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Unveiling the Knowledge–Practice Paradox: Prevalence and Lifestyle Determinants of Overnutrition and Obesity Among Healthcare Professional Students in Telangana, India

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Study site: A tertiary care hospital and medical college, Karimnagar	**Study period:** Aug 2024 – Feb 2025 (data collection Oct–Dec 2024)	**Ethics:** IEC approval obtained | **Design:** Stratified cross-sectional KAP study

ABSTRACT

Background: Overnutrition and obesity among healthcare professional students are a dual public health concern: they affect personal well-being and may weaken students' future credibility as lifestyle counsellors. We estimated the prevalence of overnutrition, assessed knowledge, attitude and practice (KAP) regarding nutrition, and identified lifestyle determinants among undergraduate medical and allied health students in Karimnagar, Telangana.

Methods: An institutional cross-sectional study was conducted between October and December 2024 among 450 undergraduate students (MBBS 180, B.Sc. Nursing 120, BPT 80, MLT 70) allocated by probability-proportional-to-size sampling. Weight and height were measured with calibrated instruments, and a pre-tested 51-item KAP questionnaire was administered. BMI was classified using WHO Asian-Pacific criteria (overweight 23.0–24.9 kg/m²; obesity ≥25.0 kg/m²); overnutrition was defined as overweight plus obesity. Determinants were examined by multivariable logistic regression.

Results: Overnutrition was present in 125 of 450 students (27.8%; 95% CI 23.6–31.9): 101 (22.4%) overweight and 24 (5.3%) obese; 13.3% were underweight. Prevalence was highest in MBBS (32.8%), followed by BPT (28.8%), MLT (24.3%) and B.Sc. Nursing (21.7%), without a statistically significant difference between streams ($p = 0.176$). Good knowledge was observed in 84.2% and a positive attitude in 72.7%, but adequate dietary practice in only 38.4% (95% CI 33.9–42.9). Independent risk factors were fast-food intake ≥3 times/week (aOR 2.45, 95% CI 1.58–3.80), sitting >5 h/day (aOR 2.10, 1.32–3.34), sleep <6 h/night (aOR 1.92, 1.20–3.08), recreational screen time >3 h/day (aOR 1.85, 1.14–2.98) and high perceived academic stress (aOR 1.64, 1.05–2.56).

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Conclusion: More than one in four healthcare students was overweight or obese, and a wide gap separated nutrition knowledge from practice. Campus policies should target the food environment, active movement, sleep hygiene and stress support rather than relying on education alone.

Keywords: *overnutrition; obesity; knowledge–attitude–practice; healthcare students; Asian-Pacific BMI; lifestyle; India*

KEY POINTS

- More than one in four healthcare students (27.8%) was overweight or obese by Asian-Pacific BMI criteria.
- Good nutrition knowledge (84.2%) was not matched by adequate dietary practice (38.4%) in any stream.
- Fast food, prolonged sitting, short sleep, screen time and academic stress independently raised the odds of overnutrition (aOR 1.64–2.45).
- Campus food, activity, sleep and stress policies, not education alone, are needed.

Abbreviations: aOR, adjusted odds ratio; BMI, body mass index; BPT, Bachelor of Physiotherapy; CI, confidence interval; IEC, Institutional Ethics Committee; KAP, knowledge–attitude–practice; MLT, Medical Laboratory Technology; PPS, probability proportional to size; STROBE, Strengthening the Reporting of Observational Studies in Epidemiology.

1. Introduction

Obesity has become one of the defining public health problems of the century. Between 1990 and 2022 the worldwide prevalence of obesity more than doubled in adults, and the burden is shifting steadily towards low- and middle-income countries [1]. India reflects this transition: the fifth National Family Health Survey documented a continuing rise in overweight and obesity among adults [2], the ICMR-INDIAB study showed that generalised and abdominal obesity are widespread in both urban and rural populations [3,4], and modelling studies project a substantial further increase over the coming decades [5].

South Asians accumulate more body fat, and develop metabolic risk, at lower BMI values than European populations. For this reason the WHO expert consultation and Indian consensus groups recommend lower action points (overweight from 23.0 kg/m² and obesity from 25.0 kg/m²) for Asian adults [6,7]. These thresholds capture cardiometabolic risk that conventional cut-offs miss in India [8,9].

