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Research Article

**ASSESSMENT OF ASSOCIATION BETWEEN BMI, PHYSICAL
ACTIVITY AND ACADEMIC PERFORMANCE AMONG
STUDENTS OF GMC**¹Dr Fatima Farooq, ¹Dr Nimra Fazal, ²Dr Umer Fateh¹Chaudhry Muhammad Akram Teaching and Research Hospital, Raiwind Road Lahore, ²House Officer, Sir Gangaram Hospital Lahore.**Article Received:** October 2019 **Accepted:** November 2019 **Published:** December 2019**Abstract:**

Background: Physical activity as well as BMI has a great influence on academic performance. Increased BMI has negative impact on academic performance while physical activity has positive impact on academic performance.

Objective: To study association between BMI, physical activity and academic performance.

Methods: Descriptive cross sectional study was conducted at Gujranwala Medical College, Gujranwala from 1st May to 30th July, 2016. A sample of 85 students was taken by stratified random sampling. Students were interviewed through a pretested semi structured questionnaire.

Results: 64(75.2%) students were found to have normal BMI. 9(10.6%) were underweight, 11(12.9%) were overweight, while 1(1.17%) were obese. 48(56.4%) exercised weekly for 50-100 minutes. Diet of 49 (57.6%) students contained high carbohydrates. Higher academic performance was associated with regular breakfast, higher consumption of fruits and greater physical activity. Out of 64 students having normal BMI, 16(25%) acquired grade A while 48 (39.06%) acquired grade B. whereas, among 11 overweight, only 3(3.5%) had grade A. Hence it is justified that BMI and academic performance are negatively associated.

Conclusion: Increased BMI and low physical activity had negative impact on academic performance.

Keywords: BMI, Physical activity, Academic performance.

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INTRODUCTION:

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m²). 1 There is an evidence of a negative relationship between body weight and the academic performance of young adults and that physical activity enhances academic performance. Regular physical activity is a preventive measure to decrease the risk of obesity. Exercise has been shown to enhance learning and cognition. 2, 3 It has been hypothesized that physical activity could enhance academic performance by increasing cerebral blood flow, enhancing arousal level, changing hormone secretion and improving self-esteem. 4 22 Along with researching the benefits of physical activity on academic success, studies have concurrently examined the relationship between weight status, as measured by body mass index (BMI), and academic achievement. BMI was found to have an inverse relationship with academic performance. 3 For adults, a body mass index (BMI) of 25 or more is considered "overweight" and a BMI of 30 or more is considered "obese". 5 Being overweight or obese is the result of consuming too many calories and not expending enough calories. 6 An elevated body-mass index is more prevalent in students from the high income families than those from the low income group and it is more prevalent in the affluent urban dwellers. 8, 9

The increase in obesity has paralleled the increase in consumption of soft drinks. Research indicates that it affects cognition and therefore academic achievement. 7 Besides less physical activity, altered dietary behavior toward more frequent breakfast skipping, constant eating, and high calorie snacks and less fixed meal times seems to enhance the problem. Portion sizes consisting mainly of high-energy-dense foods instead of water-containing foods such as fruits and vegetables have increased over the past decades among medical students. 10, 11 The energy density of foods decreases with increasing water content, since water adds weight and not energy. Energy intake is associated with larger portion sizes and has been shown to increase the risk of excess body weight. Also daily food intake and energy density of foods have been linked to body mass index (BMI). 10

There is overwhelming evidence that physical activity and exercise favorably affect weight control and overall health in all age groups. 12 There are many educators and researchers who believe that physical activity has positive impacts on the brain, learning and academic success. It helps control

weight, reduce fat, build lean muscle, and assists academic performance by activating the brain. When the brain is activated during physical activity, existing brain cells are rejuvenated and new ones are stimulated. 13 Studies on medical students suggests that being overweight is a problem among this population group, resulting in poor academic performances. 11, 14 However, exercise and fitness training at a gym, doing housework and taking part in activities like gardening, swimming, cycling, active participation in sports can help improve or maintain physical fitness among students. 15, 11 It can improve their academic performance. 15.

