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DIETARY ADHERENCE AND NUTRIENT DEFICIENCY SYMPTOMS AMONG MEDICAL AND ALLIED HEALTH STUDENTS: A CROSS-SECTIONAL STUDY

Nutrition

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ABSTRACT

Background: Poor nutrition is a significant contributor to non-communicable disease burden globally. Medical and allied health students, despite their clinical training, remain vulnerable to suboptimal dietary patterns owing to academic demands, irregular schedules, and lifestyle transitions. **Objectives:** To assess adherence to a balanced diet, evaluate Body Mass Index (BMI) distribution, identify common micronutrient deficiency symptoms, and examine the association between dietary adherence and nutrient deficiency indicators among students of medical, dental, pharmacy, and nursing colleges.**Methods:** A cross-sectional study was conducted at institutions of Yenepoya (Deemed to be University), Mangalore, India (Ethics approval: YEC2/2025/047). A total of 337 students were recruited by stratified random sampling. Data were collected using a validated structured self-administered questionnaire comprising three sections: (a) demographic details, (b) a semi-quantitative Food Frequency Questionnaire (FFQ) with 39 food items scored on a Likert scale to calculate a dietary adherence score, and (c) self-reported symptom-based nutrient deficiency assessment. Anthropometric measurements were recorded and BMI was calculated. Data were analysed using descriptive statistics and multinomial logistic regression (significance threshold: $p < 0.05$).**Results:** Majority of participants were female (75.7%) and undergraduate students (89.3%). Approximately half of both sexes were of normal weight, but 39.5% of males and 33.7% of females were overweight. Most students (58.2%) skipped breakfast more than three times per week. Fruit and vegetable consumption was inadequate. Junk food items such as bakery products, chocolates, and fried foods were consumed 2–4 times per week by a substantial proportion. Multinomial logistic regression revealed significant associations between low dietary adherence and deficiencies in iron ($p < 0.001$), calcium ($p < 0.001$), vitamin B12 ($p < 0.001$), zinc ($p = 0.003$), and vitamin C ($p < 0.001$). Magnesium deficiency at all levels (mild, moderate, and no deficiency vs. high deficiency) was strongly associated with the distinction between moderate and low dietary adherence ($p < 0.001$).**Conclusions:** Despite possessing reasonable nutrition knowledge, medical and allied health students demonstrate a significant gap between knowledge and practice. Targeted nutritional education programmes, periodic micronutrient screening, and institutional dietary interventions are urgently needed to address this public health concern within health professional training institutions.

KEYWORDS

Balanced Diet; Dietary Adherence; Food Frequency Questionnaire; Medical Students; Micronutrient Deficiency; Nutrition.

INTRODUCTION

Poor dietary habits are major drivers of the rising burden of non-communicable diseases (NCDs) worldwide.[1,2]

The 'thrifty genotype' hypothesis proposes that certain populations, including Indians, may carry genetic variants that historically favoured fat storage during periods of famine.[3] In the current context of nutritional abundance and sedentary lifestyles, this genetic predisposition may increase susceptibility to obesity and metabolic disease. South Asian populations, including Indians, demonstrate higher body fat percentages at lower BMI thresholds compared to Western populations,[4] and exhibit a greater genetic predisposition to insulin resistance.[5] India now has over 100 million people living with diabetes (ICMR-INDIAB study, 2023), with the urban burden being well-documented, while rural cases remain largely undiagnosed.[6] A typical Indian diet is carbohydrate-heavy and protein-deficient, with rice as the dominant staple.

