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Effect of Eight Weeks Conditioning On Body Mass Index of College Students

Dr. Aloke Sen Borman,[1] Dr. Binod Chowdhary,[2] Debkumar Mahato[3]
1Assistant Professor, Department of Physical Education, Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur, Pin no.721505, West Bengal, India.
2Assistant Professor, Department of Physical Education, Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur, Pin no.721505, West Bengal, India.
3CWTT, Department of Physical Education, Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur, Pin no.721505, West Bengal, India.

Abstract:
Introduction: *The BMI for a person is defined as their body mass divided by the square of their height with the value universally being given in units of kg/m^2**.** The BMI is generally used as a means of correlation between groups related by general mass and can serve as a vague means of estimating adiposity.*
Aim: *The purpose of the study was to find out the effect of conditioning on body mass index of college students.*
Method:
Subjects: *A sample of 50 male subjects was randomly selected from Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur age ranged from 17 to 23 years.*
Training Protocol: *Subjects were participated in 6 days per week in one hour conditioning between 6:00 A.M. to 7:00 A.M.*
Experimental Design: *Pre test were conducted for assessment of BMI before initial day of participation and post test after the experimental period of eight weeks.*
Statistics: *The difference between initial and final scores in selected variables were analyzed using paired t-test by SPSS version-20 and MS Excel 2007.*
Result: *Pre test mean body mass index was 25.66 ± 2.07 and Post test mean body mass index was 24.30 ± 1.76 showed statistically significant difference at P< 0.05 level.*
Conclusion: *Participation in conditioning is effective for development of Body Mass Index.*
Keywords: *Body weight, Height, Conditioning, BMI.*

I. Introduction

Physical exercise plays a vital role in bringing physical, mental and social fitness of an individual. In the modern era we are fighting against obesity which we have incurred through our lifestyle. In this context physical exercises are becoming increasing sophisticated technical going popularity as remedial measures for lifestyle development. Conditioning is a process through which we prepared anybody as necessary through participation in vigorous exercises or training such as circuit training, weight training, pressure training, interval training etc. Through conditioning we developed the general physical fitness primarily. Fitness means something a little different to everyone. It is more than just how less time one can take to complete 100 meter distance, or how one can lift the weight. For those fitness freaks it is increased enjoyment in life: getting sick less often, relieving stress, burning calories, better sleep, improved disposition and so many more. Unless habitual it is beyond the imagination of laggards to understand the psycho-physiological benefits of engaging in regular fitness WHO's recommendation is to engage in at least 30 minutes moderate intensity regular exercise seven days a week for all adults. The key to achieving and maintaining fitness is keeping training and workouts fun, challenging and varied. Physical fitness is not only of the most important key to be healthy but it is also the basis of dynamic and soundness of the body activity and of mind is subtle and complex. To keep himself fit, a person requires some sort of physical activity. Physical exercise is very important for children, youth and adults of both sexes to keep themselves fit. For all these purpose even through the conditioning programme is beneficial there is a need for kind of programme which would be successful in relieving the monotony of jogging and exercise everyday along with the beneficial of undergoing a physical fitness programme. In the primitive society which man had to do all the work by him, physical fitness was needed as an essential part of daily living with the onset of modern civilization and mechanization and automation and man's physical work capacity has become limited? Physical fitness is the ability to last, to bear up, and to withstand stress to preserve under difficult circumstances, where as unfit person give up. The present study was undertaken to highlight the alarming rate of possible metabolic disorder amongst students and empower them to take up fitness and exercise

as one of the informed choice of activity to promote and develop health related fitness. Body mass index has been used as a fairly reliable indicator of body weight. It may however overestimate and underestimate for muscular body mass and athletic body respectively.

