

## ORIGINAL ARTICLE

# Effect of Dietary Habits on Academic Performance of Medical Undergraduates: A Cross-Sectional Study

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### ABSTRACT

**Background:** Dietary choices and patterns have previously been associated with educational performance and overall academic success. However, medical students' dietary habits are seldom studied in the literature. This study aims to comprehensively assess dietary habits and their relation with academic performance among medical undergraduates. **Methods and Material:** A cross-sectional study was conducted among 110 medical undergraduates over a period of one month using a pre-tested questionnaire encompassing questions on socio-demographics, dietary habits, and marks obtained in university exams to collect data. Based on their answers, students were given a dietary habit score and were categorized into having good, moderate, or bad dietary habits. Statistical tests were used to analyse relations between survey variables like gender, accommodation, dietary habit score, and academic performance. **Results:** A high dietary habit score was related to high levels of academic performance. In contrast, a low dietary habit score was related to low levels of academic performance. (P value = 0.0351). Students having good dietary habits scored an average mark of 583/900. Students having moderate dietary habits scored an average mark of 550/900. Students having bad dietary habits scored an average mark of 520/900. **Conclusions:** Our study confirms previously conducted studies on dietary habits and academic performance that find a positive relation with regular breakfast and frequent consumption of vegetables, pulses, and fruits and a negative relation with fast food.

**Keywords** – Academic Performance, Breakfast, Dietary Habit, Fast food, Medical Students, Nutrition.

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### Introduction

Good nutrition is a well-balanced diet combined with regular physical activity. According to the World Health Organization, healthy dietary practices include balancing calories in with calories out, limiting sugar and salt, limiting fat intake with a shift from saturated to unsaturated fats, and eliminating trans-fat. <sup>[1]</sup> Dietary habits in any population indicate the general well-being and magnitude of their risks for contracting lifestyle disorders like obesity, Type – II diabetes mellitus, dyslipidemia, hypertension, and coronary heart disease; collectively forming the leading cause of mortality all over the world. <sup>[2,3]</sup> It has been observed that academic performance is significantly affected by various interdependent factors. These factors include school quality

indicators (i.e., facilities, teaching quality, allocated teaching time), family characteristics (i.e., socioeconomic status, parent's educational background, and attitudes towards education), individual characteristics (i.e., natural inclination, aptitude, motivation, and behaviour), and most importantly, individual's dietary habits. <sup>[4,5,6]</sup>

The dietary habits and nutrient composition, over a long period of time, exert beneficial or adverse effects on cognitive ability. <sup>[4,7,8]</sup> Nutrition and optimal diet are key developmental drivers of the physical, mental, and cognitive levels in students which translate into higher potential for academic success thereby empowering medical students with greater clinical

knowledge and superior skill sets. <sup>[9]</sup>Students transitioning from school to college often find it challenging to stick to healthy eating habits. They tend to skip meals, eat unhealthy snacks, dine out, and consume fast food. <sup>[10]</sup>Medical students are expected to act as role models for their peers in terms of the application of healthy eating patterns <sup>[11]</sup> although medical students possess enough knowledge about healthy dietary patterns; they appear incapable of putting this knowledge into practice. <sup>[12]</sup> This could be because medical education is one of the most challenging training programs, both, academically as well as emotionally. This stress of college life and medical studies negatively affects their dietary patterns. <sup>[13]</sup> They tend to indulge in erratic lifestyle behaviour such as unhealthy eating habits, skipping meals, inadequate intake of nutrients, irregular sleep, and physical inactivity. <sup>[14]</sup>Medical students' dietary habits are seldom studied in the literature and relatively little literature is available in our country regarding the effects of dietary habits on the

## Materials And Methods:

**Study Design:** A cross-sectional study design was used to fulfil the study objectives.

**Study area:** The study was conducted at a private medical college in central India.

**Study Participants:** One hundred ten medical undergraduates, of both genders, belonging to the age group of 20 to 23 years, including both hostellers and day scholars constituted the sample of this study.

### Inclusion Criteria:

- Medical Undergraduates only.
- Belonging to the age group of 20 to 23 years.
- Appeared for second-year university exams.
- Gave voluntary consent.

### Exclusion Criteria:

- Students suffering from any serious illness or chronic disease.
- Students following any specific dietary regimen.
- Students who denied giving consent

**Data Collection:** The study procedure was explained to the participants and consent was taken before the study. A pre-tested, self-administered questionnaire 11 encompassing questions on socio-demographics, dietary habits

academic performance of medical students. Thus this study aims for a comprehensive assessment of dietary habits and their relationship with academic performance among medical undergraduates. Our Objectives include To study the dietary habits of male and female medical undergraduates. To study the effect of dietary habits on the academic performance of medical undergraduates. To study the associated socio-demographic profile and its effect on academic performance. To suggest recommendations for improving the dietary habits of medical undergraduates and hence their academic performance.

