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Effect of regular participation in games and sports on body mass index and fat percent among interuniversity level team game players

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Abstract

The present study was aimed to assess the effect of regular participation in games and sports on body mass index (BMI) and fat percent among interuniversity level team game players and to compare the results with age matched Control Group. Total eighty eight (88) subjects aged between 19 to 22 years are purposively selected for this study. All subjects are divided into two groups i.e. Athletic Group and Control Group. The data was collected in two phases i. e. pre-test and post test for both the groups. In this study the subjects for Athletic Group and Control Groups were forty four (44) interuniversity male team game players and forty four (44) under graduate age matched different college male students respectively. The pre-test score for Athletic Group were forty four (44) male east zone interuniversity players of different games and sports from Vidyasagar University, West Bengal, who were attended their respective coaching camps for their participation of east zone interuniversity tournaments in the session 2015-16 purposively selected as subjects for this study. In the same time forty four (44) male students for Control Group were selected as subjects from different under graduate colleges affiliated to Vidyasagar University. In the next academic session 2016-17 post test data was collected for Athletic Group from their respective under graduate colleges only those who were attended their previous year coaching camps for the participation of different east zone interuniversity tournaments. The Control Group data was collected from the same subjects of pre-test samples from their respective colleges. In post test thirty five (35) male athletes were common to participated second and/or third time east zone interuniversity coaching camps as Athletic Group and forty (40) undergraduate students were appeared as post test scores for Control Group. Body mass index (BMI) was calculated by using formula of Fat percent was estimated from the sum of four sites skinfolds (biceps + triceps + sub-scapular + supra-iliac) and the total skinfold value converted into standard score from percent body fat conversion chart for men. Data was analyzed using Paired Sample 't' test by using SPSS, (Version 20.0) software. The level of significance chosen was 0.05. The results of t-test revealed that no significant differences exist between pre-test and post test scores of body mass index (BMI) and fat percent among interuniversity level team game players of Athletic Group. The findings also revealed that significant differences exist between pre-test and post test scores of body mass index (BMI) and fat percent of their age matched Control Group.

Keywords: Body mass index (BMI), fat percent, games, sports, athletic, interuniversity, skinfold

Introduction

Body mass index only indicates that one is thin, too thin, fat and too fat for one's body height relatively; and this has a predictive health information in which public health is interested, especially concerning body weight that are not normal on the international body mass index classification chart. The unnecessary or excessive fats are associated with various diseases and these have caused serious concern to many governments (Halslam & James, 2005) [3]. From various studies, findings of risk factors from excessive body weight and obesity fall into two broad categories: Those attributed to the "effects" of increased fat-mass such as osteoarthritis, obtrusive sleep apnea, social stigmatization (Sobal & Stunkard, 1989) [9] and those attributed to the increased number of fat-cells such as diabetes (type 2), cancer, cardiovascular diseases, non-alcoholic fatty liver diseases (Bray, 2004) [11]. Increased body fats alter the body's response to insulin, potentially leading to "insulin resistance" and create a pro-inflammatory and a pro-thrombotic state in the human body (Shoelson *et al.* 2006) [8]. High body mass index (BMI) is associated with increased risks for hypertension, atherosclerosis etc. (Witt & Bush, 2005) [10].

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Body mass index (BMI) gives evidence about overweight if its value varies from 25-29.9 kg/m², but obesity can be determined if body mass index is greater than 30 kg/m² (Mathews & Wagner, 2008) [4].

The body mass index (BMI) depends not only on the fat content in the human body, but also on the muscles and bones mass, as well as, on the water content in the body of athletes. High value of the body mass index (BMI) can be estimated as overweight in athletes with great skeletal muscles mass. It means that training in many sports specializations causes increase of the body mass index (BMI) (Ode *et al.* 2007) [7]. High value of the body mass index (BMI) is observed in weight lifters, body builders, rowers, professional football and handball players etc. For example, the mean body mass index (BMI) in seven defensive linemen from a former National Football League Super Bowl team is 31.9 kg/m², but the mean body mass index (BMI) in all players of the team is 28.7 kg/m² (McArdle *et al.* 2000) [5]. However, their fat content 18% for linemen and 12.1% average for the team misclassified them for fatness using only body mass index (BMI) as the overweight standard. The body mass composition in football players depends on their specific role during the game: linemen, goal keepers, backs, forwards, midfielders etc. (Melchiorri *et al.* 2007) [6]. Wittich *et al.* (2001) [11] indicated that fat content in the body of football players varies from 6.1% to 19.5%, and it depends on the position of the football player in the game: the midfielders have a significantly higher percentage of fat (13.5±3.3%) than backs or forwarders (11.0±2.3%).

