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Research Article

Effect of Body Mass Index on physical fitness of human being

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■ **ABSTRACT**

Physical fitness is the basis of dynamic and creative intellectual activity. The intelligence and skill can only function at the peak of their capacity when the body is healthy and strong, the study was taken with the objective to analyze the effect of BMI on physical fitness of college going students. With the assistance and help of the experts in the field of physical fitness and BMI factors package was evolved.To obtain physical fitness components score and BMI, AAHPERED Youth Fitness test components like; flexed-leg sit-ups to measure abdominal strength and endurance, fixed- arms hang to measure arm and shoulder strength, shuttle run to measure speed and agility, 50-yards dash to measure speed, standing broad jump to measure legs explosive power and height and weight to measure BMI were organized.Physical activity at 11 years had no effect on the BMI trajectories, in females. More active females at 16 years gained BMI more slowly than others, by 0.007 kg/m2/year per activity category over the period 16–45 years. Consistent with these analyses, change in activity was associated with change in BMI in females, e.g. females active at 16 and 42 years gained less BMI than inactive females (2.1 vs 2.5 kg/m2/10 years). Results for males were inconsistent over the time periods examined.

■ **Key Words :** Physical fitness, Body mass index

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Physical fitness is the basis of dynamic and creative intellectual activity. The intelligence and skill can only function at the peak of their capacity when the body is healthy and strong (Lahti-Koski *et al.,*2002). In the present situation there is need for the students to measure and analyze their physical fitness and body mass index (BMI) for their own benefit and improvement.

Hence, the study was taken with the objective to analyze the effect of BMI on physical fitness of college going students. With the assistance and help of the experts in the field of physical fitness and BMI factors package was evolved. With rates of obesity continuing to rise rapidly in adults and children worldwide, a recent report emphasized 'the need for prevention as the only feasible solution for developed and undeveloped countries alike'. Adulthood is a target period for prevention for several reasons, (i) Obesity tends to track, so, that fatter children are more likely to become fatter adults, (ii) Evidence is accumulating that children, like adults, suffer from adverse health consequences relating to their obesity, (iii) Treatment of obesity is difficult, with limited effectiveness. In addition, lifestyle factors with the potential to influence obesity, such as physical activity and diet, generally show moderate tracking over time, and it has been argued that healthy lifestyle habits should be encouraged in children, rather than allowing unhealthy habits to become established, which may require change later.

Based on indirect evidence of transport use, and sedentary activities such as television viewing, it is argued that physical activity is a primary factor underlying the current high rates of obesity. Time trend data show that motorized transport use and hours spent watching television have been increasing over the last 30 years or so, providing suggestive evidence for declining activity levels. Walking and cycling have decreased in all age groups, with the greatest falls being in college-age children. In children aged 14 years or less, walking and cycling fell by 20 and 26 per cent, respectively, in

the while arguments on the role of decreasing physical activity are persuasive, conclusive evidence for a causal link between physical inactivity and obesity is lacking, partly because there are few prospective studies with relevant data to address this issue. Even with relevant prospective data, the direction of association is not always clear-cut, as suggested by our study of cross-sectional relationships between physical activity and body mass index (BMI). BMI increase with increasing activity, whereas in childhood and adulthood, BMI increased with decreasing activity. Changing selection effects across the life course probably explain this phenomenon: This makes investigating longitudinal relationships between physical activity and BMI particularly complex. The aim of this study was to investigate whether adolescent physical activity influences subsequent changes in BMI through to mid-adulthood life. Specifically, physical activity of sixty eight females were examined who were randomly selected from academic college students of Sheth Shree S.T.Javeri Arts Collage, Gadh, affiliated to Hemchandracharya North Gujarat University and Gadh village.

■ METHODOLOGY

Study population :

The present study examined the relationship between effect of BMI on physical fitness of college students. In this study sixty eight females were randomly selected from academic college students of Sheth Shree S.T. Javeri Arts Collage, Gadh, affiliated to Hemchandracharya North Gujarat University and Gadh village. The general health condition of the students were found to be 'Normal'. To obtain physical fitness, components score and BMI, AAHPERED Youth Fitness test components like; fixed-leg sit-ups to measure abdominal strength and endurance, flexed- arms hang to measure arm and shoulder strength, shuttle run to measure speed and agility, 50-yards dash to measure speed, standing broad jump to measure legs explosive power and height and weight to measure BMI were organized. The obtained physical fitness components and BMI score were analyzed.

Body Mass Index (B.M.I.):

BMI is a single number which expresses a relationship between height, body surface area, and body weight. The BMI is very useful because it correlates very closely to your body fat percentage which is much more difficult to measure. This simple BMI tool will calculate your BMI and tell you your "weight status" according."

BMI (kg/m^2) was calculated from heights and weights. At 11 and 16 years, heights (to the nearest inch) and weights (in underclothes, to the nearest pound) were measured by trained medical personnel. At 23 years, self-reports of weight and height were obtained. At 33 and 45 years, weight was measured with indoor clothing, without shoes, to the nearest 0.1 kg, and height was measured to the nearest centimeter at 33 years and to the nearest millimeter at 45 years. Data have been checked to detect measurement and data entry errors. BMI values for women who were pregnant at 33 years (n = 256), were excluded.