Medical and allied health students represent a particularly important cohort. Although they possess knowledge of nutrition and disease, their demanding academic schedules, erratic meal timings, and the growing influence of Western fast-food culture make them vulnerable to poor dietary habits. The role of nutrition knowledge in shaping healthy eating behaviour during this formative period of professional training has been well recognised.[7] Studies from south India have consistently documented high rates of overweight and obesity among medical students: one Bangalore-based study of 922 students reported overweight and obesity prevalences of 19.1% and 22.2%, respectively,[10] while a study from Kannur reported that 60% of overweight students consumed one heavy meal per day or on alternate days.[11] A further study of 438 medical students in south India found that 97% were aware of balanced diets, but only 42.9% adhered to them, with 9.4% consuming junk food daily.[12]

Against this background, the present study was designed to: (1) assess adherence to a balanced diet among students of a deemed university in Mangalore; (2) evaluate BMI distribution by sex; (3) identify self-reported micronutrient deficiency symptoms; and (4) determine the association between dietary adherence category and nutrient deficiency indicators.

METHODS

Study Design and Setting

A cross-sectional study was conducted across four constituent colleges of Yenepoya (Deemed to be University), Mangalore, India: Yenepoya Medical College (YMC), Yenepoya Dental College (YDC), Yenepoya Pharmacy College and Research Centre (YPCRC), and Yenepoya Nursing College (YNC).

Ethics Approval and Consent

The study protocol was approved by the Scientific Review Board of Yenepoya (Deemed to be University) and subsequently by the Institutional Ethics Committee-2 (Protocol No. YEC2/2025/047). Written informed consent was obtained from all participants prior to data collection.

Sample Size and Sampling Strategy

A sample size of 337 was determined with a 95% confidence level and

a 5% margin of error. Participants were recruited using stratified random sampling to ensure proportional representation from each college: YMC (n = 131), YDC (n = 121), YPCRC (n = 52), and YNC (n = 31). Undergraduate students, postgraduate students, and interns were included. No exclusion criteria beyond voluntary participation were applied.

Data Collection Instrument

A structured, self-administered questionnaire was developed, validated by a panel of nutrition and clinical experts, and piloted before use. It comprised three sections:

Part A – Demographic Details: Age, sex, college, educational level, and parental education level.

Part B – Dietary Adherence Assessment: A semi-quantitative Food Frequency Questionnaire (FFQ) containing 39 food items representing cereals, pulses, dairy, fruits, vegetables, animal-based foods, junk foods, and fats. Frequency of consumption over the preceding month was scored using a six-point Likert scale: 2–3 times/day = 5 points; once/day = 4 points; 2–4 times/week = 3 points; once/week = 2 points; 1–3 times/month = 1 point; never or less than once/month = 0 points. Junk food items (e.g., sugary drinks, carbonated beverages, instant noodles, pizza, white bread) received negative scores to penalise frequent consumption. The cumulative score was categorised as low, moderate, or high dietary adherence.

Part C – Nutrient Deficiency Assessment: Participants self-reported the presence of symptoms commonly associated with micronutrient deficiencies (e.g., fatigue, hair loss, brittle nails, night blindness, frequent infections). Deficiency was categorised as no, mild, moderate, or high deficiency based on symptom burden. Anthropometric measurements (height and weight) were recorded to calculate BMI, classified per WHO criteria.

Statistical Analysis

Data were analysed using descriptive statistics (frequencies, percentages) to summarise participant characteristics, dietary patterns, and nutrient deficiency prevalence. The association between dietary adherence category (low, moderate, high) and nutrient deficiency indicators was evaluated using multinomial logistic regression. High deficiency served as the reference category for each nutrient. A two-tailed p-value of < 0.05 was considered statistically significant. Statistical analyses were performed using [software name and version to be inserted].

RESULTS

Demographic Characteristics

Table 1: Demographic profile of study participants

Variable	Category	n	% of Total
Sex	Female	255	75.7%
	Male	81	24.0%
	Prefer not to say	1	0.3%
Education Level	Undergraduate	301	89.3%
	Postgraduate	21	6.2%
	Intern	15	4.5%
College	YMC	131	38.9%
	YDC	121	36.5%
	YPCRC	52	15.4%
	YNC	31	9.2%

The majority of participants were female (75.7%), consistent with the demographic composition of allied health programmes. Undergraduates constituted 89.3% of the sample. The largest cohort was from YMC (38.9%), followed by YDC (36.5%).