LITERATURE REVIEW:

There are number of researches that suggest a strong relationship between physical activity, academic performance and BMI. We studied several articles which previously studied relationship between BMI, physical activity and academic performance. 5th Korean Youth Risk Web based (KYRBWS-V) was conducted in 2009 in order to evaluate the relationship between obesity and academic performance. KYRBWS-V was conducted by CDC (center for disease control). This was a cross-sectional study and data obtained from 135 strata. The students were asked to indicate their height and weight on KYRBWS-V from which BMI was calculated. The relationship of BMI and academic performance was found to be positive. Both overweight boys and girls had greater odd of poor academic performance as compared to boys and girls with normal weight. 16 Third National Health and Nutrition Examination survey was conducted to find association between BMI, cognitive function and academic performance. The academic performance and cognitive function was assessed by Wechsler Intelligence scale for children (WISR) and wide range achievement test (WRAT-R). Age and gender adjusted trends between BMI and academic performance was estimated by linear regression. Results showed that Z-Test scores decreased as percentile of BMI increased. 17 Edward JU studied the relationship of nutrition, physical activity, behavior and fitness measures to academic performance and results were matched to standardized scores. Measures of academic progress (MAP). MAP and association were determined by multi-regression analysis. It indicated 11.1% of variation in the MAP scores and 6,7% MAP could be accounted by selected Nutrition and Physical Activity behavior (NUT/PA), fitness meal and gender. 18

An article was published in Silver Spring journal by a survey conducted by Australian School Health and Fitness Survey. 109 schools were selected from

which samples were taken. Subjects were required to estimate number of times, average length of time and intensity of both outdoor and indoor efforts, and these efforts were compared with scholastic performance. Subjects with higher scholastic rating were more physically active and fit. 19 A survey on nutritional status of women was conducted in 6 villages of India in Pune of Maharashtra. Summary and descriptive statistics were produced to compare BMI of men and women in each category of social economic and food related variables. It was also found that higher educational status on the part of women was associated with higher BMI in men but not in women themselves. 20 A cross-sectional study was conducted in Tehran to study the effect of BMI on academic performance. 69 middle school male students between the ages of 12 to 14 in 2009–2010 were studied. BMI was considered as the obesity index. The students' Grade Point Average (GPA) along with their scores in Mathematics, Geometry, Calculus and English, and absent rate was obtained as academic performance. The GPA score, math and geometry scores were lower in overweight students in comparison with control group. 21 A research published was published to find relationship between physical activity, achievement and academic performance. BMI was calculated from height and weight. The physical activity performance was assessed using the International Physical Questionnaire and academic performance was assessed by their grade point average (GPA). The clustering demonstrated that students with higher energy expenditure and better physical fitness exhibited lower body mass index (BMI) and higher academic performance and vice versa. 22

OBJECTIVES:

- To study the association between BMI and academic performance.
- To study the association between physical activity and academic performance.

METHODOLOGY:

STUDY DESIGN:

Descriptive Cross-Sectional Study.

SITE OF STUDY:

Research was conducted at Gujranwala Medical College, Gujranwala. There are five classes from first year to final year in it. Each class has 100 students. Among them 70-75% are hostilities and 20-30% are day scholars.

STUDY DURATION:

Research was completed in duration of about three months, from 1st May to 30th July, 2016.

INCLUSION CRITERIA:

- Students from all classes i.e. from 1st year to

Final year of Gujranwala Medical College, Gujranwala

EXCLUSION CRITERIA:

- Students who were not willing
- Students who were suffering from illness

SAMPLE SIZE:

- 85 students out of population of 500.
- Sample size was calculated through Openepi. Size given was 72. But we enhanced it to 85. Among them number of boys and girls to be sampled was calculated through proportionate sampling technique.

CALCULATION:

Number of students/class = 100

Number of students to be taken as sample/class = $85/100 = 17$

By application of Proportionate Sampling Technique:-

- **For First Year:**
 - Boys: $23 \times 7/100 = 4$
 - Girls: $77 \times 17/100 = 13$
- **For Second Year:**
 - Boys: $27 \times 17/100 = 5$
 - Girls: $73 \times 17/100 = 12$
- **For Third Year:**
 - Boys: $26 \times 17/100 = 4$
 - Girls: $74 \times 17/100 = 13$
- **For Fourth Year:**
 - Boys: $17 \times 17/100 = 3$
 - Girls: $83 \times 17/100 = 14$
- **For Final Year:**
 - Boys: $26 \times 17/100 = 4$
 - Girls: $74 \times 17/100 = 13$

SAMPLING TECHNIQUE:

- Stratified Random Sampling technique was used.
- Five classes were considered as five strata and the pre-calculated number of boys and girls from each class was selected through lottery method.

