Assessment of dietary trends and its impact on academic performance among young adult medical students of a tertiary care teaching hospital

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Abstract

Background: Nutrition is one of the most important and modifiable environmental factor that may affect the neurocognitive development, which in turn has an impact on academic performance. Medical students generally tend to indulge in erratic lifestyle behaviors such as unhealthy eating habits, skipping meals, inadequate intake of nutrients, irregular sleep, and physical inactivity.

Objective: To examine the dietary habits among undergraduate medical students and to assess its impact on their academic performance

Materials and Methods: A cross-sectional medical college–based study was carried out among 289 young medical college students of both sexes in the age group of 17 to 25 years. Following ethical clearance and consent, information regarding demographic profile, dietary habits, and academic performance was collected using self-administered questionnaire.

Result: Of the 289 medical students, 42.9% were male students and 57.1% were female students and majority of them were on mixed diet. The study participants were grouped into two category as high (≥60%) and low (<60%) performers depending on their previous university examination results in percentage. The descriptive statistical analysis of possibly influencing factors such as fast food, aerated beverages, smoking, and alcohol consumption on academic performance did not differ statistically across the dichotomized samples except for the consumption of fast food ($\chi^2 = 14.632$ df = 4, $p = 0.006$). The adjusted odds ratio (aOR) showed odds of higher academic performance in participants who never consumed fast food (aOR: 6.825, confidence interval [CI]: 2.048–22.747) when compared with the ones who consumed daily.

Conclusion: Daily consumption of fast food is a risk factor for poorer academic performance. Policies and interventions aiming at promoting healthy eating habits among medical students should be incorporated by the educational institutes.

KEY WORDS: Adolescent, medical students, academic performance, diet, lifestyle

Introduction

In human life, adolescence and early adulthood together constitute a vulnerable and crucial period where major social, psychological, and biological changes occur resulting in the highest nutrient requirement.[1] The academic performance during higher education influences the career resulting in shaping an individual's socioeconomic status, health, and health-related behaviors.[2] Nutrition is one of the most important and modifiable environmental factor that may affect the neurocognitive development, which in turn has an impact on academic performance.[3] Medical students generally tend to indulge in erratic lifestyle behavior such as unhealthy eating habits, skipping meals, inadequate intake of nutrients, irregular sleep, and physical inactivity.

Relatively few literatures are available in our country regarding the impact of dietary habits on academic performance in medical students. In this study, considering the findings of previous research, we hypothesized that healthy dietary habits would be correlated with higher academic performance

and conversely high fast-food and alcohol consumption with poor academic performance among undergraduate medical students of teaching hospital of rural Mandya, India.

Materials and Methods

A cross-sectional medical institution–based study was carried out among 289 healthy undergraduate medical students of both genders in the age group of 17–25 years (165 female and 124 male students) at Adichunchanagiri Institute of Medical Sciences. A predesigned, self-administered, and reported questionnaire was used to elicit the information regarding demographic profile, dietary habits, and academic performance of previous university examination as percentage obtained. Study procedure was explained to the participants and consent was taken before the study. Information regarding dietary habits such as type of diet consumed, schedule, and frequency of fast-food intake, aerated beverages, and alcohol consumption was collected.

Data were coded numerically and transferred to a master chart (MS Excel). The primary analysis involved descriptive statistics for all the characteristics, which were represented as frequency and as percentage. The study participants were dichotomized into two groups as high (≥60%) and low performers (<60%) taking into consideration their previous university examination results. Then chi-square test for categorical variables was run and *p*-value <0.05 was considered statistically significant. A univariate logistic regression analysis was conducted to identify the correlates of academic performance and other possible influencing factors. Adjusted odds ratio (aOR) is represented with 95% confidence interval (CI) and two-tailed *p*-value of <0.05 was considered to be statistically significant. Statistical analysis was done by using the statistical software SPSS version 18.0.

Result

Of the 289 medical students, 42.9% were male and 57.1% were female participants and majority of them were within the age group of 17 to 20 years [Table 1]. There was no statistically significant difference with respect to age and sex among the study participants. A total of 95.8% of the participants were staying in hostels and only 4.2% were not staying in hostels

Table 1: Age and sex distribution of students studied

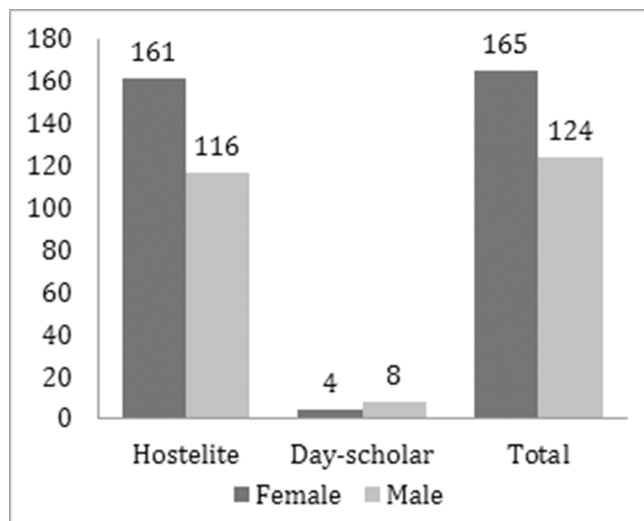| Age in years	Sex		Total
	Female	**Male**	
17–20	151 (91.5%)	93 (75%)	244 (84.4%)
21–25	14 (8.5%)	31 (25%)	45 (15.6%)
Total	165 (100%)	124 (100%)	289 (100%)