Table 2: Parental educational attainment

Educational Level	Mothers – n (%)	Fathers – n (%)
Postgraduate	40 (11.9%)	64 (19.0%)
Graduate	82 (24.3%)	130 (38.6%)
Higher secondary school	128 (38.0%)	68 (20.2%)
Pre-university level	61 (18.1%)	50 (14.8%)
Primary school	26 (7.7%)	25 (7.4%)

Paternal education levels were generally higher, with 38.6% of fathers having a graduate degree and 19.0% a postgraduate qualification. Maternal education was predominantly at the higher secondary level (38.0%).

BMI Distribution

Table 3: BMI categorisation by sex

Sex (n)	BMI Category	Frequency	Percentage
Male (n = 81)	Underweight	2	2.5%
	Normal weight	41	50.6%
	Overweight	32	39.5%
	Obesity class I	5	6.2%
	Obesity class II	0	0.0%
	Obesity class III	1	1.2%
Female (n = 255)	Underweight	25	9.8%
	Normal weight	134	52.5%
	Overweight	86	33.7%
	Obesity class I	8	3.1%
	Obesity class II	2	0.8%
	Obesity class III	0	0.0%

Approximately half of both male (50.6%) and female (52.5%) participants were of normal weight. Overweight was the second most prevalent BMI category, affecting 39.5% of males and 33.7% of females. Obesity (class I–III combined) was present in 7.4% of males and 3.9% of females. Underweight was more prevalent among females (9.8%) than males (2.5%).

Nutrition Knowledge and Practices

Table 4: Participant knowledge and practices related to food groups, nutrition label reading, and dietary fat differentiation

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I can correctly identify the major food groups	97 (28.8%)	92 (27.3%)	101 (30.0%)	34 (10.1%)	13 (3.9%)
I check nutrition labels before purchasing packaged food	59 (17.5%)	74 (22.0%)	76 (22.6%)	106 (31.5%)	22 (6.5%)
I can differentiate between healthy and unhealthy fats	49 (14.5%)	127 (37.7%)	97 (28.8%)	32 (9.5%)	32 (9.5%)

Over half of participants (56.1%) agreed or strongly agreed that they could correctly identify major food groups, and 52.2% reported the ability to differentiate between healthy and unhealthy fats. However, only 39.5% reported checking nutrition labels before purchasing packaged foods; 38.0% explicitly disagreed with this practice.

Breakfast Skipping and Lifestyle Factors

Table 5: Frequency of breakfast skipping (>3 times/week)

Response	n	% of Total	Cumulative %
No	141	41.8%	41.8%
Yes	196	58.2%	100.0%

The majority of students (58.2%) reported skipping breakfast more than three times per week. This pattern is likely attributable to early morning academic commitments and late-night study schedules.

Table 6: Frequency distribution of self-reported health issues, stress/anxiety, and sleep quality

Variable	Response Category	n	% of Total
Health Issues	Always	7	2.1%
	Often	46	13.6%
	Sometimes	174	51.6%
	Rarely	102	30.3%
	Never	8	2.4%
Stress/Anxiety	Always	12	3.6%
	Often	82	24.3%
	Sometimes	166	49.3%
	Rarely	64	19.0%
	Never	13	3.9%
Sleep Quality	Very poor	12	3.6%
	Poor	72	21.4%
	Neutral	149	44.2%
	Good	81	24.0%
	Very good	23	6.8%

Over half of respondents (51.6%) sometimes experienced health issues, and 49.3% reported sometimes feeling stressed or anxious, with

24.3% reporting frequent stress. Sleep quality was rated as neutral by the largest group (44.2%), while 21.4% reported poor and 3.6% reported very poor sleep quality.

Current Medical Diagnoses

Figure 1 presents the distribution of self-reported medical diagnoses. The majority (61.0%) reported no diagnosed medical condition. Among those with a reported diagnosis, polycystic ovarian syndrome (PCOS) was most prevalent (17.1%), followed by gastrointestinal disorders (8.1%), respiratory conditions including asthma (7.3%), mental health conditions such as anxiety or depression (5.9%), thyroid disorders (4.8%), and diabetes mellitus type 1 or 2 (0.6%).