DATA COLLECTION TOOL:

A pre tested semi-structured questionnaire was used for data collection (annexure 1). Data were recorded through google response forms. It comprised of 4 parts:

- 1st part: Bio-data.
- 2nd part: Assessment of BMI.
- 3rd part: Assessment of Physical activity.
- 4th part: Assessment of Academic Performance. (Annexure 2 contains Grading criteria used for assessment of Academic Performance)

DATA ANALYSIS:

Data was analyzed on SPSS VERSION 20. We made

cross tables between various variables to assess their association and then applied Chi-Square Test to

check the significance of results. Bar charts were also made for better presentation of findings.

RESULTS:

Table 1: Association between Exercise and BMI

Weekly Exercise (In minutes)	BMI				Total
	<18.5 (Underweight)	18.5-24.9 (Normal)	>25 (Overweight)	≥30 (Obese)	
50-100	8	48	7	0	63
100-150	1	13	2	1	17
150-200	0	3	2	0	5
Total	9	64	11	1	85

Findings:

- Exercise duration of maximum number of students i.e. 63 was 50-100 minutes per week. Among them 48 had normal weight.
- Exercise duration of 17 students was 100-150 minutes per week. Among them 13 had normal weight.

- Only 5 students exercised 150-200 minutes per week. Among them 3 had normal weight.
- We applied chi square test. Value obtained was 8.32 at degree of freedom 6. P value was 0.215. Since it was greater than 0.05 so the association was statistically insignificant.

Table 2: Association between BMI and Academic Performance

BMI	Professional Grades			Total
	Grade A (>80%)	Grade B (65-79%)	Grade C (55-64%)	
<18.5 (Underweight)	3	5	1	9
18.5-24.9 (Normal)	14	48	2	64
>25 (Overweight)	1	8	2	11
≥30 (Obese)	0	0	1	1
Total	18	61	6	85

Findings:

- Among 9 students who were underweight, 5 acquired grade B while 3 secured grade A.
- Among 64 students who had normal BMI, 48 achieved grade B while 14 got grade A.
- Among 11 students who were overweight, 8 acquired grade B while only 1 secured grade A.

- Only 1 student was obese and he got grade C. Chi-square test was applied. The value obtained was 8.53 at degree of freedom 6. P value was 0.005. Since it was less than 0.05, so association was statistically significant.

Table 3: Association between time spent on exercise and Academic Performance

Weekly Exercise Minutes	Percentage of Professionals			Total
	Grade A (>80%)	Grade B (65-79%)	Grade C (55-64%)	
050-100	16	43	4	63
100-150	2	14	1	17
150-200	0	4	1	5
Total	18	61	6	85

Findings:

- Maximum number of students i.e. 63 had an exercise span of 50-100 minutes/week. Among them 43 acquired grade B while 16 secured grade A.
- 17 students exercised for 100-150 minutes/week. Among them 14 got grade B while 2 achieved grade A.
- Only 5 students had an exercise span of 150-200 minutes/week. Among them 4 secured grade B while none could get grade A.
- Chi-square test was applied. The value obtained was 3.98 at degree of freedom 4. P value was 0.408. Since it was greater than 0.05, so association was statistically insignificant.

Table 4: Association between Major Food Content and BMI

Major Diet Component	BMI				Total
	<18.5 (Underweight)	18.5-24.9 (Normal)	>25 (Overweight)	≥30 (Obese)	
High Carbohydrates	9	49	7	0	65
High Proteins	0	13	4	1	18
High Fats	0	2	0	0	2
Total	9	64	11	1	85

Findings:

- Maximum strength i.e. 65 students, had high carbohydrates in their diet. Among them, 49 had normal BMI.
- Among 18 students who consumed high proteins in their diet, 13 fell in the normal range of weight.
- Only 2 students consumed diet high in fats and both of them had normal weight as well.
- We applied chi-square-test and value obtained was 8.37 at degree of freedom 6. P value was 0.21. Since it was less than 0.05, so association was statistically insignificant.