Young adults in higher education are an especially vulnerable group. Irregular routines, long hours of sitting, hostel living and easy access to energy-dense foods promote weight gain during the university years [10]. Studies of Indian medical students report high rates of overweight and obesity, with fast-food intake, eating out and inactivity among the associated factors [11]. Ultra-processed foods, which now dominate many campus food environments, compound the problem [12].

Healthcare students form a particularly important cohort. Clinicians' own weight and lifestyle influence their credibility and their willingness to counsel patients about diet and physical activity [13,14], and competency frameworks now expect graduates to be able to manage obesity [15]. Yet nutrition teaching in medical programmes is often limited [16], and knowledge by itself is only weakly linked to what people actually eat

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[17]. Whether healthcare trainees translate what they know into what they do, and whether this differs across medical, nursing, physiotherapy and laboratory streams, has rarely been examined in the same institution.

Several modifiable behaviours are plausible drivers of this gap: short sleep [18,19], prolonged sedentary time [20], ultra-processed and fast-food intake [21], recreational screen time [22], psychological stress [23] and breakfast skipping [24]. This study therefore aimed to (i) estimate the prevalence of overnutrition among undergraduate healthcare students in Karimnagar using Asian-Pacific BMI criteria, (ii) compare knowledge, attitude and practice scores across four academic streams, and (iii) identify lifestyle determinants independently associated with overnutrition.

2. Materials and Methods

2.1 Study design and setting

An institutional, observational, cross-sectional study was conducted at a tertiary care hospital and medical college in Karimnagar, Telangana, India. Primary data were collected from October to December 2024 within an overall project period of August 2024 to February 2025. The study is reported in accordance with the STROBE statement for cross-sectional studies [25].

2.2 Participants, sample size and sampling

Full-time undergraduate students aged ≥18 years enrolled in MBBS, B.Sc. Nursing, Bachelor of Physiotherapy (BPT) and Medical Laboratory Technology (MLT) programmes were eligible. Students with diagnosed organic endocrine causes of obesity (e.g. Cushing syndrome, unmanaged severe hypothyroidism), pregnant students and those who did not consent were excluded.

The minimum sample size was calculated with the standard single-proportion formula [26], $n = Z^2p(1-p)/d^2$, using an expected prevalence of 28.6%, 5% absolute precision and 95% confidence (Z = 1.96), which gives 314 participants; applying a design effect of 1.15 for stream-wise allocation raises this to 361. To allow proportionate representation of all four streams, 450 students were enrolled. Probability-proportional-to-size (PPS) sampling allocated participants as MBBS 180, B.Sc. Nursing 120, BPT 80 and MLT 70 (Figure 1).

2.3 Anthropometric assessment and BMI classification

Body weight was measured to the nearest 0.1 kg with a calibrated digital scale (Omron HN289) and standing height to the nearest 0.1 cm with a stadiometer. BMI was calculated as weight (kg) divided by height squared (m^2). Because South Asians carry a higher body-fat percentage at a given BMI [6–8], the WHO Asian-Pacific criteria were used for all analyses: underweight <18.5, normal 18.5–22.9, overweight 23.0–24.9 and obesity ≥25.0 kg/m^2. Overnutrition was defined as overweight plus obesity. Overweight and obesity denote abnormal or excessive fat accumulation that may impair health [27].