Figure 1: Distribution of current medical diagnoses among study participants (n = 337). [Bar/pie chart to be inserted].

Food Frequency Questionnaire Findings

Table 7: Frequency of dairy product consumption

Food Item	2–3×/day	Once/day	2–4×/week	Once/week	1–3×/month	Rare/Never
Whole milk	3.3%	17.8%	20.8%	16.9%	19.9%	21.4%
Yogurt	21.0%	11.9%	22.3%	19.0%	23.1%	21.7%
Buttermilk	0.3%	7.7%	26.4%	23.1%	22.8%	19.6%
Curd	2.4%	17.8%	35.0%	18.7%	17.5%	8.6%
Cheese	—	7.7%	22.0%	19.0%	26.7%	24.0%

Yogurt was the most frequently consumed dairy product, with 21.0% consuming it 2-3 times per day. Curd was consumed daily by 17.8%, and buttermilk 2-4 times per week by 26.4%. Cheese was the least consumed dairy item.

Table 8: Frequency of fat and oil consumption

Food Item	2–3×/day	Once/day	2–4×/week	Once/week	1–3×/month	Rare/Never
Butter	1.2%	10.7%	29.1%	24.0%	23.7%	11.3%
Ghee	1.5%	13.4%	28.8%	19.9%	19.0%	17.5%
Cheese	0.6%	7.7%	22.0%	19.0%	26.7%	24.0%

Butter and ghee were consumed 2–4 times per week by 29.1% and 28.8% of participants, respectively. Ghee was also consumed daily by 13.4%, reflecting its traditional role in south Indian cuisine.

Table 9: Frequency of fruit, nut, vegetable, and root consumption

Food Item	2–3×/day	Once/day	2–4×/week	Once/week	1–3×/month	Rare/Never
Fresh fruits	6.2%	25.8%	35.3%	17.2%	12.5%	3.0%
Dried fruits and nuts	5.0%	26.4%	27.9%	16.3%	17.2%	7.1%
Fruit juices	4.7%	24.9%	32.6%	18.1%	15.4%	4.2%
Fruit jam/jelly	1.2%	10.7%	16.6%	11.0%	15.7%	44.8%
Green leafy and other vegetables	5.3%	17.5%	29.1%	17.5%	17.5%	13.1%
Potato, sweet potato, etc.	2.4%	13.9%	30.9%	20.2%	21.7%	11.0%

Fresh fruit consumption was reasonable, with 25.8% consuming it daily and 35.3% consuming it 2–4 times per week. However, green leafy vegetable intake was suboptimal, with only 17.5% consuming these daily. Fruit jam and jelly was rarely consumed (44.8% never or less than once/month).

Table 10: Frequency of meat and egg consumption

Food Item	2–3×/day	Once/day	2–4×/week	Once/week	1–3×/month	Rare/Never
Eggs	3.3%	17.2%	30.0%	15.7%	19.9%	13.9%
Chicken	5.9%	27.3%	51.6%	10.4%	4.2%	0.6%
Beef	1.8%	13.4%	17.8%	14.6%	27.3%	25.2%
Mutton	1.8%	11.0%	14.2%	13.4%	24.6%	35.0%
Processed meat	1.2%	9.8%	14.8%	11.0%	24.3%	38.9%
Fish	1.2%	8.3%	20.2%	24.3%	21.4%	24.6%

Chicken was the most frequently consumed animal protein, with 51.6% consuming it 2–4 times per week. Eggs were commonly consumed (30.0% two to four times per week). Red meat and processed meat consumption was low. Fish was consumed once per week by 24.3% of participants.

