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Flexibility of joints for college student

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Abstract

The purpose of the present study was to compare the flexibility of various joints in respect of college men's and women's students and also to find out the flexibility of the joints by the stated four methods. For the purpose of this study, the sixty students (30 men and 30 women students) as sample were collected from the institution of Vivekananda Mahavidyalaya at Haripal in the district of Hooghly in the state of West Bengal in India. The institution was located in the area of rural locality. The data of the subjects were collected on the basis of random sampling procedure. The dates of birth were collected from their birth certificates and according to these the age was calculated in the nearest years. The age range of the subjects of two groups was 20-25 years. For the purpose of the present study, the four criterion measures of flexibility has taken such as shoulder elevation test, trunk extension test, knee flexibility test and ankle flexibility test. The results of men group was Mean \pm SD as 85.39 \pm 21.02; 35.33 \pm 7.57; 3.58 \pm 1.99 and 5.85 \pm 1.17 in

respect of shoulder elevation test, trunk extension test, knee flexibility test and ankle flexibility test. Similarly, the Mean \pm SD values of women group was 84.31 \pm 17.17; 31.28 \pm 7.04; 2.75 \pm 1.30 and 5.60 \pm 1.00 in respect of flexibility measurement tests. The present study revealed that all the mean values of men group were greater than the women group in respect of flexibility of different joints. The study was found that the calculated values such as 2.443 and 1.927 were greater than the tabulated values as 1.672 are significantly existed at 0.05 levels in the trunk flexibility test and knee flexibility test. It was also found that the calculated values such as 0.215 and 0.879 were less than the tabulated values as 1.672 were not significant in two groups in respect of shoulder elevation test and ankle flexibility test. In the present study it would concluded that the flexibility of two groups were differ in respect of different flexibility tests of various joints.

Keywords: Flexibility, Rural Area, Joints, College Students, Age of Students

1. Introduction

In human nature, it has been shown that it is an important factor as well as movement. Flexibility to a very great extent is age-dependent. Children have more flexibility than adults. Flexibility decreases as the age increases (Uppal, 2015) [9]. Flexibility is the ability of an individual to move the body and its parts through as wide a range of motion as possible without undue strain to the articulation and muscle attachment. Flexibility measurement includes flexion exercises and extension exercises. The degree of flexibility of various joints of the same individual may differ, it is considered as a specific ability of the joint involved. Flexibility is a health-related physical fitness component that has its importance directly related to the maintenance of functional independence and accomplishment of activities of the daily living (Brito *et al.*, 2013). The increase and decrease of flexibility levels can be linked to several determinants being endogenous and exogenous (Gonzalez-Suarez *et al.*, 2013). Flexibility has been defined in many different ways; although the focus has consistently been on the characteristics and functioning of muscle (Kraus and Hirschland, 1954) [7]. (Plowman, 2008) defines flexibility as the ability to "move freely through a full range of motion". Flexibility has been defined as the intrinsic property of body tissues, which determines the range of motion achievable without injury at a joint or group of joints." (Holt *et al.*, 1996). Flexibility as a component of fitness first gained prominence in the early 1900s as the field of physical therapy emerged (Linker, 2011). According to (Hupprich and Sigerseth, 1950) [5] most of the part of human is more flexibility from childhood to adolescences and then become less flexible progressively. While (McCue, 1953) found that active individuals were more flexibility than the inactive individuals and (Hartley, 1980) opinion that exercise increases flexibility. According to (Haliski, 1950) it has found that non-athletes in physical education classes to be more active flexible than football players. The greater flexibility of women is usually attributed to gender differences in pelvic structure and hormones that may affect connective tissue laxity (Alter, 1996). Women normally more flexibility as compare to men due to difference in the joint structure and also due to lower muscle mass in the case of women (Uppal, 2015) [9].

The regular practice of physical exercise improves the flexibility levels and sports practitioners tend to present better flexibility levels when compared to their non-practitioner peers (Batista *et al.*, 2018)^[2].

