Research Article

BMI Effect on Academic Performance of School-Going Students in Jhajjar, Haryana – A Correlational Study

Aruna Shastri[1], Kusum[2], Sathish Rajamani[3]

[1]Department of Neotatology, Dr Baba Saheb Ambedkar Hospital, Rohini, New Delhi India, [2]Department of Cardiology Pt. B.D Sharma University Hospital – Rohtak, Haryana, India, [3]Department of Psychiatric Nursing, DRIEMS School and College of Nursing, Cuttack, Odisha, India

Abstract

The present study was selected with the aim to assess body mass index (BMI) and academic performance among school-going children and to find correlation between them. A non-experimental correlational study was conducted among school-going adolescents of 6th–10th class in three different private schools of district Jhajjar. Non-probability convenient sampling technique was adopted for the study. The sample size was 430. Data were collected using survey method. Descriptive and inferential statistics were used to analyze the data with the help of SPSS. Among all study samples 131 had BMI <16 (very severely underweight), 66 had BMI 16.0–16.9 (severely underweight), 67 had BMI 17–18.4 (Underweight), and 166 had normal BMI (18.5–24.9). The mean, median, and standard deviation of BMI were 17.72, 17.3, and 2.8, respectively. Forty-five students had excellent performance (>90%), 208 had good performance (>75–90), 128 had average performance (>60–75%), 46 had below average performance (>45–60%), and three had poor academic performance (<45%). The mean, median, and standard deviation score of academic performance were 59, 70, 60, and 9.5, respectively. A significant positive correlation (r = 0.142) was found between BMI and academic performance at $P < 0.05$. The study concluded that majority of the students had normal BMI and maximum had good academic performance which showed that if the child is healthy and having normal BMI; then, academic performance can be better.

Keywords: BMI, academic performance, school-going children

Introduction

Among school-going children's in India childhood obesity is steadily increasing in relation with the changing lifestyle patterns. Several reasons were found regarding this, which are increasing hours of inactivity due to online games, television, and computers.[1] Obesity or being overweight have been implicated as factors in poor academic performance for elementary and high school-aged students. Several studies have implicated early childhood and adolescent obesity or being overweight, in poor performance in school.[2]

As per the WHO statistics, the prevalence of obesity among children in the age group of 5–19 years has increased from 4% in 1975–8% in 2016, which is much higher than a 3-time increase.[3] A growing prevalence of obesity from 5.5% to 17% has been reported by many Indian studies.[4] Most of the research studies in India have focused on the children in metropolitan cities and very few studies are conducted in other cities which are also under the influence of lifestyle changes related to the economic and nutritional transition. Earlier studies conducted in Mysuru reported a prevalence of 4% of obesity and 8% overweight among school children.[5]

There is a growing evidence that obesity is associated with impaired cognitive function including executive function, attention, and memory not only in patients with co-morbid medical conditions such as cerebrovascular pathology, hypertension, and diabetes but also in healthy subjects.[6] The nutritional status of children will be having

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Address for Correspondence:
Sathish Rajamani, DRIEMS School and College of Nursing, Cuttack, Odisha, India. E-mail: sathishrajamani@driems.ac.in

impacts on improving the quality of human resources. Chronic malnutrition or stunting is closely linked to getting lower in academic achievement school.[7] Nutritional problems also have an impact on child development. Nutrition is one of important factor in contributing to the quality of education achievements.[8]

The previous studies conducted in different areas have shown that under nutrition is common among school-age children; it was reported in the form of stunting range from 11 to 48.7% and underweight from 7.2% to 59.7%.[9] A study conducted in Eastern Ethiopia reported that the prevalence of stunting was 8.9%, of which 2% had severe stunted among school-aged children.[10] Although evidence about the prevalence of malnutrition is well studied in India, there is insufficient evidence regarding nutritional status allied with academic performance among school-age children. Hence, the researcher decided to take this study to assess the effect of body mass index (BMI) on academic performance of school-going children.