Table 11: Frequency of junk food consumption

Food Item	2–3×/day	Once/day	2–4×/week	Once/week	1–3×/month	Rare/Never
Bakery items	2.1%	14.5%	26.4%	21.4%	24.6%	11.0%
White bread (maida)	1.8%	17.8%	31.5%	18.7%	21.4%	8.9%
Chocolates	2.1%	20.2%	29.4%	18.1%	19.9%	10.4%
Fried foods	1.5%	17.8%	30.6%	19.9%	19.6%	10.7%
Burger	0.6%	11.0%	13.6%	14.5%	34.1%	26.1%
Pizza	0.6%	9.5%	11.9%	10.4%	32.9%	34.7%
Puffs	1.8%	11.0%	21.1%	15.1%	23.7%	27.3%
Chaats	0.6%	3.3%	13.6%	22.8%	22.6%	37.1%
Sandwich	0.6%	10.7%	16.9%	13.6%	31.2%	27.0%
Instant noodles/ Maggi/Pasta	0.3%	8.0%	24.3%	19.6%	28.8%	19.0%

White bread (maida) was consumed 2-4 times per week by 31.5% and daily by 17.8% of participants. Fried foods and chocolates were consumed 2–4 times per week by 30.6% and 29.4%, respectively. Western fast-food items such as pizza and burgers were consumed less frequently. Instant noodles were consumed 2-4 times per week by 24.3%.

Table 12: Frequency of cereal and pulse consumption

Food Item	2–3×/day	Once/day	2–4×/week	Once/week	1–3×/month	Rare/Never
Rice	19.9%	48.4%	19.6%	5.6%	3.0%	3.6%
Wheat	4.2%	26.4%	29.4%	16.6%	13.1%	10.4%
Ragi (finger millet)	2.4%	8.3%	11.9%	11.0%	18.1%	48.4%
Lentils/pulses	3.6%	12.2%	33.2%	20.2%	19.0%	11.9%

Rice was the dominant staple, consumed daily by 68.3% (once/day: 48.4%; 2–3 times/day: 19.9%). Ragi (finger millet), a nutritionally superior but underutilised cereal, was rarely or never consumed by 48.4% of participants. Lentils and pulses were consumed 2–4 times per week by 33.2%.

Table 13: Frequency of beverage consumption

Beverage	2–3×/day	Once/day	2–4×/week	Once/week	1–3×/month	Rare/Never
Tea	11.3%	32.3%	14.5%	7.4%	5.3%	29.1%
Coffee	8.0%	27.9%	20.5%	12.2%	10.1%	21.4%
Fruit drinks	1.8%	15.4%	30.0%	18.1%	21.7%	13.1%
Carbonated beverages	0.3%	8.6%	24.0%	18.4%	19.6%	29.1%

Tea and coffee were the most frequently consumed beverages, with 32.3% and 27.9% consuming them daily, respectively. Carbonated beverages were consumed by 24.0% of participants 2–4 times per week, though 29.1% rarely or never consumed them, likely due to limited campus availability.

Table 14: Frequency of fermented food consumption

Food Item	2–3×/day	Once/day	2–4×/week	Once/week	1–3×/month	Rare/Never
Fermented foods (dosa, idli, etc.)	0.9%	13.4%	34.4%	24.6%	18.4%	8.3%

Fermented foods were regularly consumed, with 34.4% consuming them 2–4 times per week and 24.6% once per week, reflecting the predominance of traditional south Indian fermented staples in the diet.

Association Between Dietary Adherence and Nutrient Deficiencies

Multinomial logistic regression was performed with dietary adherence category (low, moderate, high) as the outcome and self-reported deficiency levels for seven micronutrients as predictors. High deficiency was the reference category for each nutrient. Results are presented in Tables 15a and 15b.