II. Review Of Related Literature

The body mass index (BMI), or Quetelet index, is a statistical measure of body weight based on a person's weight and height. Though it does not actually measure the percentage of body fat, it is used to estimate a healthy body weight based on a person's height. Due to its ease of measurement and calculation, it is the most widely used diagnostic tool to identify weight problems within a population, usually whether individuals are underweight, overweight or obese. It was invented between 1830 and 1850 by the Belgian polymath Adolphe Quetelet during the course of developing "social physics". Body mass index is defined as the individual's body weight divided by the square of his or her height. The formulae universally used in medicine produce a unit of measure of kg/m^2. **Kristal AR et al. (2005)** tried to examine whether yoga practice is associated with lower mean 10-year weight gain after age 45. In this study 15,550 adults, aged 53 to 57 years, recruited to the Vitamin and Lifestyle (VITAL) cohort study between 2000 and 2002 as participant. Physical activity (including yoga) during the past 10 years, diet, height, and weight at recruitment and at ages 30 and 45. All measures were based on self-reporting, and past weight was retrospectively ascertained. They found that yoga practice for four or more years was associated with a 3.1-lb lower weight gain among normal weight (BMI < 25) participants [9.5 lbs versus 12.6 Ibs] and an 18.5-lb lower weight gain among overweight participants [-5.0 lbs versus 13.5 Ibs] (both P for trend <.001). Among overweight individuals, 4+ years of yoga practice was associated with a relative odds of 1.85 (95% confidence interval [CI] 0.63-5.42) for weight maintenance (within 5%) and 3.88 (95% Cl 1.30-9.88) for weight loss (> 5%) compared to weight gain (P for trend .026 and .003, respectively). **Sivasankaran S et al. (2006)**, investigate how yoga and meditation will improve parameters of endothelial function. They examined the effects of yoga and meditation on hemodynamic and laboratory parameters as well as on endothelial function in a 6-week pilot study. Systolic and diastolic blood pressures, heart rate, body mass index (BMI), fasting glucose, lipids, hs C-reactive protein (CRP), and endothelial function (as assessed by brachial artery reactivity) were all studied at baseline and after 6 weeks of yoga practice. A course in yoga and meditation was given to the subjects for 1.5 h three times weekly for 6 weeks and subjects were instructed to continue their efforts at home. This prospective cohort study included 33 subjects (mean age 55 +/- 11 years) both with (30%) and without (70%) established coronary artery disease (CAD). There were significant reductions in blood pressure, heart rate, and BMI in the total cohort with yoga. None of the laboratory parameters changed significantly with yoga. For the total cohort there was no significant improvement in endothelial-dependent vasodilatation with yoga training and meditation compared with baseline (16.7% relative improvement from 7.2-8.4%; p = 0.3). In the group with CAD, endothelial-dependent vasodilatation improved 69% with yoga training (6.38-10.78%; p = 0.09). They concluded that yoga and meditation appear to improve endothelial function in subjects with CAD. **Bertisch SM et al.(2008)** analyzed data on CAM use from the 2002 National Health Interview Survey (NHIS) Alternative Medicine Supplement (n=31,044). They compared the use of CAM overall, within the past 12 months, between normal weight (BMI from 18 to <25), overweight (from 25 to <30), mildly obese (from 30 to <35), moderately obese (from 35 to <40), and extremely obese (>40) adults. For the primary analysis, our multivariable model was adjusted for sociodemographic factors, insurance status, medical conditions, and health behaviors. We performed additional analyses to explore the association of BMI and the use of seven CAM modalities. They found that adults with obesity have lower prevalence of use of yoga therapy, and similar prevalence of use of several CAM modalities, including relaxation techniques, natural herbs, massage, chiropractic medicine, tai chi, and acupuncture, compared to normal-weight individuals. After adjustment for sociodemographic factors, insurance status, medical conditions, and health behaviors, adults with obesity were generally less likely to use most individual CAM modalities, although the magnitude of these differences were quite modest in many cases. They concluded that even though adults with obesity have a greater illness burden and higher utilization of traditional medical care, adults with higher BMIs were no more likely to use each of the individual CAM therapies studied. Additional research is needed to improve our understanding of CAM use by adults with obesity. **Chen TL et al (2009)** investigate the effect of yoga exercise on the health-related physical fitness of school-age children with asthma. The study employed a quasi-experimental research design in which 31 voluntary children (exercise group 16; control group15) aged 7 to 12 years were purposively sampled from one public elementary school in Taipei County. The yoga exercise program was practiced by the exercise group three times per week for a consecutive 7 week period. Each 60-minute yoga session included 10 minutes of warm-up and breathing exercises, 40 minutes of yoga postures, and 10 minutes of cool down exercises. Fitness scores were assessed at pre-exercise (baseline) and at the seventh and ninth week after intervention completion. A total of 30 subjects (exercise group 16; control group 14) completed follow-up. Results included: 1. Compared with children in the general population, the study subjects (n = 30) all fell below the 50th percentile in all five physical fitness items of interest. There was no significant