According to Montana State University-Bozeman, a lower percentage of body fat typically equates to improved performance. Fat, however, is a source of fuel and a certain amount is necessary for optimum performance. Women and men also differ in the amount of body fat they need for basic body processes combined with athletic performance. Athletes come in all varieties, each with a unique body fat composition. Elite athletes, who perform at the Olympic level, typically have fat percentages that are lower than average. According to a 1983 research study published in "American Journal of Sports Medicine," athletes who engage in more aerobically challenging sports such as running have lower percentages of body fat than athletes who participate in less aerobic sports. Excess body fat adds unnecessary weight to an athlete's skeleton. The additional weight can slow you down and impair your ability to perform your sport. Too much body fat can also affect your flexibility and endurance, and can increase the risk of injury. Having the ideal percentage of body fat that meets your requirements for fuel, speed and flexibility, given your age, gender and level of activity can make a significant difference in the end result. Most athletes benefit from lower percentages of body fat than non-athletes, but too little body fat can pose a hazard to athletic performance. Your body needs a certain amount of fat for cushioning, regulating your temperature and the distribution of nutrients. Without enough body fat, female athletes may cease to menstruate, a condition that can lead to decreased bone density. Male athletes without adequate body fat can also experience adverse effects with performance.

Statement of the Problem

The purpose of the study was to find out the effect of regular participation in games and sports on body mass index (BMI) and fat percent among interuniversity level team game players.

Hypothesis

It was hypothesized that there would be significant effects in body mass index (BMI) and fat percent among interuniversity level team game players.

Significance of the Study

- The results of the study will quantify the body mass index (BMI) and fat percent of interuniversity level team game male players.
- The results of the study will indicate the effects regular participation in games and sports on body mass index (BMI) and fat percent among interuniversity level team game male players.
- The study may be useful for the preparation of better physical education schedule for optimal improvement and maintenance of body mass index (BMI) and fat percent among interuniversity level team game players.
- The results of the study may regulate the body mass index (BMI) and fat percent of different under graduate students of different colleges as well as players of different male team games.

Selection of Subjects

A total of eighty eight (88) subjects are purposively selected for this study. Total subjects are divided into two groups i.e. Athletic Group and Control Group. The data was collected in two phases as pre-test and post test for both the groups. In this study the subjects for Athletic Group and Control Groups were forty four (44) interuniversity male team game players and forty four (44) under graduate age matched different college male students respectively. The pre-test score for Athletic Group were forty four (44) male east zone interuniversity players of different games and sports i.e. twelve (12) football players, twelve (12) cricket players, ten (10) volleyball players and ten (10) Kho-kho players from Vidyasagar University, West Bengal, who were attended their respective coaching camps for their participation of east zone interuniversity tournaments in the session 2015-16 purposively selected as subjects for this study. In the same time forty four (44) male students for Control Group were selected as subjects from different under graduate colleges affiliated to Vidyasagar University in the same academic session. The age level of the subjects was between nineteen (19) to twenty two (22) years for both Athletic and Control Groups. In the next academic session i. e. 2016-17 post test data was collected for Athletic Group from their respective under graduate colleges only those who were attended their previous year coaching camps for the participation of different east zone interuniversity tournaments. The Control Group data was collected from the same subjects of pre-test samples from their respective colleges. In post test thirty five (35) male athletes were common of which ten (10) football players, ten (10) cricket players, seven (7) volleyball players and eight (8) Kho-kho players were attended participated 2nd or 3rd time east zone inter university coaching camps as Athletic Group and forty (40) undergraduate students were appeared as post test scores for Control Group.

Selection of Variables

The selected variables of body mass index (BMI) and fat percent were collected by employing the standard testing procedures available in the literature. Height and weight of the subjects were measured through Stadiometer and Weighing Machine respectively. Body mass index (BMI) was calculated by using formula of Fat percent was estimated

from the sum of four sites skinfolds (biceps + triceps + sub-scapular + supra-iliac) and the total skinfold value converted into standard score from percent body fat conversion chart for men.

Criterion Measures

The criterion measures adopted in this study were as follows: Age was calculated in years. Height and weight were measured through Stadiometer and Weighing Machine respectively. Body mass index (BMI) was measured by kg/mt^2 and fat percent was measured by percent (%) unit.

Statistical Procedure

For the purpose of analysis of data descriptive statistics the mean, standard deviation, range and mean difference were obtained through the Statistical Package for Social Studies,

(SPSS, Version 20, Inc, Chicago, Illinois). To check the difference of mean scores between pre-test and post test scores of Athletic Group and Control Group in body mass index (BMI) and fat percent the Paired Samples t-test was applied. The level of significance was set at 0.05.