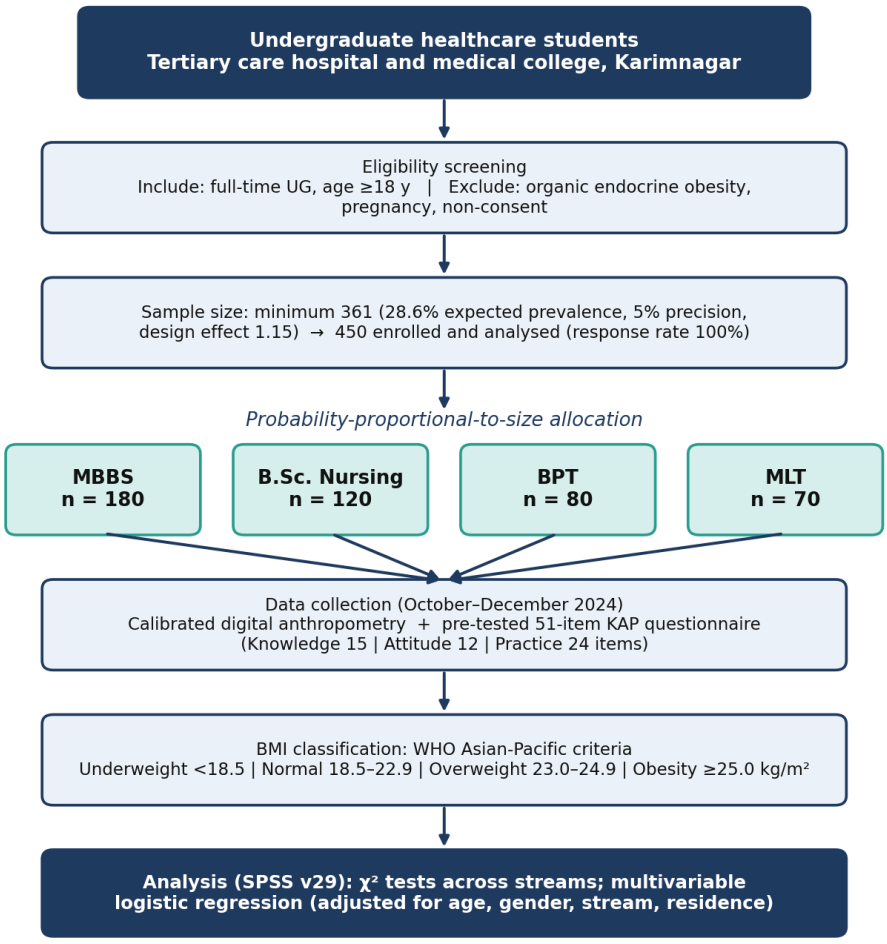
2.4 KAP instrument and scoring

A pre-tested 51-item questionnaire assessed nutrition Knowledge (15 items), Attitude (12 items) and Practice (24 items). Proficiency cut-offs were ≥75% for good knowledge and positive attitude, and ≥60% for adequate (healthy) practice. Lifestyle exposures were dichotomised as fast-food intake ≥3 times/week, sedentary time >5 h/day, sleep <6 h/night, recreational screen time >3 h/day, high perceived academic stress (versus moderate/low) and breakfast skipping ≥3 days/week. Perceived academic stress was self-reported through the study questionnaire and categorised as high versus moderate/low. The questionnaire was pre-tested before

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use; formal psychometric validation (such as reliability coefficients) was not undertaken or is not reported here.

Figure 1. Study flow diagram and sampling methodology.



2.5 Ethics

IEC approval was obtained from the institutional ethics committee. Written informed consent was obtained from all participants, and data were anonymised before analysis.

2.6 Statistical analysis

Data were analysed in SPSS version 29. Categorical variables are presented as frequencies and percentages with 95% confidence intervals (Wald) where stated. Differences across the four streams were tested with the Pearson χ^2 test (df = 3). Multivariable logistic regression estimated adjusted odds ratios (aOR) with 95% CI for lifestyle exposures, adjusting for age, gender, academic stream and residence. Model calibration was assessed with the Hosmer–Lemeshow test [28] and explanatory power with Nagelkerke R^2. A two-sided $p < 0.05$ was considered significant.

3. Results

All 450 students approached completed the study (response rate 100%). The mean age was 20.8 ± 1.6 years; 59.3% (267/450) were female and 74.0% (333/450) lived in campus hostels (Table 1).