Statement of the problem

A study was to assess the Effect of BMI on Academic Performance among School-going Students in Jhajjar, Haryana.

Objectives

The objectives of this study were as follows:

1. To assess BMI of the school-going children
2. To assess the academic performance of the school-going children
3. To determine correlation between BMI and academic performance of the school-going children.

Methodology

A cross-sectional descriptive study that includes students from the secondary schools located in Jhajjar District Haryana was taken to conduct the study. Data collection was conducted between August 2021 and October 2021. Formal Permission was taken from the selected school authorities to obtain data regarding weight, height, and the percentage of marks obtained during first internal assessment examination which was held during 1st week of August 2021. We included secondary school students who range in age from 11 to 14 years who were willing to participate in the study. We excluded any students with any chronic medical illness, existing psychiatric disorders, and any students with learning disabilities.

The study included a total of 430 male and female students from three different private schools. Samples were selected based on their willingness to take participate in this study. Non-probability convenient sampling technique was used. The personal information was collected through an interview and self-reported questionnaire. This questionnaire was tested in one school before the data collection phase to check for errors, ambiguities, and redundancies. The researchers sat with the respondents, explained the rationale of the study and the process, and took consent from them verbally. They handed over the questionnaire to be completed immediately. The respondents were given adequate time to fill in the questionnaire and the researchers were available to answer any related questions. Collected data were analyzed using the Statistical Package for the Social Sciences (IBM Corp., Armonk, NY, USA) version 20).

Results

The baseline characteristics of the study samples were represented in the following table.

From the Table 1, we can found that majority of the samples 219 (50.93%) were in age between 11 and 14 years. With

Table 1: Frequency and percentage distribution of samples according to sociodemographic variables (*n*=430)

S. No	Sociodemographic variables	Frequency	Percentage
1.	Age (years)		
	a. Less than 11 years	69	16.04
	b. 11–14 years	219	50.93
	c. More than 14 years	142	33.02
2.	Gender		
	a. Male	249	57.90
	b. Female	181	42.10
3.	Monthly Income of Family (Rs)		
	a. <than 10000	50	11.62
	b. 10001–20000	231	53.72
	c. 20001–30000	73	16.97
	d. >than 30001	76	17.69
4.	Mother's Education		
	a. Up to 8th	125	29.06
	b. 8th–12th	269	62.55
	c. Higher education	36	8.37
5.	Father's Education		
	a. Up to 8th	33	7.67
	b. 8th–12th	333	77.44
	c. Higher education	64	14.88
6.	Father's Occupation		
	a. Private job	346	80.46
	b. Government job	84	19.54
7.	BMI		
	a. <16 very Severely Underweight	131	30.46
	b. 16.0–16.9 Severely Underweight	66	15.34
	c. 17.0–18.4 Underweight	67	15.58
	d. 18.5–24.9 Normal	166	38.60
8.	Class		
	a. 6th	87	20.24
	b. 7th	98	22.79
	c. 8th	79	18.37
	d. 9th	83	19.30
	e. 10th	83	19.30
9.	Academic Performance		
	a. Excellent	44	10.23
	b. Good	209	48.60
	c. Average	128	29.76
	d. Above average	46	10.69
	e. Poor	3	0.69

regard to gender, majority 249 (57.90%) are male. Monthly income of the family depicts, majority of the samples 231 (53.72%) were having an income between Rs. 10,001 and Rs. 20,000. Mother's education of the samples shows that majority 269 (62.55%) were studied 8th–12th standard. Father's education of the sample displays that majority 333 (77.44%) were studied between 8th and 12th standard. With regard to the father's occupation, majority of the subject's 346 (80.46%) were doing private job. BMI shows that majority 166 (38.60%) had 18.5–24.9 normal BMI. Academic performances of the subject's in the study revealed that majority 209 (48.60 %) had good academic performance.