Table 15a: Multinomial logistic regression: predictors of Low dietary adherence (reference: High deficiency for each nutrient)

Nutrient	Deficiency Level vs. High Deficiency	Estimate (β)	SE	p-value
Iron	Mild – High	80.16	2.491	< 0.001
	Moderate – High	51.43	48.794	0.292
	None – High	63.76	158.360	0.687
Vitamin D	Mild – High	–139.43	—	—
	Moderate – High	–1.24	1.624	0.447
	None – High	–53.67	56.313	0.341
Calcium	Mild – High	213.79	91.279	0.019
	Moderate – High	104.99	15.199	< 0.001
	None – High	182.32	5.586	< 0.001
Vitamin B12	Mild – High	–42.36	2.472	< 0.001
	Moderate – High	1.54	1.115	0.167
	None – High	23.75	158.571	0.881

Magnesium	Mild – High	–96.79	60.891	0.112
	Moderate – High	12.95	15.199	0.394
	None – High	–40.71	157.752	0.796
Zinc	Mild – High	38.57	95.852	0.687
	Moderate – High	139.70	46.322	0.003
	None – High	90.03	62.526	0.150
Vitamin C	Mild – High	–33.81	153.786	0.826
	Moderate – High	–29.94	47.334	0.527
	None – High	–57.28	5.604	< 0.001

Statistically significant associations with low dietary adherence (vs. high deficiency as reference) were observed for calcium ($p < 0.001$), vitamin B12 ($p < 0.001$), zinc ($p = 0.003$), vitamin C ($p < 0.001$), and iron ($p < 0.001$). Vitamin D and magnesium did not demonstrate significant associations in this comparison.

Table 15b: Multinomial logistic regression: predictors distinguishing Moderate from Low dietary adherence (reference: High deficiency for each nutrient)

Nutrient	Deficiency Level vs. High Deficiency	Estimate (β)	SE	p-value
Iron	Mild – High	1.60	0.990	0.106
	Moderate – High	0.60	0.933	0.523
	None – High	1.78	1.025	0.082
Vitamin D	Mild – High	–0.08	0.857	0.922
	Moderate – High	–1.06	0.824	0.198
	None – High	0.01	0.895	0.987
Calcium	Mild – High	0.35	1.373	0.797
	Moderate – High	0.18	1.228	0.884
	None – High	0.53	1.399	0.704
Vitamin B12	Mild – High	0.69	1.077	0.519
	Moderate – High	1.76	0.932	0.059
	None – High	0.58	1.120	0.602
Magnesium	Mild – High	–322.81	0.689	< 0.001
	Moderate – High	–320.46	0.708	< 0.001
	None – High	–323.21	0.737	< 0.001
Zinc	Mild – High	2.15	1.624	0.185
	Moderate – High	1.19	1.058	0.262
	None – High	2.43	1.672	0.146
Vitamin C	Mild – High	140.36	0.529	< 0.001
	Moderate – High	142.13	0.530	< 0.001
	None – High	140.16	0.543	< 0.001

Magnesium deficiency at all levels (mild, moderate, and no deficiency compared with high deficiency) was strongly associated with the distinction between moderate and low dietary adherence (all $p < 0.001$). Vitamin C deficiency similarly demonstrated strong associations across all deficiency levels (all $p < 0.001$). These findings suggest that magnesium and vitamin C status are key discriminators between moderate and low dietary adherence categories.

DISCUSSION

This cross-sectional study examined dietary adherence and micronutrient deficiency symptoms among 337 medical and allied health students at Yenepoya (Deemed to be University), Mangalore. The predominance of female participants (75.7%) reflects the gender composition of allied health programmes in this institution. Most participants were undergraduates (89.3%).

The BMI findings are noteworthy. Nearly 39.5% of males and 33.7% of females were overweight, echoing trends reported across Indian campuses. A national survey of university students in India found overweight prevalence of 37.5% and central obesity in 16.4%.[13] A Karnataka-based study of 922 medical and allied health students reported overweight and obesity rates of 23.6% and 5.2%, respectively.[14] Higher overweight prevalence among males compared with females in the present study aligns with these earlier data and may partly reflect differences in dietary patterns and physical activity levels.

Despite over half of participants claiming to be able to identify major food groups and differentiate healthy from unhealthy fats, practical adherence to dietary guidelines remained suboptimal. This knowledge–practice gap in health professional students has been documented previously. One south Indian study found that 97% of medical students were aware of a balanced diet but only 42.9% followed one.[12] Institutional curricula may provide nutrition knowledge without sufficient emphasis on behaviour change.

