Research Article

Physical Activity and Eating Habits: The Major Elements to BMI among Indian Undergrads

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ABSTRACT

The purpose of the study is to examine the relationship between BMI, Social support, Physical activity and Eating habits among adolescent. The design was Descriptive Correlational Research Design. The study samples were the adolescent students of selected undergraduate colleges. Tools administered were BMI scoring process, Social support assessment scale: (Fetzer Institute-2006), Physical Activity Questionnaires (University of Saskatchewan.) & Eating habits questionnaires (Dana fibre institute). The analysis showed that there is a significant negative relationship between Physical activity and eating habits among adolescent (r = -0.013 and Positive co-relationship between Eating habits and BMI (r = 0.024), at 0.05 level of significance. There was no statistical significance between BMI with Age, Gender, Social support and physical activity but BMI with Socioeconomic status and eating habits is extremely statistically significant. BMI and Physical activity in case of adolescent are negatively correlated, whereas BMI and eating habits are also found as significantly correlated and there is no such significant relationship between BMI and social support.

Keywords: Social Support; Body mass index; Exercise; Feeding behaviour; Adolescent; Adolescence; Youth.

INTRODUCTION

Obesity is one of the most dangerous and crucial public health concern of 21st century. The rate of obesity rose apparently during last decade and became epidemic worldwide. The rate of obesity has heightened at an alarming rate, especially in urban setting. The obesity and its related issues drives a biggest chunk of healthcare cost. The impact of overweight and obesity on health have been widely debated but many research findings suggested it is single most independent risk factors of lifestyle diseases like hypertension, diabetes, cardiovascular diseases and notably increase the chance of premature death and disability. Some USA based studies indicated that, incessant rise in obesity may reduce the life expectancy in future.[1] Many middle and low income countries are confronting with a devastating state of double burden, a hefty load of communicable disease and under nutrition with a rapid boom of obesity, with its companion co- morbidities - diabetes, heart disease, hypertension, stroke etc. The increasing rate of non-communicable disease, exceptionally in developing countries like India, crush to already overstretched health care services. Obesity has become a phenomenon globally, paradoxically hit hard on all age groups, irrespective of socio-economic status and ethnicity.[2] Since 1980 obesity rates have doubled in children and get tripled among adolescents. The world's overweight and obese population increased from 857 million to 2.1 billion in between the year 1980 to 2013. The USA crowned the list with a biggest chunk of obese population, i.e. 13 percent worldwide, at the same time China and India together counted for 15 percent of obesity with 46 million and 36 million respectively in the year 2013.[2,3]

According to WHO (2014), more than 1.9 billion adults, 18 years and older were overweight and 600 million were obese. In the year 2014 adults aged 18 years and over were 39% overweight and 13% were obese globally.[4]India constitutes of world's largest youth population, i.e. 356 million 10-24 years old and country's growth and development depends on them and needs a full phase focus on their holistic development. In India adolescent obesity and overweight are emerging as a crucial health issues due to prosperity as a result of urbanization, modernization and economic betterment.[5] Some studies suggested that today's adolescent's diet habit and diet are far-away from the suggested one. Even though the healthy food is important, their regular food intake doesn't fulfill the daily requirement as per recommendation.[5, 6] A N Onyiriuka et.al in 2013conducted a study on, Weight status and eating habits of adolescent Nigerian urban secondary school girls. They have taken2097 samples and the result revealed that the breakfast was the most frequently skipped (46.3%) and dinner the least frequently skipped (21.5%) meal. The two leading reasons cited by participants for skipping breakfast were lack of appetite and time. Only 15.2% of the participants reported daily consumption of fruits and vegetables and more than half of the participants (60.2%) ate fast food at least once a week, with more than three-quarters of them (76.4%) consuming fast food along with soft drinks, with the prevalence of both overweight (24.5% v. 13.2%) and obesity (2.5% v. 1.1%) They concluded that meal skipping was associated with an

increased prevalence of overweight and obesity among adolescent schoolgirls.[7]