difference in scores between the two groups at baseline (i.e., pre-exercise) for all five fitness items. 2. Research found a positive association between exercise habit after school and muscular strength and endurance among asthmatic children. 3. Compared to the control group, the exercise group showed favorable outcomes in terms of flexibility and muscular endurance. Such favorable outcomes remained evident even after adjusting for age, duration of disease and steroid use, values for which were unequally distributed between the two groups at baseline. 4. There was a tendency for all item-specific fitness scores to increase over time in the exercise group. The GEE analysis showed that yoga exercise indeed improved BMI, flexibility, and muscular endurance. After 2 weeks of self-practice at home, yoga exercise continued to improve BMI, flexibility, muscular strength, and cardiopulmonary fitness. **Dittmann KA et al. (2009)** evaluated attitudes about body image and eating in women practicing postural yoga. Study 1 described scores from questionnaires on variables related to body awareness, intuitive eating, spirituality, and reasons for practicing. Scores were favorable on all measures with significant correlations ($p < .01$) among all main variables except between spiritual readiness and intuitive eating, and between BMI and both body awareness and spiritual readiness. Reasons for practicing did not affect scores. Study 2 evaluated interviews in a sub-sample. Qualitative data reported improvements in body satisfaction and disordered eating due in part to yoga and its associated spirituality. **McIver S et at. (2009)** examined the efficacy of a 12-week yoga program aimed at reducing binge eating severity. A randomised trial was undertaken assigning participants to yoga (n=45) or wait-list control (n=45) groups. Of these, 25 in each group were analysed. A community-based sample of women between 25 and 63 years of age who identified with diagnostic criteria for binge eating disorder (BED) and a BMI>25 were recruited for the study. Primary outcomes included the Binge Eating Scale (BES) and International Physical Activity Questionnaire (IPAQ). Secondary outcomes comprised measures for BMI, hips and waist. They found that for the yoga group, self-reported reductions in binge eating and increases in physical activity were statistically significant. Small yet statistically significant reductions for BMI, hips and waist measurement were obtained. The wait-list control group did not improve significantly on any measures. **Kosuri M et al. (2009)** observed that the effect of yoga practice on clinical and psychological outcomes in subjects with type 2 diabetes mellitus (T2DM). In a 40-day yoga camp at the Institute of Yoga and Consciousness, ambulatory subjects with T2DM not having significant complications (n = 35) participated in a 40-day yoga camp, where yogic practices were overseen by trained yoga teachers. Clinical, biochemical, and psychological well-being were studied at baseline and at the end of the camp. At the end of the study, there was a reduction of body mass index (BMI) (26.514 +/- 3.355 to 25.771 +/- 3.40; $P < 0.001$) and anxiety (6.20 +/- 3.72 to 4.29 +/- 4.46; $P < 0.05$) and an improvement in total general well-being (48.6 +/- 11.13 to 52.66 +/- 52.66 +/- 12.87; $P < 0.05$). They concluded that participation of subjects with T2DM in yoga practice for 40 days resulted in reduced BMI, improved well-being, and reduced anxiety. **Telles S et al. (2010)** worked on single group of 47 persons were assessed on the first and last day of a yoga and diet change program, with 6 days of the intervention between assessments. The assessments were: body mass index (BMI), waist and hip circumferences, mid-arm circumference, body composition, hand grip strength, postural stability, serum lipid profile and fasting serum leptin levels. Participants practiced yoga for 5 hours every day and had a low fat, high fiber, vegetarian diet. Last and first day data were compared using a t-test for paired data. Following the 6-day residential program, participants showed a decrease in BMI (1.6 percent), waist and hip circumferences, fat-free mass, total cholesterol (7.7 percent decrease), high density lipoprotein (HDL) cholesterol (8.7 percent decrease), fasting serum leptin levels (44.2 percent decrease) and an increase in postural stability and hand grip strength ($p<0.05$, all comparisons). They concluded that 6-day yoga and diet change program decreased the BMI and the fat-free mass. Total cholesterol also decreased due to reduced HDL levels. This suggests that a brief, intensive yoga program with a change in diet can pose certain risks. Benefits seen were better postural stability, grip strength (though a 'practice effect' was not ruled out), reduced waist and hip circumferences and a decrease in serum leptin levels. **Carei TR et al. (2010)** did a pilot project designed to assess the effect of individualized yoga treatment on eating disorder outcomes among adolescents receiving outpatient care for diagnosed eating disorders. A total of 50 girls and 4 boys aged 11-21 years were randomized to an 8-week trial of standard care vs. individualized yoga plus standard care. Of these, 27 were randomized to standard care and 26 to yoga plus standard care (attrition: n = 4). They found that the yoga group demonstrated greater decreases in eating disorder symptoms. Specifically, the EDE scores decreased over time in the Yoga group, whereas the No Yoga group showed some initial decline but then returned to baseline EDE levels at week 12. Food preoccupation was measured before and after each yoga session, and decreased significantly after all sessions. Both groups maintained current BMI levels and decreased in anxiety and depression over time. They concluded that individualized yoga treatment decreased EDE scores at 12 weeks, and significantly reduced food preoccupation immediately after yoga sessions. Yoga treatment did not have a negative effect on BMI. Results suggest that individualized yoga therapy holds promise as adjunctive therapy to standard care. **Gajewska E et. al. (2015)** worked on 121 children aged 10-16 years, including 60 girls and 61 boys. All of the children lived in rural areas. The investigated group was divided according to age and sex; body height and weight were measured and body mass index (BMI) calculated. All children performed the Cooper's run test and