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Table 1. Socio-demographic profile of study participants (N = 450)

Variable	Category	Frequency (n)	Proportion (%)
Gender			
	Female	267	59.3
	Male	183	40.7
Residential status			
	Campus hostel resident	333	74.0
	Day scholar / living at home	117	26.0
Academic stream			
	MBBS	180	40.0
	B.Sc. Nursing	120	26.7
	Bachelor of Physiotherapy (BPT)	80	17.8
	Medical Laboratory Technology (MLT)	70	15.5

3.1 Prevalence of overnutrition

Using Asian-Pacific criteria, 60 students (13.3%) were underweight, 265 (58.9%) had normal weight, 101 (22.4%) were overweight and 24 (5.3%) were obese. The overall prevalence of overnutrition was therefore 125/450 (27.8%; 95% CI 23.6–31.9). It was highest among MBBS students (32.8%) and lowest among B.Sc. Nursing students (21.7%), but the difference across streams was not statistically significant ($\chi^2 = 4.94$, df = 3, p = 0.176). Underweight was most frequent in nursing students (18.3%). The distribution is shown in Table 2 and Figures 2 and 3.

Table 2. Distribution of BMI categories across academic streams (WHO Asian-Pacific criteria)

Stream	N	Underweight (<18.5) n (%)	Normal (18.5–22.9) n (%)	Overweight (23.0–24.9) n (%)	Obesity (≥25.0) n (%)	Overnutrition n (%)
MBBS	180	18 (10.0)	103 (57.2)	45 (25.0)	14 (7.8)	59 (32.8)
B.Sc. Nursing	120	22 (18.3)	72 (60.0)	21 (17.5)	5 (4.2)	26 (21.7)
BPT	80	9 (11.2)	48 (60.0)	19 (23.8)	4 (5.0)	23 (28.8)
MLT	70	11 (15.7)	42 (60.0)	16 (22.9)	1 (1.4)	17 (24.3)
Total	**450**	**60 (13.3)**	**265 (58.9)**	**101 (22.4)**	**24 (5.3)**	**125 (27.8)**

Categories are mutually exclusive and sum to N = 450 in every row. Overnutrition = overweight + obesity. Difference in overnutrition across streams: $\chi^2 = 4.94$, df = 3, p = 0.176.

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Figure 2. BMI category distribution by academic stream (Asian-Pacific criteria).

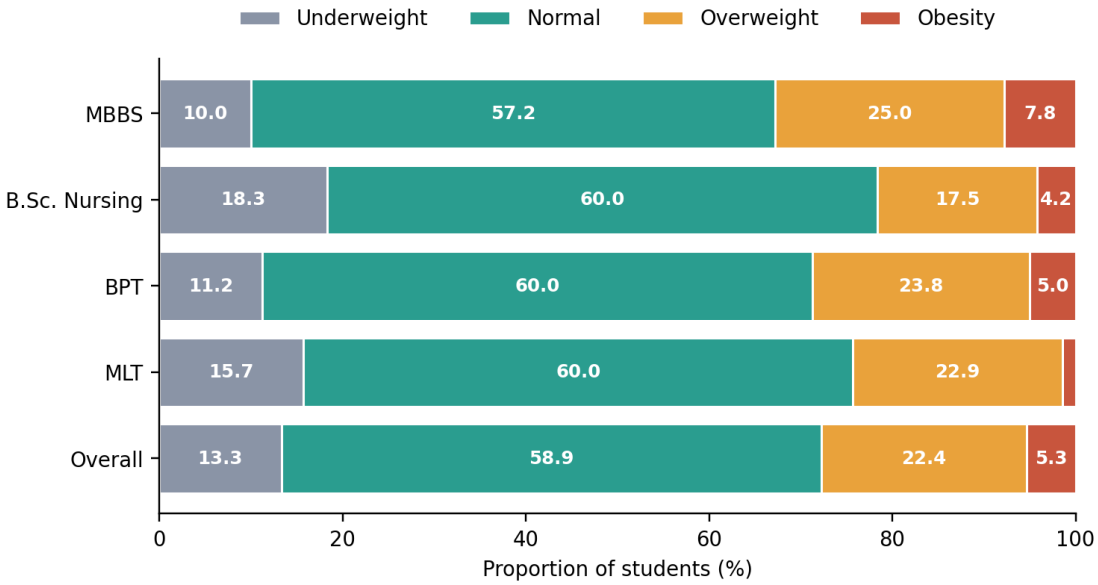
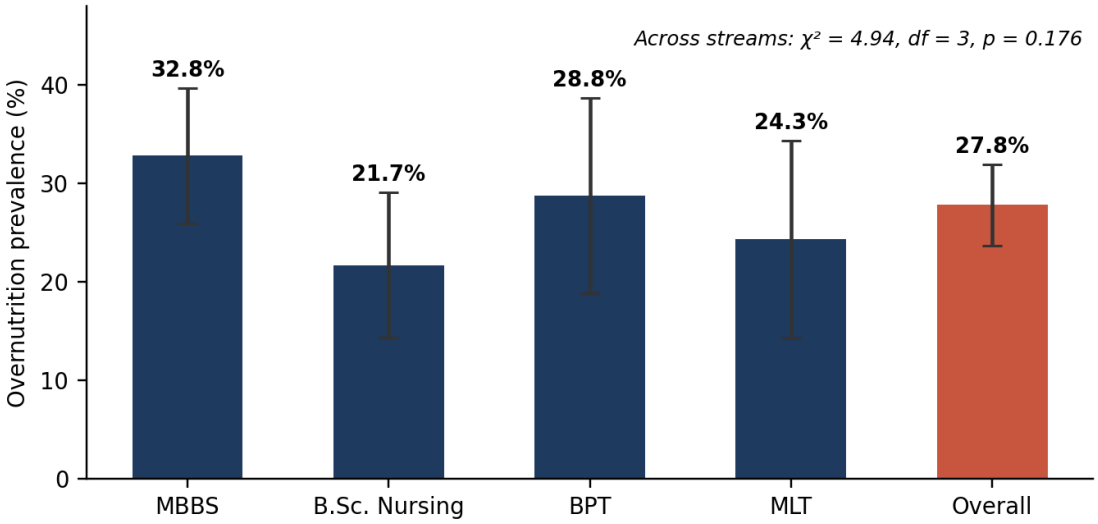