### Key Messages:

On assessing the academic performance of students concerning their dietary habits we found that students following healthy dietary habits scored much better in their university exams compared to those who had poor dietary habits including frequent consumption of fast food.

and marks obtained in university examination was used to collect data. Information regarding dietary habits such as regularity of meals, frequency of taking breakfast, including pulses, vegetables and fruits in meals, frequency of eating outside and having fast-food was collected.

**Statistical Analysis:** Each answer was given a score of one, two, or three for bad, moderate, or good dietary practice respectively. Since there were 14 questions regarding dietary habits, the maximum dietary habit score was 42. Based on their dietary habit score, students were categorized into having well (dietary habit score greater than 28), moderate (dietary habit score between 14 to 28), or bad (dietary habit score less than 14) dietary habits. The Shapiro-Wilk test was used to examine the normality of data and it was found that dietary habit scores were not normally distributed while marks of students in exams were normally distributed. A one-way ANOVA test was used to check whether there is a statistically significant difference between the dietary habits (good/ moderate/bad) of students and their academic performance (marks obtained in university exams). P value less than 0.05 was considered statistically significant. All statistical analysis was done using R software (R-4.2.3).

## Results:

### (I) DEMOGRAPHIC CHARACTERISTICS

**Table 1: Distribution of Participants**

		Frequency (n=110)	Percentage (%)
Gender	Male	49	44.4
	Female	61	55.6
Accommodation	Day Scholar	4	3.6
	Hosteller	106	96.4
Age	21.78 ± 1.25		

Of the 110 medical students, 61 (55.60%) were female students & 49 (44.40%) were male and the majority of them were within the age group of 20 to 23 years. A total of 96.4 % of the participants

were staying in hostels and only 3.6% were day scholars. [Table 1]

(II) COMPARISON OF DIETARY HABITS WITH RESPECT TO DEMOGRAPHICS

**Table 2: Comparison of Dietary Habits Score with respect to Demographics**

		Dietary Habits Score (Median ±IQR)	P- Value
Gender	Male	26 ±10	0.043
	Female	29± 7	
Accommodation	Day Scholar	32±8	0.036
	Hosteller	28±12	
Overall		28.5 ± 9	

On comparing the dietary habits with respect to gender and modes of accommodation, there was a statistically significant difference between dietary habit scores of different genders (P=0.043) and modes of accommodation (P= 0.036) [Table 2].

(III) RELATION OF DIETARY HABIT WITH ACADEMIC PERFORMANCE

High dietary habit score was related to high levels of academic performance. In contrast, a low

dietary habit score was related to low levels of academic performance. (P = 0.0351)

- Students having good dietary habits scored an average mark of 583/900
- Students having moderate dietary habits scored an average marks of 550/900
- Students having bad dietary habits scored an average marks of 520/900

Gender wise association

**Table 3: Gender-wise Comparison of Dietary Habits with respect to Marks obtained in the exam**

	Good (Mean ±SD)	Moderate (Mean ±SD)	Bad (Mean ±SD)	P-Value
Male	560 ± 21.05	515±28.78	507± 35.95	0.0432
Female	595±16.98	576±27.61	532± 32.96	0.0015
Overall	583 ±19.50	550±26.07	520± 34.50	0.0351

There is a highly statistically significant difference between dietary habit scores and marks obtained by female students (P=0.0015). It is also statistically significant in overall students

(P=0.0351) and male students (P=0.0432) [Table 3]

Accommodation wise association

**Table 4: Accommodation-wise Comparison Dietary Habits with respect to Marks obtained in the exam**

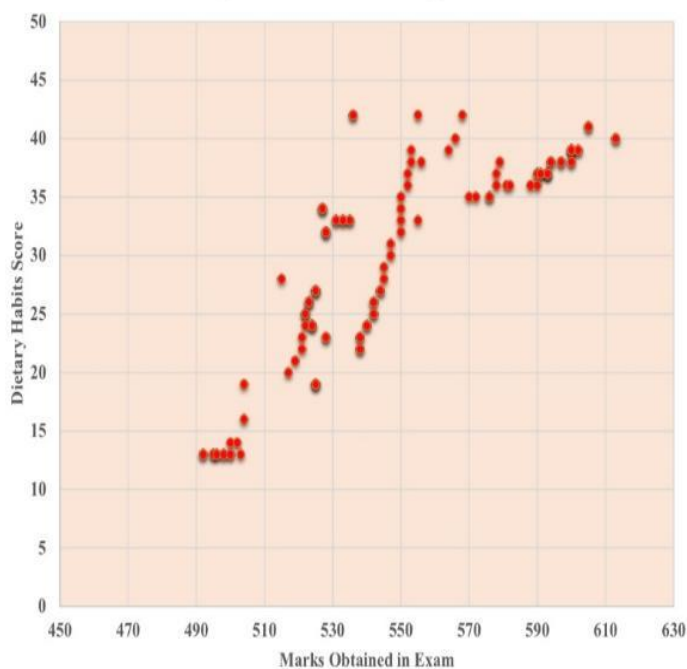
	Good (Mean ±SD)	Moderate (Mean ±SD)	Bad (Mean ±SD)	P-Value
Day Scholar	598± 20.05	571±27.80	-	0.382
Hosteller	570±16.83	535±25.70	520± 34.50	0.0415
Overall	583 ±19.50	550±26.07	520± 34.50	0.0351