Scanty physical activity is a leading risk factor for lifestyle diseases like diabetes, cancer and cardio-vascular diseases, as well. Insufficient physical activity has become 1 of the 10 leading risk factors of death.[6] According to WHO, 80% of adolescents are not enough physically active worldwide. Department of Health and Human Services (HHS)-2014, suggested that adults should do at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Children and adolescents should do 60 minutes (1 hour) or more of physical activity daily.[8] Despite of all the recent research report on the health benefits of physical activity, 2 million people are dying annually as a result of physical inactivity and its related complications. Jin-HoYoon, Wi-Young did a study in 2013, that is, to find the association between leisure-time physical activity and hypertension status in Korean adults. They took men (586) and women (1135), who visited a public health promotion center for a medical checkup in Seoul from 2010 to 2011.They found that, by multivariate logistic regression analyses for physical activity intensity and frequency according to hypertension status, that the prevalence of hypertension was 46.2% in men and 29.0% in women. The odds ratios, at 95% confidence interval, for having hypertension and performing physical activity, compared to having hypertension and not performing physical activity were not significant in both sexes regardless of frequency and intensity, except for moderate PA three times per week in women.[9]

EA Mitchell, R Beasley, B Björkstén conducted a study, in the year 2013 on the association between BMI, Vigorous Physical Activity and Television Viewing and the Risk of Symptoms of Asthma, Rhino conjunctivitis and Eczema in Children and Adolescents**.** They found that there was a dose–effect relationship seen with the risk of asthma symptoms and eczema in patients who were obese or overweight compared with those children who were underweight. This finding was not seen for rhino conjunctivitis. Vigorous physical activity correlated with symptoms of asthma, rhino conjunctivitis, and eczema in adolescents but not in young children. Viewing ≥5 hours of television a day was associated with an increased risk of symptoms of asthma, rhino conjunctivitis, and eczema in adolescents. In the 6- to 7-year-old group, television watching for ≥5 hours daily was associated with increased asthma symptomstoo.[10]

Annette Rauner and Fiip Mess conducted a systematic review in the year 2013 on the relationship between physical activity, physical fitness and overweight in adolescents among the studies published in or after 2000. They found that there were no significant differences between body weight groups in objectively (F=0.08; p>0.05) or subjectively (F=0.03; p>0.05) measured total physical activity analyzed by gender. However, moderate physical activity significantly differed between boys and girls (F=4.25; p≤0.001). The results for over fat (measured via skin fold thickness) and normal fat boys and girls were comparable. Objectively (F= 0.47; p>0.05) and subjectively (F=2.13; p>0.05) measured total physical activity, light physical activity (F= 0.18; p>0.05) and moderate physical activity (F=1.4; p>0.05) did not differ significantly between overeating and normal fat boys and girls.[11]

Not only in adults but also in children and adolescents, obesity increases the risk for several health disorders. In turn, many factors including genetic variations and environmental influences (e.g. physical activity) increase the risk of obesity. For instance, 25 to 40 %of people inherit a predisposition for a high body mass index (BMI)**.**[12]

METHODS

Design and Sample

The study was conducted as a descriptive, cross sectional, correlational design, to examine the relationship between the physical activity, eating habits and social support on BMI, through stratified random sampling method of 390 adolescent boys and girls from a selected college in Dhenkanal district, Odisha. Prior to data collection, Written permission was obtained from Principal of P.B.M College, Mahabir Road, explanation was given regarding purpose of the study, confidentiality and anonymity was ensured, informed consent was obtained from adolescent boys and girls and freedom to withdraw from the study anytime was ensured.

In the present study the investigator had divided the entire population to strata or subgroups that is, Science, Arts and Commerce. And then randomly selected the samples from different strata by Systematic random sampling technique. Researcher was interested to find the relationship between BMI and Social Support, Physical activity and eating habits among adolescents and to compare the BMI within the group of Science, Arts and Commerce of P.B.M College, Odisha.