Figure 3. Prevalence of overnutrition by stream with 95% confidence intervals.



3.2 Knowledge, attitude and practice

Good nutrition knowledge was observed in 84.2% of students (95% CI 80.9–87.6) and a positive attitude in 72.7% (95% CI 68.5–76.8), whereas only 38.4% (173/450; 95% CI 33.9–42.9) reported adequate dietary practice, a gap of 46 percentage points between knowledge and practice (Table 3, Figure 4). Good knowledge was highest in MBBS (89.4%) and lowest in nursing (78.3%) students, a borderline difference ($p = 0.050$). Attitude ($p = 0.359$) and practice ($p = 0.568$) did not differ significantly across streams, indicating that the practice deficit was shared by all four programmes.

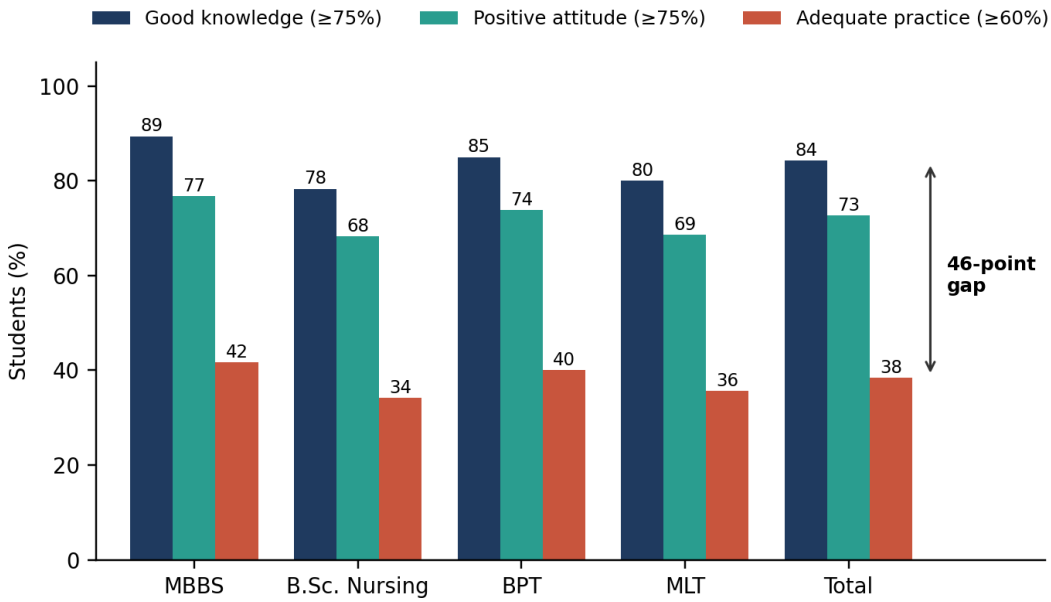
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Table 3. Knowledge, attitude and practice scores across academic streams