Physical activity :

Physical activity frequency was assessed by taking fitness test of student Youth Fitness test components like; flexed-leg sit-ups to measure abdominal strength and endurance, flexed- arms hang to measure arm and shoulder strength, shuttle run to measure speed and agility, 50-yards dash to measure speed, standing broad jump to measure legs explosive power and height and weight to measure BMI were organized. All participants were found to be normal general health condition.

Students who play outdoor game and other physical activity from their childhood were more physically fit than others.

Potential confounding factors :

The influence of several previously identified potential confounding factors was considered.

Pubertal stage was assessed by doctors at 11 and 16 years. Measures used in this study (based on previous work) include: for girls, breast development at 11 years was assessed on a scale of 5 (1 = pre-adolescent, 5 = mature) and age at menarche reported at 16 years; for boys, axillary hair at 16 years was assessed as absent, sparse, intermediate, or adult, and age of voice breaking reported at 16 years.

Television viewing was assessed by questionnaire, at 11, 16, and 23 years. At 11 and 16 years cohort members reported how often they watched television as often, sometimes, or never/hardly ever. Few children reported watching television never or hardly ever (2–6%) and, therefore, the sometimes and never/hardly ever categories were combined. At 11 years 'often' was defined as nearly every day, but at 16 years 'often' was undefined. At 23 years, cohort members reported how often they watched television in six categories ranging from '5 times per week or more', to 'not at all in the last 4 weeks'. In this paper we used two categories; $\leq$ 5 times per week and $\leq$ 4 times per week.

Statistical analysis :

Statistical analysis were performed using spas programme measure height and weight of all student to find out BMI than physical fitness score then find out mean, standard deviation (S.D.) and correlation coefficient. Repeated main analysis (i) with physical activity as a categorical variable (ii) after transferring BMI using analyses gave similar results to those presented here.

■ OBSERVATIONS AND DISCUSSION

Correlation coefficient of height and weight, flexed-leg sit-ups and shuttle run, flexed-leg sit-ups and 50 yard dash, fixed-leg sit-ups and standing broad jump, flexed-leg sit-ups and physical fitness score, flexed-arm hang and shuttle run are significant at the 0.005 level.

Correlation coefficient of height and BMI, weight and BMI, fixed-arm hang and 50 yard dash, fixed-arm hang and physical fitness score, shuttle run and 50 yard dash, shuttle run and standing broad jump, shuttle run and physical fitness score, 50 yard cash and standing broad jump, 50 yard dash and physical fitness score, standing broad jump and physical fitness score are significant at the 0.001 level.

BMI increased with age, and was higher in females than males at 16 years, but higher in males from 23 years onwards (Table 1). Males were more active than females at 11, 16, and 23 years, whereas activity was similar at 33 and 42 years (Table 2). Physical activity had a low to moderate correlation between successive time-points, with coefficients between 0.1 and 0.2.

Table 1 : Mean BMI by age and gender

Age	Males			Females		
	Mean	S.D.	Number	Mean	S.D.	Number
BMI at 16 years	20.24	2.72	5698	21.00	2.96	5342
BMI at 23 years	23.10	2.90	6134	22.12	3.25	6145
BMI at 33 years	25.62	3.99	5496	24.60	4.89	5424
BMI at 45 years	27.80	4.24	4590	26.96	5.53	4626

Table 2 : Distribution of leisure activity by age

Age	Activity category [a]	Males(%)	Females(%)
11 years	Activity level 4	19	13
	Activity level 3	27	26
	Activity level 2	27	29
	Activity level 1	27	32
	Total number	7708	7298
16 years	Activity level 4	23	14
	Activity level 3	16	13
	Activity level 2	19	19
	Activity level 1	41	54
	Total number	6114	5863
23 years	≥3 times a week	21	8
	Once or twice a week	21	14
	1-3 times in last 4 week	17	14
	Not at all in last 4 week	41	64
	Total number	6253	6266
33 years	4-7 days a week	24	27
	2-3 days a week	23	19
	Once a week	21	23
	2-3 times per month or less	32	31
	Total number	5572	5770
42 years	4-7 days a week	25	28
	2-3 days a week	22	21
	Once a week	20	17
	2-3 times per month or less	34	35
	Total number	5599	5772

Physical activity at 11 years had no effect on BMI, at age 33 years (intercept), and no effect on the slope of the BMI trajectory, either from 16 to 45 years or from 23 to 45 years in males or females. Between 16 and 45 years, more active females gained BMI more slowly than less active females, by 0.007 kg/m^2/year per activity category, while more active males gained BMI faster than less active males, by 0.005 kg/m^2/year per activity category. This effect of activity at 16 years in females was similar in a model where the outcome was a BMI trajectory between 23 and 45 years.

The obtained physical fitness components and BMI score were analyzed by using SPSS programme and find out the mean, standard deviation and correlation coefficient.

Key message :

- There was no significant correlation among BMI and percentile score of physical fitness component.
- There were significant correlations among BMI, height and weight.
- There were significant correlations among percentile score of physical fitness component.

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