Breakfast skipping (reported by 58.2% more than three times per week) is a pervasive finding in studies of medical students in India.[15,16,17,18] Early morning academic commitments and late-night study sessions are well-recognised drivers of this behaviour, which is associated with impaired cognitive performance and suboptimal dietary intake throughout the day.

Stress and poor sleep quality were common: 49.3% reported sometimes feeling anxious, 24.3% often, and 21.4% rated their sleep quality as poor. Social media use, academic pressure, and career-related anxiety are established contributors to psychological distress in undergraduate health professional students.[19] Sleep disturbance in turn adversely affects dietary choices and metabolic health.[20]

The most commonly reported medical diagnosis was PCOS, affecting 17.1% of female participants. A 2025 study among 18–25 year old Indian students reported a PCOS prevalence of 17.4%, consistent with the present finding.[21] Hyperinsulinaemia and insulin resistance are central to PCOS pathophysiology and are exacerbated by high-glycaemic-index diets and excess abdominal adiposity.[21] Dietary interventions incorporating low-glycaemic-index, antioxidant-rich, and anti-inflammatory foods have been shown to improve insulin resistance in this population.[22]

The FFQ results reflect a diet built around traditional south Indian staples, with rice consumed daily by over 68% of participants. Rice is a high-glycaemic-index food, and its consumption without adequate fibre and protein can promote weight gain and insulin resistance.[23,24]

The regular consumption of fermented foods (dosa, idli) is a positive dietary behaviour; such foods support gut microbiome diversity. Regular probiotic intake is associated with favourable gut health outcomes.[25] Yogurt was the most commonly consumed dairy item (21.0% consuming it 2–3 times/day), further reinforcing the probiotic component of the diet.

Junk food consumption, particularly bakery items, fried foods, chocolates, white bread, and instant noodles, was prevalent at a frequency of 2-4 times per week. This pattern of moderate but habitual junk food intake-rather than rare indulgence-is of concern. A study in Udupi found that 37.87% of students had no knowledge of the harms of fast food, and 72.5% consumed it because they found it palatable and convenient.[26] Fast foods are energy-dense but nutrient-poor, and their regular consumption is expected to displace micronutrient-rich foods.

The regression findings confirm this mechanistic link. Low dietary adherence was significantly associated with deficiencies in iron, calcium, vitamin B12, zinc, and vitamin C. These are precisely the micronutrients found in foods displaced by junk food (dairy, legumes, fresh fruits, and animal proteins). Magnesium and vitamin C emerged as the strongest discriminators between moderate and low adherence categories, suggesting that adequate intake of these nutrients may represent a meaningful threshold differentiating truly poor diets from borderline ones.

Earlier literature has documented the association between junk food consumption and nutritional deficiency anaemia (iron, vitamin B12) in young adults.[27] The present study adds to this body of evidence by demonstrating statistically significant associations using a logistic regression model and a validated FFQ in the specific context of Indian health professional students.

Limitations of this study include: (1) reliance on self-reported dietary recall and symptom-based nutrient deficiency assessment, which are susceptible to recall and social-desirability bias; (2) cross-sectional design precluding causal inference; (3) the study population is from a single university, limiting generalisability; and (4) the absence of biochemical confirmation of micronutrient deficiencies. Future studies should incorporate objective biomarkers (serum ferritin, 25-hydroxyvitamin D, vitamin B12 levels) and longitudinal designs.

CONCLUSIONS

This study identifies a concerning knowledge–practice gap in dietary behaviour among medical and allied health students. Despite reasonable nutritional awareness, a significant proportion fail to meet basic dietary guidelines, particularly for fruit, vegetable, and protein intake, while habitually consuming junk foods. These patterns are reflected in the high prevalence of self-reported micronutrient deficiency symptoms, particularly for iron, calcium, vitamin B12,

zinc, vitamin C, and magnesium. Targeted nutritional education programmes, periodic micronutrient screening, and institutional dietary interventions are needed to bridge this gap and safeguard both the health and future clinical performance of health professional students.

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