Table 5: Association between Monthly Income of Parents and BMI

Monthly Income of Parents	BMI				Total
	<18.5 (Underweight)	18.5-24.9 (Normal)	>25 (Overweight)	≥30 (Obese)	
20000-30000	0	6	0	0	6
30000-50000	3	4	0	0	7
50000-1Lac	5	43	5	1	54
Above 1Lac	1	11	6	0	18
Total	9	64	11	1	85

Findings:

- Parents of 6 students had monthly income between the range of 20000-30000 and they all had normal weight.
- Parents of 7 students had monthly income in the range of 30000-50000. 4 of them had normal weight.
- Parents of 54 students had monthly income in the range of 50000-1 lac. Among them, 43 had normal weight.

- Parents of 18 students had monthly income above 1 lac. Among them 11 had normal weight.
- We applied chi square test. Value obtained was 18.05 at degree of freedom was 9. P value was 0.035. Since it was less than 0.05 so, the association was statistically significant.

Table 6: Association between Daily meals and BMI

Daily meals	BMI				Total
	<18.5 (Underweight)	18.5-24.9 (Normal)	>25 (Overweight)	≥30 (Obese)	
Once	0	2	1	0	3
Twice	1	17	3	1	22
Thrice	8	44	7	0	59
More	0	1	0	0	1
Total	9	64	11	1	85

Findings:

- Out of 3 students taking meals once a day, 2 fall in normal range and 1 was overweight.
- Among 22 students taking meals twice a day, majority i.e. 17 fell in normal range.
- Among 59 students taking meals thrice a day, majority i.e. 44 had normal weight.

- Only a single student was taking meals thrice a day and he had normal weight too.
- We applied chi-square-test and value obtained was 5.18 at degree of freedom was 9. P value was 0.76. Since it was greater than 0.05, so association was statistically insignificant.

Table 7: Association between Junk Food Consumption and BMI

Junk Food	BMI				Total
	<18.5 (Underweight)	18.5-24.9 (Normal)	>25 (Overweight)	≥30 (Obese)	
Daily	2	8	3	0	13
2-3 times a week	0	14	2	1	17
Once a week	3	20	1	0	24
Once a month	4	22	5	0	31
Total	9	64	11	1	85

Findings:

- 13 students took junk food daily. Majority out of them i.e. 8 had normal weight.
- 17 students consumed junk food 2-3 times a week. Among them, 14 had normal weight.
- 24 students took junk food once a week. Among them, 20 had normal weight.

- Maximum strength i.e. 31 students were in habit of eating junk foods once a month and among them 22 are normal.
- We applied chi square test. Value obtained was 9.76 at degree of freedom was 9. P value 0.37. Since it was greater than 0.05, so the association was statistically insignificant.

Table 8: Association between Soft drink Consumption and BMI

Soft Drink Consumption	BMI				Total
	<18.5 (Underweight)	18.5-24.9 (Normal)	>25 (Overweight)	≥30 (Obese)	
Daily	1	11	4	0	16
2-3 times a week	3	25	5	0	33
Once a week	5	28	2	1	36
Total	9	64	11	1	85

Findings:

- Out of the 16 students who took soft drinks daily, 11 had normal weight.
- Among the 33 students who were taking soft drinks 2-3 times a week, 25 had normal weight.
- Maximum strength i.e.36 students, were taking soft drinks once a week and among them 28 had normal weight.
- We applied chi chart square. Value obtained was 6.35 at degree of freedom 9. P value was 0.704. Since it was greater than 0.05 so the association was statistically insignificant.

Table 9: Association between Performance of Household Chores and BMI

Degree of Effort spent on Household Chores	BMI				Total
	<18.5 (Underweight)	18.5-24.9 (Normal)	>25 (Overweight)	>30 (Obese)	
Light Effort	6	41	5	1	53
Moderate Effort	2	21	6	0	29
Vigorous Effort	1	2	0	0	3
Total	9	64	11	1	85

Findings: In performance of household chores;

- Maximum number of students i.e. 53 spent light effort. Among them 41 had normal weight.
- 29 spent moderate effort and 21 had normal weight among them.
- Only 3 students spent vigorous effort. Out of them, 2 fell in normal range of BMI.
- Chi-square test was applied. The value obtained was 4.78 at degree of freedom 6. P value was 0.57. Since it was greater than 0.05, so association was statistically insignificant.