Results and Discussion

The statistical analyses of data have been presented in this chapter. The selected variables of body mass index (BMI) and fat percent of Athletic group and Control Group were collected from different under graduate male students under Vidyasagar University, West Bengal. The body mass index (BMI) and fat percent of pre-test and post test of Athletic Group and Control Groups are presented in table-1 and table-2 respectively.

Table 1: represented the pre-test and post test scores of sample number, mean, standard deviation, standard error of mean of body mass index (BMI) and fat percent for Athletic Group

Variable	Test	N	Mean (kg/mt^2)	Standard Deviation	Standard Error of Mean
Body Mass Index (BMI) of Athletic Group (kg/mt^2)	Pre-test	35	22.1423	1.93013	0.32625
	Post-test	35	22.3503	1.53403	0.25930
Fat Percent of Athletic Group (%)	Pre-test	35	12.1429	1.91960	0.32447
	Post-test	35	12.2500	1.30187	0.22006

Table-1 clearly shows the mean and standard deviation of body mass index (BMI) in pre-test and post test scores of Athletic Group are 22.1423 ± 1.93013 and 22.3503 ± 1.53403 kg/mt^2 respectively. Table-2 also clearly indicates the mean

and standard deviation of fat percent in pre-test and post test scores of Athletic Group are 12.1429 ± 1.91960 and $12.2500 \pm 1.30187\%$ respectively.

Table 2: represented the pre-test and post test scores of sample number, mean, standard deviation, standard error of mean of body mass index (BMI) and fat percent for Control Group

Variable	Test	N	Mean (kg/mt^2)	Standard Deviation	Standard Error of Mean
Body Mass Index (BMI) of Athletic Group (kg/mt^2)	Pre-test	40	21.5338	1.38304	0.21868
	Post-test	40	22.0378	1.48603	0.23496
Fat Percent of Athletic Group (%)	Pre-test	40	12.8375	1.49094	0.23574
	Post-test	40	13.2375	1.43664	0.22715

Table-2 clearly shows the mean and standard deviation of body mass index (BMI) in pre-test and post test scores of Control Group are 21.5338 ± 1.38304 and 22.0378 ± 1.48603 kg/mt^2 respectively. Table-2 also clearly indicates the mean and standard deviation of fat percent in pre-test and post test scores of Control Group are 12.8375 ± 1.49094 and

$13.2375 \pm 1.43664\%$ respectively.

The research that was conducted aimed to determine the effect of regular participation in games and sports on body mass index (BMI) and fat percent (%) among interuniversity level team game players are presented in Table-3 and Table-4.

Table 3: shows the Mean (\pm SD), Mean Difference, Paired Sample t-test and significant level of pre-test and post test scores of body mass index (BMI) for Athletic Group and Control Groups

Variable with Group	Test	N	Mean (kg/mt^2)	Mean Difference	Sig. (2-tailed)	S/NS
Body Mass Index (BMI) of Athletic Group	Pre-test	35	22.1423	-0.2080	0.117	NS
	Post-Test	35	22.3503			
Body Mass Index (BMI) of Control Group	Pre-test	40	21.5338	-0.5040	0.000*	S
	Post-Test	40	22.0378			

*Significant at 0.05 level.

Table-3 clearly indicated that the pre-test and post test scores of body mass index (BMI) of Athletic Group were 22.1423 kg/mt^2 and 22.3503 kg/mt^2 respectively. The mean difference was -0.2080 clearly showed that there was no significant difference between pre-test and post test scores of body mass index (BMI) in Athletic Group. The probable reason for insignificant in body mass index (BMI) that regular participation in different games and sports or any form of

regular participation in physical activity might be controlled the body weight of university level male team game players those who were considered as under Athletic Group. In this age the subjects of Athletic Group already gained their maximum body height and maintained their body weight more or less same in pre-test and post-test scores, due to this reason no significant change found in the body mass index (BMI) of Athletic Group. Table-3 also indicated that the pre-

test and post test scores of body mass index (BMI) of Control Group were 21.5338 kg/mt² and 22.0378 kg/mt² respectively. The mean difference was -0.5040 clearly showed that there was significant difference at 0.05 level between pre-test and post test scores of body mass index (BMI) of Control Group. Significant difference was noted due to the fact that sedentary life style may increase the body weight of university level male students (Control Group) those who were not participated in different games and sports or any form of regular participation in physical activity of their daily life. Though the subjects of Control Group achieved their maximum height but increase in body weight leads to enhance their body mass index (BMI) score as body mass index (BMI) formula is indicated.