the Ruffier's test. The analysis of BMI for the nutritional status of children in relation to the entire study group demonstrated that 81 children had normal weight, 20 children were overweight and 11 were obese, while 9 children were underweight. The studied group of children showed on average very good and good performance in the Cooper's test, regardless of body weight, whereas the results of the Ruffier's test showed merely weak or medium cardiorespiratory endurance, which was even worse in overweight or obese children.

Aim Of The Study

The main aim of the study was to find out the effect of eight weeks conditioning training on BMI of college students.

III. Methodology

Subject: Fifty male students who are pursuing B.P.Ed. course from Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur were randomly selected as subject for this study. The male subject's age ranged between 17-23 years. All the subjects were residents of the hostel and regular participated in all activity classes of their course.

Experimental Design

Pretest measurement was taken before the initial day of participation in conditioning and post test measurement was taken after completion of eight weeks of conditioning.

Training Protocol

The subjects were participating in one hour conditioning for 6 days in a week for eight weeks and maintaining the following schedule:

Days	Training	Time
Monday	Weight training	6:00 A.M. to 7:00 P.M.
Tuesday	Interval Training	6:00 A.M. to 7:00 P.M.
Wednesday	Pressure training	6:00 A.M. to 7:00 P.M.
Thursday	Pilate training	6:00 A.M. to 7:00 P.M.
Friday	Circuit training	6:00 A.M. to 7:00 P.M.
Saturday	Cross country running	6:00 A.M. to 7:00 P.M.

Veriables Measured

Standing Height:

Test: Standing height measurement. **Purpose**: To measure the height in standing position. **Facilities and equipments**: In measuring height, the only equipment and facilities are a flat surface against which the subject stands, against anthropometric rod campus. **Procedure:** The subjects standing without shoes with the back against a anthropometric rod campus. The chin is trucked in slightly and the head is held erect. The thread of rod campus is used to form a right angle to the rod campus is pressed firmly on to the subject' head. Care should be taken so that the upper surface is horizontal and not tilted and also this pressure does not the subject to slump or alter his position. Finally, the subjects bends his knees slightly when he steps away so as not to disturb the angle before the height is recorded from the rod campus. The reading from the rod campus was taken in centimeters. **Instruction**: 1. The subjects should be stand erectly with the rod campus. 2. The thread of rod campus should be placed firmly on the head of the subject. **Scoring**: Average of three trails was final score in centimeters. **Testing personal:** For conducting this test the researcher and an assistant was required for recording the score.

Body Weight:

Test: Body weight measurement. **Purpose**: To measure body weight. **Facilities and equipments**: Standard weighting machine. (SALTER Model no. 920, www.salterhousewares.com. Pvt. Ltd., H.O. 3/17; Asaf Ali Road, New Delhi). **Procedure**: The subjects wearing with shorts only giving both feet (bare) on the weighting machine and stand erect and also without any jerk. The digital score which had shown on the machine was recorded in Kg. **Instructions**: 1. Weighing machine should be placed on a non slippery floor. 2. Before the measurement should check the score on the machine has shown zero or not. **Scoring**: Average of three trails was the final score in kilogram. **Testing personnel**: The researcher and one recorder were involved for conducting the measurement. (Kansal, 1996)

Body Mass Index:

Body mass index is a statistical measurement which is derived by using body weight in Kg. and square of standing height in meters ratio. **Test**: Body Mass Index Calculation. **Purpose**: To derive Body Mass Index.

Facilities and equipments: Body weight in Kg. and standing height in meter data and a calculator. **Procedure**: Body Mass Index is derived mathematically by using the following formula. (Kansal, 1996) **Body Mass Index** =(Standing height in Mt.)2/Body weight in Kg. **Instructions**: 1. Mathematical calculation should be done two or more times for accurate result. 2. After two digit of point approximately may be taken for calculation. **Scoring**: Calculation had done three times and after satisfying it was recorded. **Testing Personnel**: Researcher had done this calculation by using science calculator.