Table 10: Association between Performance of Household chores and Academic Performance

Time spent on household chores	Percentage of Professionals			Total
	Grade A (>85%)	Grade B (65-79%)	Grade C (55-64%)	
Light Effort	14	34	5	53
Moderate Effort	3	25	1	29
Vigorous Effort	1	2	0	3
Total	18	61	6	85

Findings:

- Among 53 students doing light effort in

- performance of household chores, 34 got grade B while grade A was achieved by 14.
- Among 29 students doing household chores with moderate effort, 25 secured grade B while 3 got grade A.
 - Among 3 students performing household chores with vigorous effort, 2 achieved grade B while grade A was achieved by only 1.
 - Chi-square test was applied. The value obtained was 4.95 at degree of freedom 4. P value was 0.292. Since it was greater than 0.05, so association was statistically insignificant.

Table 11: Frequency and Duration of Outdoor Games being played

Duration of Indoor Games in hours/day	Indoor Games		Total
	Yes	No	
0.5-1	27	0	27
1-2	15	0	15
More	7	0	7
N.A	0	36	36
Total	49	36	85

Findings:

- 23 played for 0.5 to 1 hour/day while 15 played for 1-2 hours/day. Only 2 students played outdoor games for more than 2 hours/day.
- 45 did not play any outdoor game daily.

Table 12: Frequency and Duration of Indoor Games being

Duration of Outdoor Games hours/day	Outdoor games		Total
	Yes	No	
0.5-1	23	0	23
1-2	15	0	15
More	2	0	2
N.A	0	45	45
Total	40	45	85

Findings:

- 27 students played indoor games for 0.5-1 hour/day while 15 played for 1-2 hours days/day.
- Only 7 students played for more than 2 hours daily.
- 36 students were not in habit of playing any indoor game.

Table: 13 Association between Class Test Failure and Annual Results

Number of Class Tests failed	Percentage of Professionals			Total
	Grade A (>80%)	Grade B (65-79%)	Grade C (55-64%)	
None	10	28	1	39
Once	4	19	0	23
Twice	3	9	3	15
More	1	5	2	8
Total	18	61	6	85

Findings:

- Among 39 students who did not fail any class test in the year, 28 secured grade B while 10 secured grade A in professionals.
- Out of 23 students who failed class test once in the year, 19 achieved grade B while grade A was secured by 4.
- Out of 15 students who failed in class tests twice this year, 9 got grade B while 3 got through with grade A.

- Only 8 students failed more than twice in the year. Among them 5 got grade B while only one of them could get grade A.
- Chi-square test was applied. The value obtained was 11.525 at degree of freedom 6. P value was 0.073. Since it was greater than 0.05, so association was statistically insignificant.

Table14: Association between Father's Education on Academic Performance

Father's Education Level	Percentage of Professionals			Total
	Grade A (>80%)	Grade B (65-79%)	Grade C (55-64%)	
Secondary (Level 3)	1	5	1	7
Higher Secondary (Level 4)	3	14	0	17
University Program (Level 5)	14	42	5	61
Total	18	61	6	85

Findings:

- Fathers of 7 students were educated up to secondary level. In this category, 5 students acquired grade B while 1 got grade A.
- Fathers of 17 students were educated up to higher secondary level. In this category 14, students acquired grade B while 3 got grade A.

- Fathers of 61 students were educated up to university level. In this category, 42 students acquired grade B while 14 got grade A.
- Chi-square test was applied. The value obtained was 2.51 at degree of freedom 4. P value was 0.642. Since it was greater than 0.05, so association was statistically insignificant.