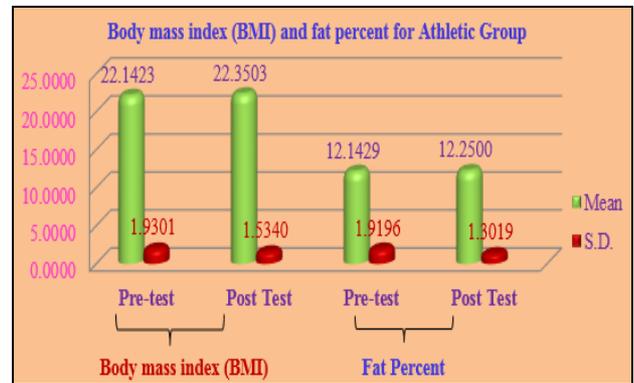


Fig 1: Graphical representation of pre-test and post test scores of Body mass index (BMI) and fat percent for Athletic Group.

Table 4: shows the Mean (±SD), Mean Difference, Paired Sample t-test and significant level of pre-test and post test scores of fat percent for Athletic Group and Control Groups

Variable with Group	Test	N	Mean (%)	Mean Difference	Sig.(2-tailed)	S/NS
Fat Percent of Athletic Group	Pre-test	35	12.1429	-0.10714	0.759	NS
	Post-Test	35	12.2500			
Fat Percent of Non-athletic Group	Pre-test	40	12.8375	-0.40000	0.003*	S
	Post-Test	40	13.2375			

*Significant at 0.05 level

Table-4 clearly indicated that the pre-test and post test scores of fat percent of Athletic Group were 12.1429% and 12.2500% respectively. The mean difference was -0.1071 clearly showed that there was no significant difference between pre-test and post test scores of fat percent of Athletic Group. The reason behind that the regular participation in different games and sports or any form of physical activity as their specialization might be maintained the fat percent of university level male players of different games and sports in Athletic Group. Table-4 also indicated that the pre-test and post test scores of fat percent of Control Group were 12.8375% and 13.2375% respectively. The mean difference was -0.4000 clearly showed that there was significant difference at 0.05 level between pre-test and post test scores of fat percent of Control Group. Significant difference was noted due to the fact that inactive life style of Control Group subjects might be increase their total body fat amount as well as body fat percent of university level male students.

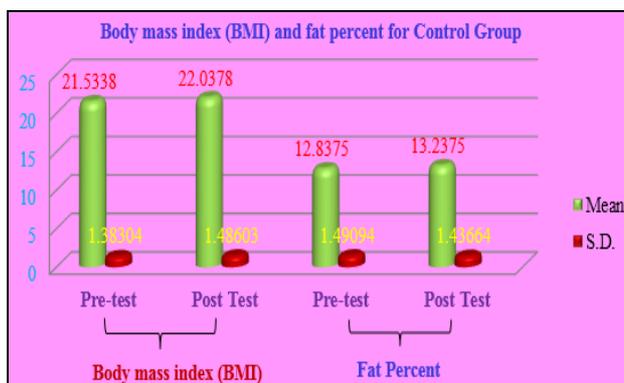


Fig 2: Graphical representation of pre-test and post test scores of Body mass index (BMI) and fat percent for Control Group.

Conclusion

Based on the analysis of the results obtained, it may be concluded that the pre-test scores of body mass index (BMI) and fat percent of Athletic Group and Control Group were more or less same as recommended different norms. The comparative result of pre-test and post test scores of body

mass index (BMI) were found statistically insignificant; that means Athletic Group maintained their body mass index (BMI) due to regular participation in different games and sports. Also the comparative result of pre-test and post test scores of fat percent were found statistically insignificant; that means Athletic Group also maintained their fat percent after regular practice of their specific games and sports. There was significant difference in body mass index (BMI) between pre-test and post test scores of Control Group and they were increased their body mass index (BMI) scores in post test which may leads to inhibited their future healthy and progressive educational life as well as productive life. There was significant difference in fat percent between pre-test and post test scores of Control Group and they were increased their fat percent gradually in post test score. From the findings of this study it may be concluded that regular participation in different games and sports or any form of physical activity may be controlled the body mass index (BMI) and fat percent of university level male players of different games and sports. Another conclusion may be drawn that inactive life style or sedentary life style may be increased the body mass index (BMI) and also fat percent of university level male subjects of Control Group which leads to promote the different life style diseases as well as hypo-kinetic and hyperkinetic diseases in future life. Finally the findings of this study indicates that the regular participation in different games and sports or any form of physical activity control body mass index (BMI) and fat percent which may helps to promote our healthy, wealthy and economically productive life.

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