Inclusion criteria were (i) Girls and boys in adolescent age group. (ii) Adolescent interested to participate in this study. (iii) Adolescent who can understand Odia or English. The researcher tried to reach respective classrooms and systematically selected 135 students each from science and arts class and 120 students from the commerce class. Selected students were requested to reach the physical training centre for measuring the height and weight, followed by attending the questionnaires provided. There was 0% attrition.

Tools utilised in the study were tape measure and weighing machine for height and weight measurement, and the BMI was calculated by the standard method and standardized scoring (underweight = <18.5, normal =

18.6-25, overweight = >25). Social support was assessed by social support assessment scale, which was a 12 item rating scale, with the subscales of appraisal support, belonging support and tangible support. A subjective assessment physical activity questionnaire by the University of Saskatchewan, determines the level of physical activity each student. Yet another tool, the eating habits questionnaire by Dana Farber institute, for assessing the eating habits was also used among the adolescents.

Analytic strategy: The researchers used descriptive analysis to describe the samples. Frequency and percentage was utilized to describe the level of physical activity, social support, eating habits and BMI among the adolescents. Researchers calculated Pearson's correlation to identify the relationship between physical activity, eating habits and social support with BMI. Two-way ANOVA was done to find the association between BMI and education stream, BMI and social support, BMI and physical activity, BMI and eating habits. Independent z-tests were done to compare BMI in between science, arts and commerce groups.

RESULTS

Description of study samples according to socio demographic variables by using frequency (f) and percentages (%).

Table 1: Sample characteristics (n=390)

Sl no.	Item	Frequency	Percentage (%)
1.	Age in years:		
	16-18	141	36.2
	18-21	249	63.8
2.	Gender		
	Male	179	45.9
	Female	211	54.1
3.	Height in centimetres:		
	130-150	64	16.4
	150-170	280	71.8
	170-182	46	11.8
4.	Weight in kilograms:		
	40-45	155	39.7
	45-50	47	12.1
	50-55	97	24.9
	55-60	62	15.9
	>60	29	7.4
5.	BMI		
	Underweight	143	36.7
	Normal	225	57.7
	Overweight	22	5.6
6.	Education stream:		
	Science	135	34.6
	Arts	135	34.6
	Commerce	120	30.8
7.	Socio economic status		
	Lower income group	207	53.1
	Middle income group	132	33.8
	Higher income group	51	13.1

Table 1 reveals that the majority of the participants (63.8%) were in the age group of 18-21 years and male (45.9%) and female (54.1%) were almost same. Huge majority of the participants (71.8%) were in the height range of 150-170cms, and most of the participants (39.7%) were weighing between 40-45kgs. As of which, it is also seen that the majority group (57.7%) were having healthy BMI. Science, arts and commerce group students were almost the same number by the sampling technique. It is also seen that half of the participants (53.1%) were in lower socioeconomic group.

Percentage (%) distribution of study samples according to Social support

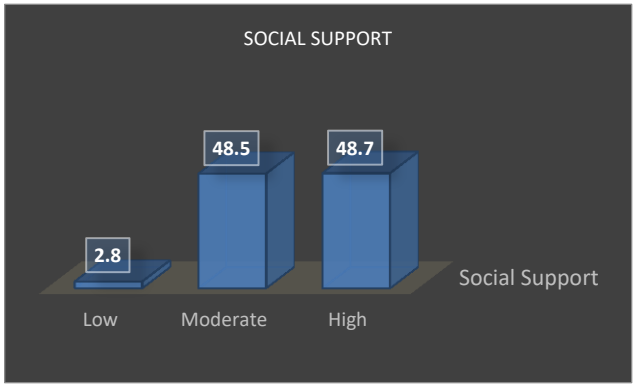

Figure 1: column diagram showing social support percentage distribution of study samples

(n=390)

Figure 1 reveals that the almost all of the participants are divided between moderate (48.5%) and high (48.7%) social support, with just few (2.8%) participants with low social support.