Table 15: Association between Mother's Education and Academic Performance

Mother's Education Level	Percentage of Professionals			Total
	Grade A (>80%)	Grade B (65-79%)	Grade C (55-64%)	
Primary or Below Level 1)	0	1	0	1
Middle (Level 2)	1	1	0	2
Secondary (Level 3)	2	5	0	7
Higher Secondary (Level 4)	5	18	1	24
University Program (Level 5)	10	36	5	51
Total	18	61	6	85

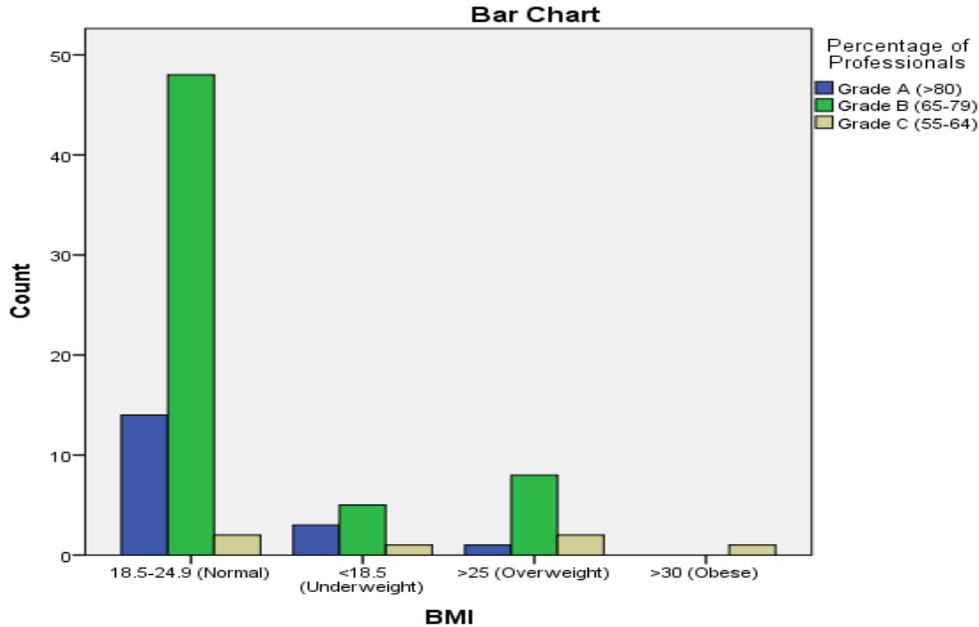
Findings:

- Mother of one student was educated up to primary level and that student acquired grade A.
- Mothers of 2 students were educated up to middle level. Among those students one got grade A while other got grade B.
- Mothers of 7 students were educated up to secondary level. Among those students 5 got grade B while 2 got grade A.
- Mothers of 24 students were educated up to higher secondary level. Among those students 18 got grade B while 5 secured grade A.

- Mothers of 7 students were educated up to secondary level. Among those students 5 acquired grade B while 2 got grade A.
- Mothers of 51 students were educated up to university level. Among those students 36 got grade B while 10 achieved grade A.
- Chi-square test was applied. The value obtained was 3.06 at degree of freedom 8. P value was 0.931. Since it was greater than 0.05, so association was statistically insignificant.

GRAPHS:

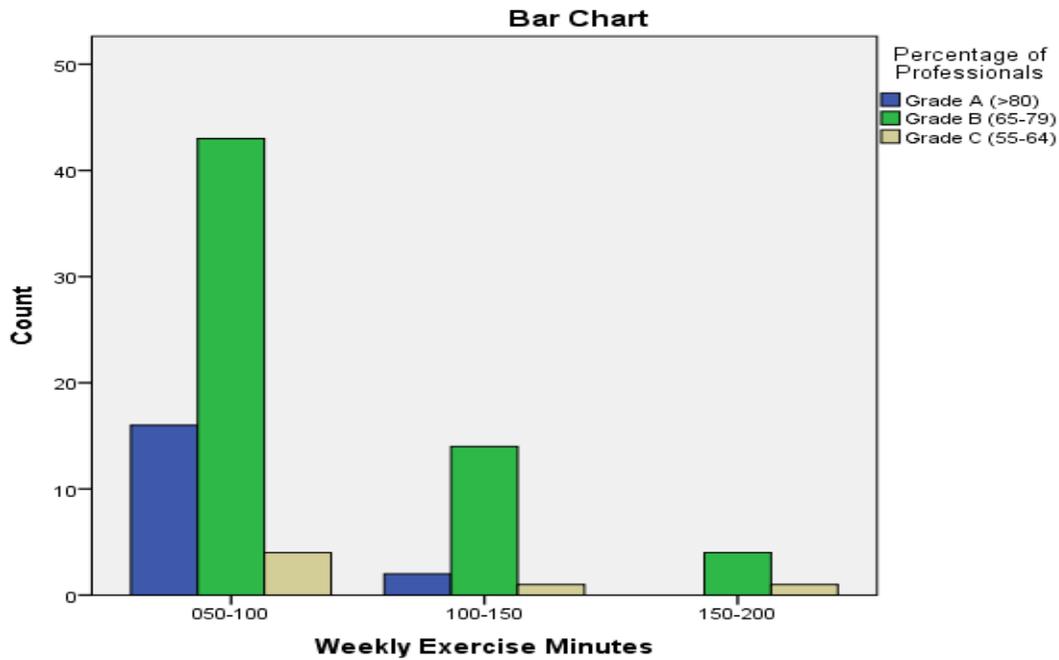
Graph 1: Association between BMI and Academic Performance