Figure 1: Mode of accommodation of participants

[Figure 1]. According to the self-reported data by the medical students on the type of diet they consumed, 74.5% and 17% showed that they were on mixed and vegetarian diet, respectively [Figure 2].

Table 2 presents the demographic data, place of stay, and type of diet consumed relative to the academic achievements among medical students. The mean age in both the categories of high and low performers was similar (19.17 ± 1.5 and 19.5 ± 1.05 years, respectively). The results showed that majority of the high performer category included female students (59.3%), hostel residents (95.2%), and on mixed type of diet (74%), but was not statistically significant.
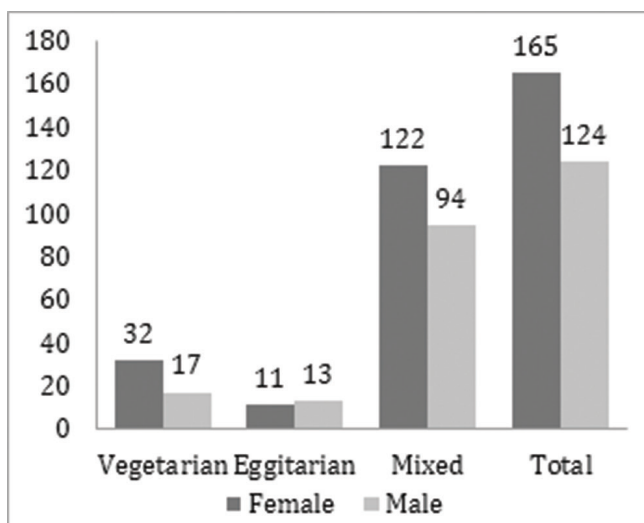

Figure 2: Type of diet consumed by the students

Table 2: Demographic profile, type of accommodation, and type of diet among high and low performers

	Age in years	Gender *N* (%)		Type of accommodation *N* (%)		Type of diet *N* (%)		
	Mean (SD)	Male	Female	Hostelite	Non-hostelite	Vegetarian	Eggitarian	Mixed
Low performers <60% *N* = 58	19.5 (1.05)	30 (51.7)	28 (48.3)	57 (98.3)	1 (1.7)	7 (12.1)	6 (10.3)	45 (77.6)
High performers ≥60% *N* = 231	19.17 (1.5)	94 (40.7)	137 (59.3)	220 (95.2)	11 (4.76)	42 (18.2)	18 (7.8)	171 (74)

SD, standard deviation.

The descriptive statistical analysis [Table 3] did not differ significantly across the dichotomized samples according to the academic performance except for the consumption of fast food. Further, we examined the association of

Table 3: Descriptive analysis of possible influencing factors of academic performance among medical undergraduate students dichotomized into high and low performers

Variables	Previous examination results		
	Less than 60%	60% and above	Total
	N (%)	*N* (%)	*N* (%)
*Fast-food consumption frequency			
Never	2 (11.8)	15 (88.2)	17 (100)
Occasionally	21 (18.4)	93 (81.6)	114 (100)
<3 times/week	18 (20.2)	71 (79.8)	89 (100)
3–5 times/week	7 (14)	43 (86)	50 (100)
Daily	10 (52.6)	9 (47.4)	19 (100)
$\chi^2 = 14.632$, df = 4, *p* = 0.006			
Aerated beverages consumption frequency			
Never	12 (16.2)	62 (83.8)	74 (100)
Occasionally	20 (18.9)	86 (81.1)	106 (100)
<3 times/week	10 (16.1)	52 (83.9)	62 (100)
3–5 times/week	9 (29)	22 (71)	31 (100)
Daily	7 (43.8)	9 (56.3)	16 (100)
$\chi^2 = 8.526$, df = 4, *p* = 0.072			
Smoking frequency			
Never	53 (19.3)	222 (80.7)	275 (100)
Occasionally	2 (25)	6 (75)	8 (100)
<3 times/week	0 (0)	1 (100)	1 (100)
3–5 times/week	1 (50)	1 (50)	2 (100)
Daily	2 (66.7)	1 (33.3)	3 (100)
$\chi^2 = 5.659$, df = 4, *p* = 0.246			
Alcohol consumption frequency			
Never	49 (18.9)	210 (81.1)	259 (100)
Occasionally	8 (29.6)	19 (70.4)	27 (100)
<3 times/week	1 (50)	1 (50)	2 (100)
3–5 times/week	0 (0)	1 (100)	1 (100)
Daily	0 (0)	0 (0)	0 (100)
$\chi^2 = 3.120$, df = 2, *p* = 0.351			

*Statistically significant.

fast-food consumption frequency and academic performance. The adjusted analysis [Table 4] showed increased odds of high academic achievement in participants who never consumed fast food compared with the ones who consumed daily (aOR: 6.825, CI: 2.048–22.747).