Domain / category	MBBS (n=180)	Nursing (n=120)	BPT (n=80)	MLT (n=70)	Total (N=450)	χ^2 (df=3)	p-value
Knowledge							
Good (≥75%)	161 (89.4)	94 (78.3)	68 (85.0)	56 (80.0)	379 (84.2)	7.80	0.050
Moderate/poor (<75%)	19 (10.6)	26 (21.7)	12 (15.0)	14 (20.0)	71 (15.8)		
Attitude							
Positive (≥75%)	138 (76.7)	82 (68.3)	59 (73.8)	48 (68.6)	327 (72.7)	3.22	0.359
Neutral/negative (<75%)	42 (23.3)	38 (31.7)	21 (26.3)	22 (31.4)	123 (27.3)		
Practice							
Adequate (≥60%)	75 (41.7)	41 (34.2)	32 (40.0)	25 (35.7)	173 (38.4)	2.02	0.568
Inadequate (<60%)	105 (58.3)	79 (65.8)	48 (60.0)	45 (64.3)	277 (61.6)		

Values are n (%). Pearson χ^2 test across the four streams computed on the good/adequate versus remaining category.

Figure 4. The knowledge–practice paradox: proportion of students with good knowledge, positive attitude and adequate practice, by stream.



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3.3 Lifestyle determinants of overnutrition

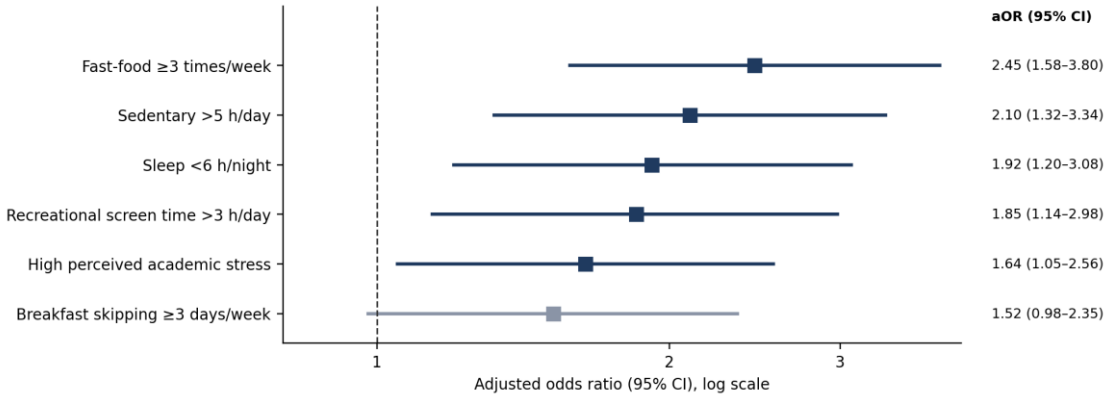
In multivariable analysis, five exposures were independently associated with overnutrition (Table 4, Figure 5): fast-food intake ≥3 times/week (aOR 2.45), sedentary time >5 h/day (aOR 2.10), sleep <6 h/night (aOR 1.92), recreational screen time >3 h/day (aOR 1.85) and high perceived academic stress (aOR 1.64). Breakfast skipping showed a similar direction of effect that did not reach significance (aOR 1.52, 95% CI 0.98–2.35; p = 0.061). The model showed good calibration (Hosmer–Lemeshow $\chi^2 = 5.42$, p = 0.712) and explained about a quarter of the variance (Nagelkerke $R^2 = 0.248$).