Findings;

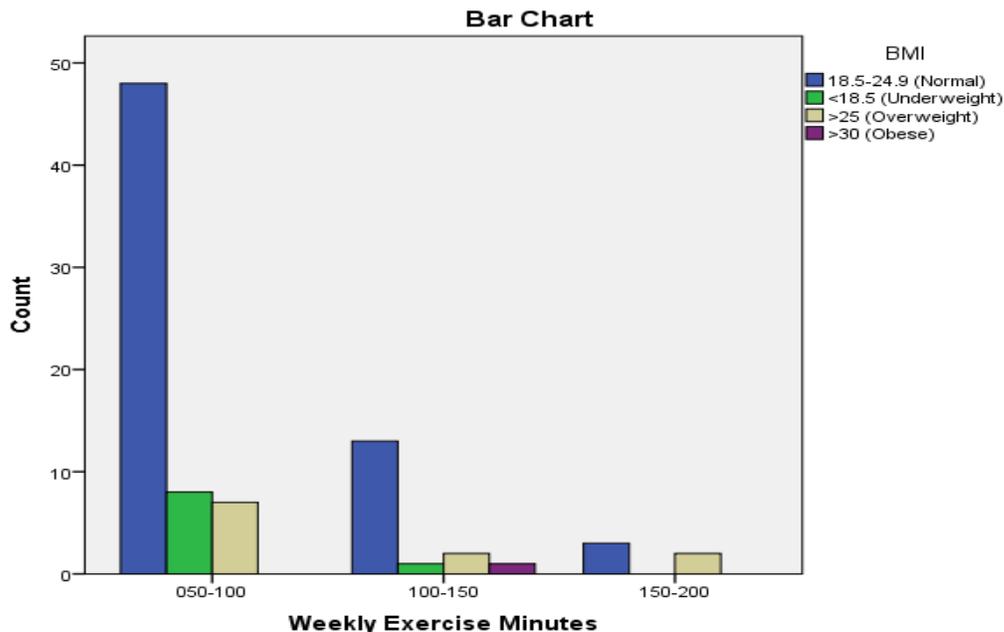
- BMI has significant negative association with Academic Performance.

Graph 2: Association between Physical activity and Academic performance



Findings:

- Exercise had insignificant association with Academic Performance.

Graph 3: Association between Physical Activity and BMI**Findings:**

- Exercise had insignificant association with BMI.

DISCUSSION:

In our study 64(75.2%) were normal according to BMI .Out of these 16 (18.4%) acquired grade A and 48(56.4%) acquired grade B. It indicated that normal BMI was associated with better academic performance. The percentage of professionals was graded according to GPA (grade point average) to compare our research with international researches.

Another research was conducted by Maitte-Pellicer-Chenoll and Xavier-garcia-Masso to find relationship between physical activity and academic performance. The findings of this research also correlated with our study that normal BMI was associated with better academic performance. 22

A research was published in journal of physical health to asses association between obesity and academic performance. The results indicated a decreased academic performance as the BMI of the students increased. These results were exactly in accordance with our study. 16

A cross-sectional study was conducted on 18-22 year old students of Azad Kashmir and New Delhi. According to this study there was no association between BMI, cognition and academic performance. This contradicted our study completely where chi square test value revealed a significant association

between BMI and academic performance (p value=0.005).