Table 2 illustrates that the sample's weight mean and standard deviation scores were 38.89 + 7.511 and the mean % was 7.511 with the variance level as 56.411. Samples height mean and standard deviation scores were 148.26 + 12.996 and the mean % was 24.8 with the variance level 168.888. The mean and standard deviation scores of BMI were 17.72 + 2.810. Mean % score was 182.88. The variance score was 7.895.

Table 3 depicts the level of academic performances of the samples, majority of the samples 206 (48.6%) were having good academic performance, and 128 (29.76%) were having average performances in academic.

Table 4 describes the level of correlation between BMI and academic performance of the samples. In this study, it was found that there was a moderately positive correlation (r = 0.71).

Table 2: Descriptive statistics of the weight, height, and BMI of the samples (*n*=430)

Variables	Mean	Mean %	SD	Variance
Weight	38.89	73	7.511	56.417
Height	148.26	24.8	12.996	168.888
BMI	17.72	182.88	2.810	7.895

Table 3: Frequency and percentage distribution of samples according to level of academic performance (*n*=430)

S. No	Level of academic performance	Frequency	Percentage
1	Excellent	43	10.0
2	Good	206	47.9
3	Average	128	29.7
4	Above Average	46	10.6
5	Poor	7	1.8

Discussion

The results of the present study were not found to be similar with the past studies.

Almarshad and Bhilal (2020) done a study with to determine whether BMI as a single influencing factor has any impact on college student academic performance. Five hundred and forty (214 females, 326 males) university-level undergraduate medical students from the region of India and Saudi Arabia were studied for 1 year. Their BMI was calculated and compared with academic aggregate marks. Results of this study revealed that the majority of the students had normal BMI. On comparing grades of underweight, overweight, and obese students with normal weight students, we found that there was no significant difference in their academic performance ($P = 0.899$). Gender-wise comparison also showed an insignificant relationship between BMI and academic performance (females $P = 0.539$, males $P = 0.622$).[11]

In a study, which was similar to the aim of the present study, Alhazmi *et al*. (2021) studied the BMI and its association with academic performance of female undergraduates studying in King Khalid University, results revealed that majority of respondents 53.6% were within the normal BMI category.[12] The above findings were similar to the study findings of Steiniger, Laura (1997) This study examined the relationship between BMI and academic achievement in third-grade white females. The results of the investigation indicated no statistically significant differences in classroom grades between groups of "normal-weight" students and a group of obese students. However, teachers predicted less school success for obese girls and the highest degree of school success for the thinnest girls. Study results show that there were weak negative correlations among BMI ($r = –0.14$, $P < 0.05$), total screen time ($r = –0.12$, $P < 0.05$), and academic scores.[9]

Study findings revealed that a total of 14 schools included 424 students. 24.5% were either overweight or obese. The mean age was 15.44 year, 74.8% of the students were male, 53.8% were high school students, and 83.7% attended public schools. The mean overall GPA was 82.44% and the mean GPA for science subjects was 70.91%. No statically significant difference in the BMI was found between those who achieved >90% of the overall grade compared with those who achieved <90%.[13] Douglas and Shingairai (2013) study was to determine if a relationship exists between physical activity or BMI and academic performance in college-age students. Results of the study revealed that students in the normal BMI category had significantly higher GPA and ACT scores than students in the overweight category.[14]

Table 4: Level of correlation between body mass index and academic performance

Variables	Mean	Standard Deviation	Karl Pearson Correlation Co-efficient Value	Level of Correlation
Body Mass Index	17.72	2.810	0.71	Moderately Positive Correlation
Academic Performances	74.5	11.909		

Conclusion

The study results conclude that there was a moderate positive relationship between BMI and academic performances of the school students in the selected schools of Jhajjar district, Haryana. It appears that either being or becoming overweight/obese have some kind of impact academic achievement for these children. This research recommends the future researcher's to study detail on the various factors in addition to basal metabolic rate and its impact on the academic performances.

Conflicts of Interest

Nil

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