Table 4. Multivariable logistic regression of lifestyle correlates of overnutrition

Behavioural / risk variable	Unadjusted OR (95% CI)	Adjusted OR (95% CI)*	p-value
Fast-food intake ≥3 times/week vs <3	2.82 (1.85–4.28)	2.45 (1.58–3.80)	<0.001
Sedentary time >5 h/day vs ≤5 h/day	2.35 (1.52–3.64)	2.10 (1.32–3.34)	0.002
Sleep <6 h/night vs ≥6 h/night	2.08 (1.34–3.22)	1.92 (1.20–3.08)	0.007
Recreational screen time >3 h/day vs ≤3 h/day	1.98 (1.26–3.12)	1.85 (1.14–2.98)	0.012
High perceived academic stress vs moderate/low	1.75 (1.15–2.68)	1.64 (1.05–2.56)	0.030
Breakfast skipping ≥3 days/week vs rarely	1.61 (1.05–2.48)	1.52 (0.98–2.35)	0.061

**Adjusted for age, gender, academic stream and residence. Hosmer–Lemeshow $\chi^2 = 5.42$, p = 0.712; Nagelkerke $R^2 = 0.248$. p-values correspond to the adjusted estimates.*

Figure 5. Forest plot of adjusted odds ratios for lifestyle determinants of overnutrition.



4. Discussion

This study found that more than one in four undergraduate healthcare students in Karimnagar (27.8%) was overweight or obese by Asian-Pacific criteria, and that this occurred against a background of high nutrition knowledge (84.2%) but low adequate practice (38.4%). Reported prevalence among Indian medical students

varies widely with setting and BMI cut-off [11]; applying lower Asian thresholds classifies more young adults as overweight than conventional cut-offs would [6–9], and our figure should be read in that light. The national and regional context of rising adiposity [1–5] suggests that trainees are not insulated from the same forces.

MBBS students had the highest prevalence (32.8%), a pattern that fits the long academic hours and sedentary study routines of medical training, but the differences between streams were not statistically significant ($p = 0.176$), and this study was not powered to detect stream-level differences. We therefore interpret the stream ranking as descriptive. Nursing students had the lowest prevalence of overnutrition but the highest prevalence of underweight (18.3%), which points to a double burden of malnutrition within the same campus that deserves attention in its own right.

The central finding is the knowledge–practice paradox. Roughly 84% of students had good knowledge, yet fewer than 4 in 10 translated it into healthy practice, and this gap was visible in every stream (Figure 4). This is consistent with evidence that nutrition knowledge explains only a small part of dietary behaviour [17] and with reviews showing that nutrition education within medical curricula is limited and rarely behaviour-focused [16]. Informing students is evidently not enough; the environment in which they eat, move, sleep and study appears to be the stronger determinant.

The lifestyle exposures identified here agree with the wider literature. Frequent fast-food intake carried the largest effect (aOR 2.45), in line with the link between ultra-processed food and adverse health outcomes [12,21] and with the association of fast-food and eating-out frequency with overweight among Indian medical students [11]. Sitting for more than five hours a day nearly doubled the odds, in keeping with the association of sedentary time with chronic disease risk [20]. Short sleep, which we found to be independently associated with overnutrition, has consistently been linked to obesity in adults [18,19]. Recreational screen time [22] and perceived academic stress [23] were also independently associated, suggesting behavioural and psychological pathways that operate alongside diet and activity. Breakfast skipping showed a borderline association (aOR 1.52; $p = 0.061$), consistent with meta-analytic evidence [24] but not significant in our sample. Because the design is cross-sectional, these associations describe co-occurrence rather than causation.

These findings carry practical weight. Students who struggle with their own weight may feel less confident, and may be perceived as less credible, when counselling patients [13,14]. Building the personal and professional capacity to manage obesity is a stated competency for physicians [15]. Institutional measures should therefore address the environment directly (Figure 6): improving the nutritional quality of mess and canteen food in line with national dietary guidance [29], protecting time for physical activity during the academic day, promoting sleep hygiene, limiting recreational screen use and providing accessible stress counselling.