In our study 64(75.2%) normal individuals had normal BMI (in the range of 18.5-24.9).Out of these 49(57.6%) students took a high carbohydrate diet and 48 (57.6) did a weekly exercise of 50-100 minutes. A chi square test was applied to find relation between physical activity and BMI and it displayed no association between the above 2 variables. Our study is contraindicated by another study conducted to assess relationship between physical activity and academic performance for sixth graders in school of Midwest. According to this study Higher MAP scores (Measures of Academic performance) were associated with more milk and breakfast,100% fruit juice, sweetened beverages and increased physical activity and fitness.

In our study 43 students both male and female having adequate income between 50,000-1 lac showed normal BMI and as BMI increased above 1 lac there was an increase in BMI which means that both BMI and academic performance are positively associated and statistically significant (p value=0.035). A study conducted in Pune district of Maharashtra contraindicated our study. According to this study difference in thinness, women engaged in more or less household chores, having more or less economic

status showed no significant changes in BMI.

CONCLUSION:

It was concluded that increased BMI and low physical activity had a negative impact on academic performance.

14 grade A students and 48 grade B students had normal BMI and among 11 overweight, only 1 had grade A and 8 had grade B. Only one was falling in obese category and he acquired grade B. Hence it showed that increased BMI was negatively associated with academic performance and the association between them was statistically significant (p value =0.05).

Physical activity was assessed from weekly exercise duration, the participation of students in indoor and outdoor games, and time spent on household chores.

From 64 normal students, 63 students who had normal BMI, performed a weekly exercise of 50-100 minutes and 17 students performed a weekly exercise of 100-150 minutes. Chi square test was applied giving a p value of 0.48 which showed that association was insignificant.

Among 64 students having normal BMI, 53 were engaged in light, 21 in moderate and 2 in vigorous efforts which justified that increased physical activity was associated with lower BMI but the association was statistically insignificant (p value=0.57).

It was found that 18 grade A and 61 grade B students were engaged in both light and moderate effort which confirmed a positive association between increased physical activity and academic performance.

Monthly income also affected academic performance. Among 64 students, who had normal BMI, had an adequate income between 50000 and 1 lac. Increased income was associated with an increased BMI so it showed that increased income was associated with increased BMI and association was statistically significant (p value =0.035).

A chi square test was applied which gave a value of 18.533, degree of freedom 6 and a p value of 0.05 which showed that association between BMI and academic performance was significant.

Recommendations:

- Students should engage themselves in outdoor activities, games and other physical activities in order to stay healthy as well as to improve their academic performance.
- Students should take a balanced diet to maintain

their BMI within an optimal range.

- Exercise and relaxation techniques are an important part of a healthy lifestyle.

LIMITATIONS:

- Duration of study was too short.
- Sample size was too small.
- Sample was limited to only one college.
- As forms were submitted online, so exact height and weight could not be determined.

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ANNEXURE-I**ASSESSMENT OF ASSOCIATION BETWEEN BMI, PHYSICAL ACTIVITY AND ACADEMIC PERFORMANCE AMONG STUDENTS OF GMC****Questionnaire**

Serial No: _____

Age: _____

Gender: _____

Address: _____

Height in feet: _____

Weight in Kg: _____

1. How frequently do you take meals daily?

- Once
- Twice
- Thrice
- More

2. How frequently do you take junk food?

- Daily
- 2-3times/week
- Once/week
- Once/month

3. Major content of your diet comprises of:

- High Carbohydrates
- High Proteins
- High Fats

4. Monthly Income of Parents:

A: _____

5. Your time spent weekly on exercise:

- 50-100 minutes
- 100-150 minutes
- 150-200 minutes

6. Do you play indoor games? Also mention duration.

A: _____

7. Do you play outdoor games? Also mention duration.

A: _____

8. Degree of Effort spent on household chores:

- Light Effort
- Moderate Effort
- Vigorous Effort

9. Percentage of previous professionals:

A: _____

10. Have you failed any class test this year?

- None
- Once
- Twice
- More

11. Father's Education:

A: _____

12. Mother's Education:

A: _____