Discussion

Dietary trends and eating behaviour play an important role in an individual's physical, mental, and emotional well-being.[4] Medical course is a complex, ever demanding field of study, and is considered to be one of the most stressful courses among undergraduate studies.[5]

To the best of our knowledge, very few studies have examined the association between wide variety and range of dietary habits and academic performance among undergraduate medical students in India. We have examined the association between medical student's dietary habits and academic performance in the age group of 17–25 years. In this study, female students had higher academic performance than male students and thus is in accordance with the results of few previously conducted studies.[6,7] This disparity could be partly explained by the fact that female students more often display greater motivational discipline, commitment, and also they have a better time management skills.[8,9]

The quality, quantity, and also the type of diet has been shown to influence the academic performance of adolescents[10–12] and that a western diet has been identified as a risk factor for lower academic performance during adolescent.[13] Our study found that more consumption of fast food was associated with significant poorer performance in academics,

Table 4: Adjusted odds ratio (aOR) and 95% confidence interval (CI) for high academic performance in relation to fast-food consumption frequency in medical students

Frequency of fast-food consumption	aOR	CI
Never	6.825	2.048–22.747
Occasionally	4.383	1.551–12.381
<3 times/week	4.921	1.779–13.611
3–5 times/week	8.33	1.480–46.936
Daily	Reference	

which is in accordance with the results reported by Nyaradi et al.[13] The fast-food diets are not only high in saturated fats, refined sugars, and sodium, but also poor in micronutrients. Research have shown that foods rich in micronutrients such as folates[14] and iron[15] are positively associated with academic performance in children and adolescents.

Furthermore, a Norwegian study among 2,432 adolescents aged 15–17 years demonstrated that a regular meal pattern, consumption of healthy foods, and regular physical activity were all associated with increased odds of high academic performance in contrast to decreased odds of high academic achievements in adolescents consuming unhealthy foods, beverages, and smoking.[16]

Another study conducted among 16,188 American adolescents also demonstrated a significant positive relationship between the intake of sugar-sweetened beverages and low performance.[17] In addition to this, it was suggested that consuming high quantity of fruits and vegetables is positively associated with high academic performance among adolescents.[18] Further, consumption of refined carbohydrates, high fatty foods, and markers of metabolic syndrome all have been linked with alterations in cognitive functions (possibly lower academic performance) through hippocampal and frontal lobe volume loss and dysfunction. This dysfunction may be attributed to inflammation of neurons, oxidative stress leading to blood–brain barrier damage, and/or abnormal lipid metabolism in central nervous system.[19,20]

Chambel and Curral[21] showed that higher levels of academic satisfaction positively influence the student's performance. In addition, the limited knowledge and information on healthy eating habits and ignorance about the ill effects of erratic eating behavior among junior students might also influence the performance. Another study by Taranikanti et al.[22] showed higher percentage of overweight and obesity along with increased body fat percentage among medical students when compared with paramedical students and attributed this to higher intake of junk foods and lack of physical activity. Apart from fast-food consumption, this study also showed high number of students in high performer category who never smoked or consumed alcohol but this was not statistically significant. This may be due to the reason that the data collected were based on the self-reported questionnaire and also small sample size. But studies conducted among Norwegian adolescents,[16] Canadian-based study,[23] and another recent study[24] examined the relationship between smoking, alcohol, and academic performance, and concluded that adolescents who attain high levels of academic achievements are less likely to smoke and drink alcohol.

Even though our study is among the very few studies where the participants were medical students examined for wide variety and range of dietary habits and academic performance, it has a few limitations as well. The sample size was small and it was a cross-sectional study design, which limits establishment of a cause–effect relationship in the observed analysis. Although we have evaluated academic performance among medical students in relation to their dietary habits, presently it is not known whether this achievement translates into a better clinical practice and improved patient outcome. Finally, we acknowledge that our study could not consider the possibility of other confounding factors such as psychological and motivational aspects, and physical activity, which may have been significant drivers of academic performance.

Conclusion

To conclude the results are in accordance with our hypothesis, increased odds of high academic performance were shown among medical students who never consumed fast foods and thereby we have identified daily consumption of fast food as a risk factor for poorer academic performance. Further policies and interventions aiming to promote healthy eating behaviors among medical students should be incorporated by the management as health science students will become future health-care professionals and thus, it is vital for them to have appropriate knowledge and practices before they educate their patients.

Acknowledgment

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