The average marks obtained by day scholar students are higher than hosteller students. Also,

there is a statistically significant difference between marks obtained by students according to

their dietary habits for hosteller students ( $P=0.0415$ ) while in day scholar students there was

no statistically significant difference ( $P=0.382$ ) [Table 4]



**Figure 1:** Scatter diagram between dietary habit score and marks obtained in examinations.

## Discussion:

Nutrition is an important modifiable environmental factor that affects neurocognitive development, which in turn impacts academic performance. <sup>[15]</sup> Academic performance during higher education influences the career thus shaping an individual's socioeconomic status, health, and health-related behaviours. <sup>[16]</sup>

In our study, 110 medical students studying in 3rd year MBBS 44.30 % of which were Male and 55.69% were female, belonging to the age group of 19-25 mostly accommodated in college hostels (96.4 % hostellers and only 3.6%-day scholars), were asked questions regarding their eating habits.

### (I) COMPARISON OF DIETARY HABITS WITH RESPECT TO DEMOGRAPHIC

#### Gender

We found that female students followed a better diet (having an average dietary habit score of 29) compared to their male counterparts (average dietary habit score of 26) which is statistically significant ( $P=0.043$ ). This could be because females tend to have a greater sense of health

consciousness compared to male students. Our findings are consistent with a similar study. <sup>[17]</sup>

#### Accommodation

On comparing the dietary habits of hostellers and day scholars we found that day scholars follow a healthier dietary pattern (with an average dietary habit score of 32) compared to hostellers (average dietary habit score of 28). This could be because day scholars living under their parents' supervision at their homes tend to eat healthily. But this finding cannot be truly extrapolated because in our study day scholars form a very small proportion of students since hostel facilities are compulsory in the institute.

### (II) RELATION OF DIETARY HABIT WITH ACADEMIC PERFORMANCE

On assessing the academic performance of students with respect to their dietary habits we found that students following healthy dietary habits scored much better in their university exams compared to those who had poor dietary habits including frequent consumption of fast food.

Gender wise

We found that female students having good dietary habits scored much better than their male counterparts, in accordance with the results of few previously conducted studies.<sup>[18, 19]</sup> This could be because female students tend to be more disciplined and committed towards their studies.<sup>[20, 21]</sup>

#### Accommodation wise

We found that day scholars having healthy dietary habits scored relatively better in their university exams compared to hostellers. This could be because staying away from their families deprives students of emotional stability, parental support and control, resulting in lower academic performance. 22 Similar findings were put forward in a study conducted among Saudi Arabian university students.<sup>[14, 23]</sup>

Though our study is the one of very few studies conducted among medical undergraduates, it has certain limitations. The sample size was small and it was a cross-sectional study design, which limits establishment of a causal relationship in the observed analysis. The recall-based method used to assess dietary habits has the risk of over-or-underreporting consumption. Also, because we investigated the frequencies of food intakes, the amounts of foods consumed could not be estimated. Moreover, because we collected the data only regarding types of foods and there was no calculation of nutrients, we could not quantify the nutrient exposure of the participants. We also acknowledge that our study could not consider the possibility of other confounding factors such as psychological and motivational aspects, obesity, regular physical exercises and meditation, smoking and alcohol consumption, interpersonal relationships, and socioeconomic status which may have been significant drivers of academic performance.

#### Conclusion And Recommendations:

This study confirms previous studies of academic performance and dietary habits that find a positive association with eating breakfast and consuming vegetables, pulses, fruits and adequate water intake and a negative relation with fast food like instant noodles, soft drinks etc.

Further research is required to explain potential strategies for positive behavior change among medical undergraduates regarding eating habits. It is also essential to determine the difficulties faced

by students staying in hostels since most of them had poor dietary habits and low academic performance.

We recommend developing a nutrition education program with behavior change communication targeting medical students to promote healthy eating behaviors among them as medical students are future health-care professionals of the country and thus, it is indispensable for them to have appropriate knowledge and practices before they educate their patients.

#### Limitations:

The data comes exclusively from a single medical college located in central India, which might limit its applicability to broader contexts.

#### Conflict Of Interest:

The authors confirm no conflicts of interest associated with this paper's publication.

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