Table values required for significance at 0.05 levels with df 1 and 84; 2 and 84 are 3.96 and 3.11 respectively)

Table –2 shows that the obtained ‘F’ ratio value of gender (men & women) 74.06, age groups (group-I, group-II & group-III) 33.18 are greater than the table value of 3.96 and 3.11 with df 1 and 84; 2 and 84 respectively required for significance at 0.05 level of confidence. Also the obtained ‘F’ value of interaction (gender & age groups) 9.51 which is higher than the table value of 3.11 with df 2 and 84 required for significance at 0.05 level of confidence. The result of the study shows that significant difference exists among gender (men & women) and age groups (group-I, group-II & group-III) on percent body fat.

Since, the interaction effect is significant, the simple effect test has been applied as follow up test and it is presented in table-3.

Table 3: The Simple Effect Scores of Men and Women of Three Different Age Groups on Percent Body Fat

| Source of Variance | Sum of Squares | df | Mean Squares | Obtained ‘F’ ratio |
|---------------------------------|----------------|----|--------------|--------------------|
| Gender at Age group - I | 34.13 | 1 | 34.13 | 24.73* |
| Gender at Age group – II | 80.03 | 1 | 80.03 | 57.99* |
| Gender at Age group - III | 4.03 | 1 | 4.03 | 2.92 |
| Men and Age Group I, II & III | 36.40 | 2 | 18.20 | 13.19* |
| Women and Age Group I, II & III | 72.04 | 2 | 36.02 | 26.10* |
| Error | 58.26 | 42 | 1.38 | |

(Table values required for significance at .05 levels with df 1 and 42, & 2 and 42 are 4.07 and 3.22 respectively.)

Table -3 shows that the obtained ‘F’ ratio values for gender at age group –I, and II are 24.73 and 57.99 respectively, which are higher than the table value of 4.07 with degrees of freedom 1 and 42 required for significance at 0.05 level of confidence. It indicates that significant difference exists between the paired means of gender at age group –I, and II on percent body fat. Whereas, there is no significant difference exist between genders at age group-III on percent body fat.

Table -3 also shows that 'F' values obtained for tests of men and women all age groups are 13.19 and 26.10 which are greater than the table value of 3.22 with the degrees of freedom 2 and 42. It implies that significant difference exists among different age groups of men and women on percent body fat.

Since, the obtained 'F' ratio value in the simple effect is found to be significant, the Scheffe's test is applied as post hoc test to find out the paired mean difference, and it is presented in table -4.

Table 4: Scheffe's Test for Mean Value on Percent Body Fat among Different Age Groups of Men

| Group – I (Age -31 – 40) | Group – II (Age -41 – 50) | Group – III (Age -51 – 58) | DM | CI |
|-----------------------------|------------------------------|-------------------------------|-------|------|
| 21.33 | 23.13 | | 1.80* | 1.04 |
| 21.33 | | 23.33 | 2.00* | 1.04 |
| | 23.13 | 23.33 | 0.20 | 1.04 |

*Significant

Table- 4 shows the Scheffe's test results that there are significant differences between the means value of group-I and group-II; group-I and group-III on percent body fat. Result also showed that there is no significant difference between group-II and group-III on percent body fat.

Table 5: Scheffe's Test for Mean Value on Percent Body Fat among Different Age Groups of Women

| Group – I (Age -31 – 40) | Group – II (Age -41 – 50) | Group – III (Age -51 – 58) | DM | CI |
|-----------------------------|------------------------------|-------------------------------|-------|------|
| 23.46 | 26.4 | | 2.94* | 1.04 |
| 23.46 | | 24.06 | 0.60 | 1.04 |
| | 26.4 | 24.06 | 2.34* | 1.04 |

*Significant

Table - 5 shows the Scheffe's test results that there are significant differences between the means value of group-I and group-II; group-II and group-III on percent body fat. Result also showed that there is no significant difference between group-I and group-III on percent body fat.

Discussion

Overweight and obesity are growing problems in much of the world. Obesity has a negative impact on health and quality of life. Obesity is a chronic disorder that has multiple causes. Overweight and obesity have significant impact on both physical and physiological health. In addition, psychological disorders such as depression occur with increased frequency in obese. Overweight people are more likely to have cardiovascular and digestive diseases in adulthood as compared with those who are lean. It is believed that both over-consumption of calories and reduced physical activity are mainly involved in obesity. From the perspective of both the individual and society, it is therefore essential to identify strategies for managing this problem. Once present, obesity is difficult to treat, making effective preventive intervention is more important.

Fat is an essential component of the human body, critical in maintaining normal physiological function and homeostasis. The majority of body fat is stored in adipose tissue in subcutaneous sites. There are some deposited around vital organs to play a primarily protective role in the case of trauma (Malina *et al.* 2004) [6]. However, elevated body fat composition is undesirable, given the strong associations to various diseases including coronary heart disease and non-insulin dependent diabetes mellitus (Gidding *et al.* 2004;

Hardly *et al.* 2004; Tantisira & Weiss, 2001) [3, 4, 10], some cancers and hypertension have been associated with cardiovascular disease (Higashi *et al.* 2003) and osteoporosis (Ravn *et al.* 1999) [7]. The relationship between densitometrically-determined body fat percentage (BF%) and BMI, taking age and sex into account internal and external cross-validation of the prediction formulas showed that they gave valid estimates of body fat in males and females at all ages. Large-scale studies to explore the true factors and causes of higher obesity and poor physical fitness in physical education teachers are required.

Conclusion

The obtained result of the study indicates that significant difference exists between 31-40 age group men and women and also between 41-50 age group men and women on percent body fat. Whereas, no significant difference exist between 51-60 age group men and women on percent body fat. When comparing different age categories of men, significant differences found between 31-40 and 41-50 age groups; and also between 31-40 and 51-60 age groups men on percent body fat although no significant difference between 41-50 and 51-60 age groups on percent body fat. When comparing different age categories of women, significant differences found between 31-40 and 41-50 age groups; and also between 41-50 and 51-60 age groups women on percent body fat while no significant difference between 31-40 and 51-60 age groups on percent body fat. Hence it is suggested that changes in diet and exercise patterns are the primary ways for one to control percent body fat.

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