Statistical Analysis:
In order to find out the significant effects of conditioning programme on BMI, paired sample t- test was applied through SPSS version-20 and MS Excel 2007. And the level of significance was set at 0.05.

IV. Result And Findings

Table no. 1: Mean and standard deviation of age and height of the students:

Variables	Number of subject	Mean	S.D.	S.E.
Age in years	50	20.82	1.513	0.195
Height in meters	50	1.6727	0.06812	0.00879

Table No 1 shows the mean and standard deviation of age and height of the students (N=50) as measured at the beginning of the fitness training. Mean age of the students was 20.82± 1.51 years and height measured in meters was 1.67± 0.06.

Table No -2: Paired samples body weight of the students:

Variables	Mean	N	S.D	Df	't'	p-value
Weight (pre test)	71.6603	50	5.35824	59	10.307**	0.000
Weight(Post test)	67.8353	50	4.27065			

** Significant at 0.05 level

Table no-2 indicates that significant difference was found between the mean scores of pre and post test in relation of BMI as the t- value was found 10.30 which greater than the required value at 0.05 level of significance.

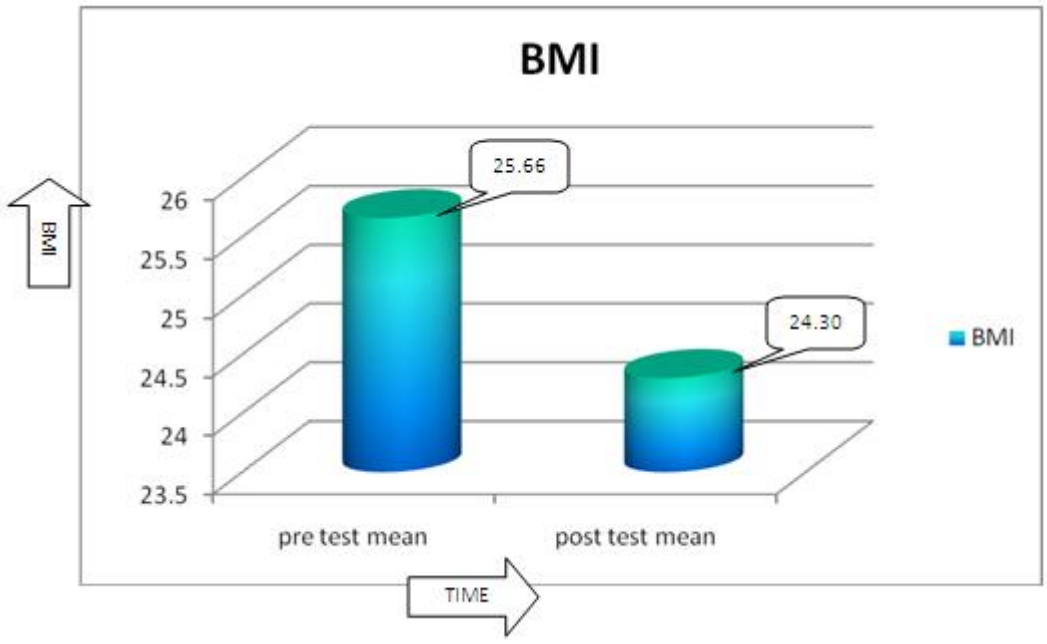
Table No 3: Paired 't' test of BMI of students:

Variables	N	Mean	SD	df	't' value	p-value
BMI Pre	50	25.66	2.07	59	10.48*	0.000
BMI Post	50	24.30	1.76			

*significant at 0.05 level.

Table no-3 indicates that significant difference was found between the mean scores of pre and post test in relation of BMI as the t- value was found 10.48 which greater than the required value at 0.05 level of significance.

Figure: Pre test and post test mean of BMI



The result of descriptive statistics in pre and post mean shows significant improvement in the BMI and reduction of body weight of students. Similar result in a study by Shirley Telles et al. (2010), significant reduction in BMI of a single group of 47 persons was observed on the first and last day of a yoga and diet change program. Shirley Telles et al. (2014) study to compare the effect of 90 minutes/day of supervision yoga and walking on body composition in 68 overweight and obese persons. Both yoga and walking groups showed a significant decrease in BMI and other variables.

V. Conclusion:

We may concluded that the eight weeks of conditioning training was sufficient enough to reduce the body weight of the subjects and due to this weight loss significant decrease in the BMI of the students has occurred. Thus conditioning may be utilized to decrease of obesity. .

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