Percentage (%) distribution of study samples according to physical activity

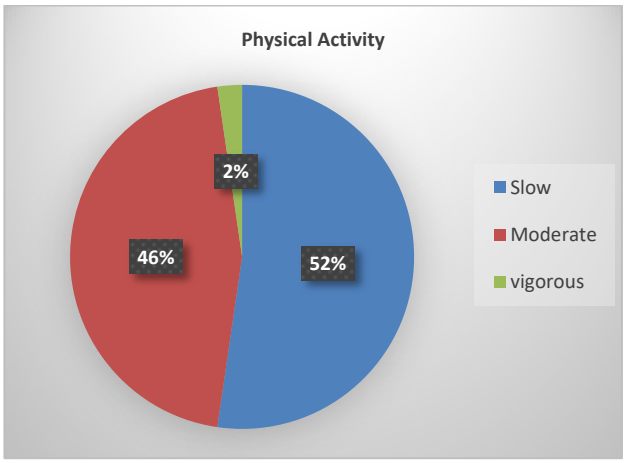

Figure 2: Pie graph showing physical activity percentage distribution of study samples

Figure 2 shows that majority of participants (52.3%) were engaged in slow physical activity, and most of the participants (46.4%) were into moderate physical activity and adolescents and young adult university students were rarely (2.3%) a part of vigorous physical activity.

Percentage (%) distribution of study samples according to eating habits

Figure 3 shows that the majority of the participants (66.4%) only have fair eating habits, and few participants (32.1%) have good eating habits, and merely (1.5%) a few participants were claiming to be having excellent eating habits.

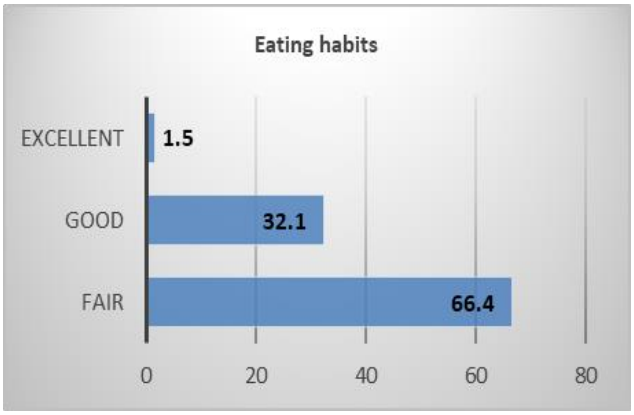

Figure 3: Pie graph showing eating habits percentage distribution of study samples

Co-relation between BMI, social support, dietary habits and physical activity

Table 2: Showing the relationship between BMI, social support, dietary habits and physical activity (n=390)

Sl. No.	Common Item	Variable item	r value	df	p-value	Inference
1	BMI	Physical activity	-0.13	288	0.026*	Significant negative correlation
2		Eating habits	0.24		0.0001 *	Significant Positive correlation
3		Social Support	0.044		0.455	No significant correlation

(*p≤0.005 is significant)

The finding of this table no.2, indicates that there is significant negative relationship between Physical activity and BMI among adolescent as the value of r is -0.13 and p value at 0.026. It means if the Physical activity will increase then BMI will decrease.

Whereas, it also indicates that there is significant positive relationship between eating habits and BMI among adolescent as the value of r is -0.24 and p value at 0.0001. It means if the eating habits will increase then BMI will also increase.

Finally, it indicates that there is no significant relationship between social support and BMI among adolescent as the value of r is -0.044 and p value at 0.455. It means if the social support will have no effect on BMI.

Table 3: ANOVA table showing association between BMI within the Educational stream, Science, Arts and Commerce. (n=390)

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6274.667	2	3137.333	10.30135	0.011473*	5.143253
Within Groups	1827.333	6	304.5556			
Total	8102	8				

*p≤0.05 is significant

Comparison of BMI within different streams

The ANOVA analysis, in table 3, shows that there is significant association between BMI within the Educational stream as the p-value is (0.011473) and which is less than 0.05 significance level. It indicates that the change in educational stream has, surprisingly, an effect on BMI. Other parameters like social support, dietary habits and physical activity were also tested for Anova, with BMI and found to be statistically insignificant.