2. Materials and method

The sample consisted of 60 college students (i.e. 30 men and 30 women) which were collected from the Vivekananda Mahavidyalaya at Haripal in the district of Hooghly in the state of West Bengal, India. There are two groups i.e. men's groups and the other is women's group. The college was situated in the area of rural locality. The data were collected on the basis of random sampling method and the data analysis method was adopted for the purpose of the present study. The researcher had collected the date of birth of the subjects from their birth certificate and age was calculated in nearest years. The age range of the two groups was 20-25 years. The purpose of the present study was to measure the flexibility of various joints of two groups. The study of flexibility was taken as the criterion measure. The investigator has taken the four criterion measure as shoulder elevation test; trunk extension tests (Johnson, 1970)^[6]; knee flexibility test and ankle flexibility test (Horschig, 2015) for the purpose of the variables for flexibility.

Table 1: Mean±SD and range values (Men & Women Gr.) of flexibility of joints

Test items	Men Gr. Mean±SD	Women Gr. Mean±SD	Range(Men) (Inches)	Range(Women) (Inches)
SET(Inches)	85.39±21.02	84.31±17.17	69.85	76.22
TFT(Inches)	35.33±7.57	31.28±7.04	20.00	31.37
KFT(Inches)	3.58±1.99	2.75±1.30	6.25	4.50
AFT(Inches)	5.85±1.17	5.60±1.00	5.00	4.50

In table-2, the P-value and the t-ratio were stated of the groups. From the table-2, it was finding that the P-values were greater than the values of $t_{0.05}$ level that is $P > t_{0.05}$ in respect of shoulder elevation test and ankle flexibility test. So, the men and women group were not significant at 0.05

3. Results and discussion

The results of the flexibility of various joints for men and women group were stated in the table-1 and table-2. The Mean±SD and range of men and women group in respect of the test are presented in the following way. In table-1, the mean value of men group 85.39, 35.33, 3.58 and 5.85 in respect of shoulder elevation test (SET), trunk flexibility test (TFT), knee flexibility test (KFT) and the ankle flexibility test (AFT). Similarly, the mean values of women group are 84.31, 31.28, 2.75 and 5.60 in respect of flexibility test. The present study revealed that all the mean values of men group were greater than the mean values of women group in respect of flexibility of various joints. On the other way, the range values of women group were greater than the men group in respect of shoulder elevation test and trunk flexibility test but the range values of men group were greater than the women group in respect of knee flexibility test and ankle flexibility test. Hence, women were more flexibility than men in respect of shoulder flexibility test and trunk flexibility test which was similar opinion of (Phillips, 1955)^[8] and inflexibility in knee flexibility test and ankle flexibility test in respect of range values.

levels in respect of these two flexibility tests. On the other way, the calculated values 2.443 and 1.927 were greater than the tabulated values 1.672. Hence, two groups were significantly existed at 0.05 levels in respect of trunk flexibility test and knee flexibility test.

Table 2: Mean±SD, p-value and t-ratio of flexibility of men and women groups

Test items	Men Gr. Mean±SD	Women Gr. Mean±SD	p-value	t-ratio
SET(Inches)	85.39±21.02	84.31±17.17	0.830	0.215 ^{ns}
TFT(Inches)	35.33±7.57	31.28±7.04	0.036	2.143*
KFT(Inches)	3.58±1.99	2.75±1.30	0.050	1.927*
AFT(Inches)	5.85±1.17	5.60±1.00	0.383	0.879 ^{ns}

$T_{0.05, 58} = 1.672$; * Significant at 0.05 level; ns= not significant

Some evidence suggests that women's generally are more flexible than men's at all ages (Payne *et al.*, 2000). Similarly, according to (Holland, 1968)^[3] women's tend to be more flexible than men's of the same age throughout life and this difference is generally attributed to anatomical variations in joint structures which was same opinion of (Uppal, 2015; Alter, 1996)^[9]. (Araujo, 2004)^[1] agree that among elementary school age children girls are superior to boys in flexibility and this difference exists all ages and throughout adult life. Male adolescents have higher flexibility levels at more advance stages of maturation and when comparing sexes, females have higher absolute values for this variable opinion by (Batista *et al.*, 2018)^[2].

4. Conclusion

On the basis of present study, the following conclusion were drawn as.

1. The mean values of men group were greater than the women group in respect of flexibility tests.
2. The study shows that the range values of women group are better in the shoulder elevation test and trunk

flexibility tests than the men group of the students. In the same way, the range values of men group are better in knee flexibility test and ankle flexibility test than the women group of the students.

3. The present study also revealed that the between groups of men and women of the students are significant at 0.05 level in respect of trunk extension test and knee flexibility test and the two groups of students are insignificant in respect of shoulder elevation test and ankle flexibility test.

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