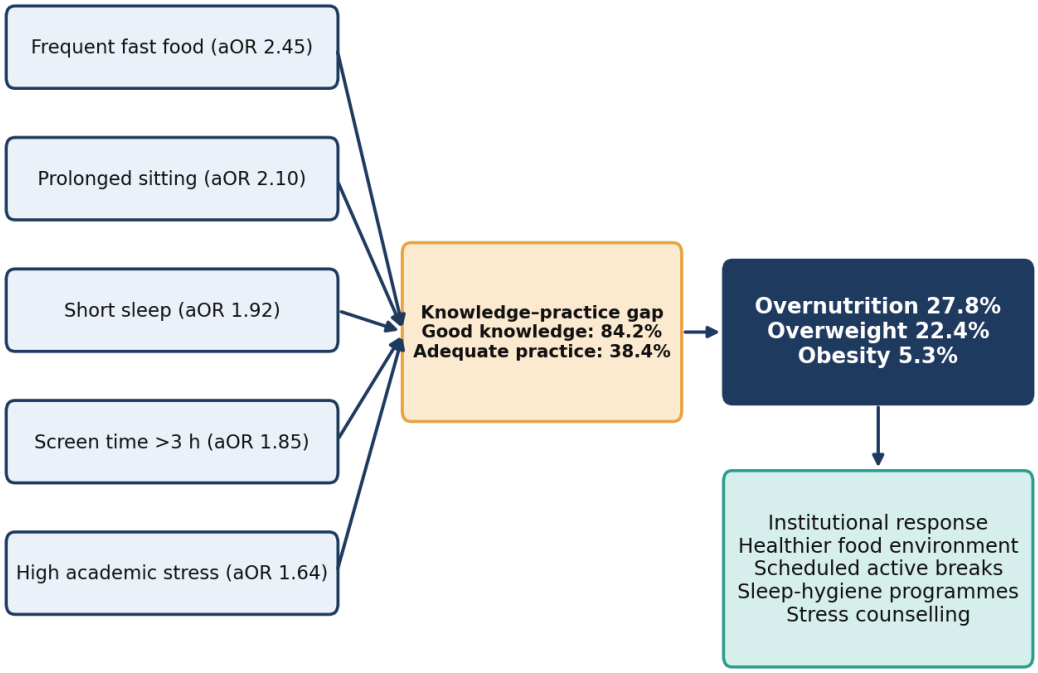
4.1 Strengths and limitations

Strengths include objective, calibrated anthropometry, inclusion of four healthcare streams in one institution, a 100% response rate, a PPS sampling frame and adjusted multivariable analysis. Limitations should be acknowledged. The design is cross-sectional and single-institution, limiting causal inference and generalisability. Lifestyle exposures and KAP scores were self-reported and subject to recall and social-desirability bias, which could even narrow the observed gap. Perceived academic stress was captured by a single self-reported categorisation rather than a standardised, validated stress scale, and the questionnaire lacked formal psychometric validation, so measurement error and misclassification are possible.

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Dichotomised exposure cut-offs and the proficiency thresholds (≥75% and ≥60%) are conventions rather than validated clinical limits. BMI does not distinguish fat from lean mass or capture central adiposity, which is relevant for Asian populations and for current thinking on defining clinical obesity [30]; future work should add waist circumference or body-composition measurement. Finally, only Asian-Pacific cut-offs were used, so direct comparison with studies applying standard WHO categories should be made with care.

Figure 6. Conceptual framework: lifestyle determinants, the knowledge–practice gap and recommended institutional response.



5. Conclusion

Overnutrition affected 27.8% of healthcare professional students in Karimnagar, and a large gap separated good nutrition knowledge (84.2%) from adequate practice (38.4%) in every stream. Fast-food intake, prolonged sitting, short sleep, recreational screen time and academic stress independently raised the odds of overnutrition by about 1.6- to 2.5-fold. Campus health policy should move beyond education and address food environments, active breaks, sleep hygiene and stress support, and these measures should be evaluated in multi-centre and longitudinal studies.

6. Declarations

Ethics approval: IEC approval was obtained from the institutional ethics committee.

Informed consent: Written informed consent was obtained from all participants.

Funding: Self-funded.

Conflicts of interest: The authors declare no conflicts of interest.

Author contributions: AGA: conceptualisation, methodology, formal analysis, writing – original draft, supervision. AA: investigation, data curation, validation, writing – review and editing.

Data availability: The anonymised dataset is available from the corresponding author on reasonable request.

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