Comparison of BMI within physical activity

Comparison of Body Mass Index between Science, Arts and Commerce

Table 4: showing the difference between different streams with regard to BMI (n=390)

BMI	MEAN	Z-Value	INFERENCE
Science & Arts	20.22	4.26*	Statistically significant
Arts & Commerce	20.19	3.98*	Statistically significant
Science & Commerce	19.46	0.13	Statistically not significant.

(*p≤0.05 is significant)

The analysis, in table 4, shows that the difference of BMI between Science and Arts, as calculated Z-values (4.26) which is greater than the tabulated P value so there is a statistically significant difference in BMI. Difference between Arts and commerce in calculated Z- value (3.986) is greater than the tabulated P-value so there is a statistically significant difference as well and difference between Science and Commerce calculated Z-value is 0.13, which is less than the tabulated p value so there are no statistical significant difference .

DISCUSSION

Extreme care has been taken to strengthen the internal validity of the methodology, yet the generalisability is limited to the fact that the participants were selected from a single district.

There is a negative co-relation between BMI with Physical activity as the r value is (-0.11315). It means that if the Physical activity will increase then BMI will be decreased. There is a positive co-relation between BMI with eating habits. as the r value is (0.024155). Contradicting, the above findings, a study was conducted by C Cruz, S Sequeira, H. Gomes. et. al on 2011, Relationship between physical fitness, physical activity and body mass index of adolescents. They found that difference in Physical Activity participation levels was significant between boys and girls (p=0.005). Almost all students were considered fit based on BMI (84% boys, 79% girls) and no differences were found between genders (p=0.531). Although the most active boys and girls performed better on PF test, a relationship between PF and PA was not found (boys p=0.069, girls p=0.079). For both genders, students with lower BMI had better results on the PF test, however only for the boys the results were significant (p=0.009). Additionally, there was no relationship between the practice of Physical Activity and BMI for boys (p=0.883) and girls (p=149). There are no relationships between Physical Fitness, Physical Activity and BMI.[13]

Steven Allender, Peter Kremer, Andrea de Silva-Sani Gorski, Kathleen Lacy, Lynne Millar, Louise Mathews conducted a study in the year of 2011 on “Associations between activity-related behaviour’s and standardized BMI among Australian adolescents" They are taken 3040 samples with mean age of 14.66 among them 44% are girls of Australian adolescent. They noted that Males were more likely to be active during the school day than females and had higher median hours of screen time per school day. Physical activity during the school day was associated with higher standardized BMI (BMI-z) among males. Higher levels of activity after school were associated with lower BMI-z for males and females. For both males and females, the odds of overweight or obese were higher among the least active.[14]

Analysis of association between BMI selected variable

shows that there is statistically significant relationship of BMI with socio economic status and Eating habits as Chi-square calculated value is (83.03 and 12.07) which is more than tabulated value(p=0.05) to support this findings similar study was conducted byNurSynhadaZofiranet.als-2011Conducted a Study on "The relationship between eating behaviours, body image and BMI status among adolescence age 13 to 17 years in Meru, Klang, Malaysia" They found that for relationship between eating behaviour and BMI status. Only snacking and convenience as well as emotional eating is associated with BMI status. While for relationship between eating behaviour and body image only body image perception was found to be associated with emotional eating. For relationship between body image perception was found to be associated with BMI status, Male adolescents were prone to be affected by body image. Gender did not have an affected on BMI status.[15]

Analysis of difference of BMI within the Educational stream i.e Science, Arts and Commerce shows that there is significant association between BMI within the Educational stream as the p-value is (0.011473) and which is less than 0.05 significance level to supper. So the present study findings describe that by improving physical activity BMI will be Decreased.

CONCLUSION

This particular study, which is dealing with the relationship between BMI, Social Support, Physical activity and Eating habits brought out several significant aspects. BMI and Physical activity in case of adolescent are negatively correlated, whereas BMI and eating habits are found as positively correlated and there is no significant relationship between BMI and social support. In this study BMI, Social Support, Physical activity and Eating habits are found to be not significantly associated within itself. The study able to put the light on the fact that physical activity will decrease the BMI, and unlikely the improved eating habits, will increase the BMI.

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