Analysis Of Dietary Patterns And Their Relationship With Body Mass Index (BMI) Among 2022 Medical Students At UNPRI

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Abstract.

Background: Dietary patterns strongly influence Body Mass Index (BMI), a key anthropometric measure for nutritional status. Medical students face dietary disruptions from academic stress and irregular schedules, increasing obesity risk. Objective: To examine the association between dietary patterns and BMI among Universitas Prima Indonesia medical students, class of 2022. Methods: A quantitative correlational cross-sectional study was conducted on 198 randomly sampled students. A 15-item dietary pattern questionnaire (Cronbach's α = 0.959) and measured weight and height data were used. Data were analyzed with univariate statistics, the Kolmogorov–Smirnov normality test, and Spearman correlation. Results: Fifty-one percent of students had good dietary patterns, while 61.1% exhibited non-normal BMI (overweight or obese). Spearman analysis showed a strong negative correlation between dietary patterns and BMI ($r = –0.639$, $p < 0.001$). Conclusion: Better dietary patterns are significantly associated with normal BMI. Interventions promoting healthy eating and continued nutritional education are recommended.

Keywords: *Body Mass Index; Cross-Sectional Study; Dietary Patterns; Medical Students and Spearman Correlation.*

I. INTRODUCTION

Body Mass Index (BMI) represents a fundamental anthropometric measurement used globally to assess an individual's nutritional status, calculated as body weight in kilograms divided by the square of height in meters. The World Health Organization employs BMI categorization to classify nutritional status ranging from underweight through normal weight to obesity, with specific cut-off points adapted for Asian populations due to their higher susceptibility to metabolic complications at lower BMI thresholds (Li et al., 2022; Lim et al., 2017). Maintaining optimal body weight extends beyond aesthetic concerns to encompass critical health implications, as both excessive and insufficient body weight significantly elevate risks for cardiovascular diseases, hypertension, and type 2 diabetes mellitus (Muñoz-Galeano et al., 2025; Platikanova et al., 2022). Recent global epidemiological data indicate alarming trends, with obesity prevalence projected to increase substantially across multiple regions, particularly affecting younger populations transitioning into independent living arrangements (Szemik et al., 2024; Yun et al., 2018).Dietary patterns constitute a primary determinant of BMI fluctuations and overall nutritional status. Consumption patterns characterized by high intakes of sugar and saturated fats coupled with insufficient dietary fiber disrupt energy homeostasis and promote adipose tissue accumulation (Hu et al., 2020; Anyanwu et al., 2022). Conversely, regular adherence to nutritionally balanced dietary regimens incorporating appropriate proportions of macronutrients and micronutrients facilitates maintenance of ideal body weight and metabolic health (Platikanova et al., 2022; Syahruramdhani et al., 2023).

Contemporary research demonstrates strong associations between frequent fast food consumption and elevated BMI among young adult populations, with Indonesian college students showing particularly high consumption rates, where 91.2% regularly incorporate fast food into their diets (Zhang et al., 2025; Afriani et al., 2025). Furthermore, evidence suggests that unhealthy eating behaviors, including meal skipping, inadequate fruit and vegetable intake, and excessive consumption of processed foods, commonly emerge during the university transition period (Yun et al., 2018; Muñoz-Galeano et al., 2025).Medical students represent a population uniquely vulnerable to dietary pattern disruptions attributable to multiple concurrent stressors, including intensive academic workloads, chronic sleep deprivation, and psychological pressure (Lee et al., 2022; Szemik et al., 2024). The demanding nature of medical curriculum often necessitates extended study hours and irregular schedules, which compromise opportunities for meal preparation and regular eating patterns, increasing reliance on convenient but nutritionally suboptimal food choices (Seyam et al., 2025; Alexatou et al., 2025). Academic stress functions as a significant trigger for

emotional eating behaviors, where individuals consume energy-dense comfort foods as maladaptive coping mechanisms to regulate negative affective states (Silva et al., 2025; Alexatou et al., 2025). This phenomenon manifests particularly prominently among Indonesian medical students, where investigations have documented positive correlations between emotional eating tendencies and elevated BMI (Mulya Salsabila et al., 2024; Abadi et al., 2025).

The confluence of sedentary lifestyle patterns, characterized by prolonged seated academic activities and minimal physical activity, further compounds obesity risk among this demographic (Cuyan-Zumaeta et al., 2025; Szemik et al., 2024). Longitudinal studies tracking medical students across academic years reveal progressive increases in BMI and body fat percentage, with the most pronounced changes occurring during initial and final study years (Szemik et al., 2024; Muñoz-Galeano et al., 2025).Despite accumulating evidence linking dietary patterns with BMI variations in university populations globally, comprehensive investigations examining these relationships specifically within Indonesian medical student cohorts remain notably limited. This knowledge gap assumes particular significance given Indonesia's rising obesity rates, which increased from 10.5% in 2007 to 21.8% in 2018, alongside distinctive cultural dietary practices and economic factors that may uniquely influence eating behaviors (Hanauli et al., 2022). Previous research conducted in similar Asian contexts has yielded conflicting findings regarding the strength and directionality of associations between specific dietary components and anthropometric outcomes, suggesting potential moderating influences of institutional, cultural, and individual factors (Yun et al., 2018; Platikanova et al., 2022). Understanding these relationships within the specific context of Indonesian medical education is essential for developing culturally appropriate, evidence-based interventions to promote optimal nutritional status and prevent obesity-related complications in this high-risk population.

This study was conducted to regularly analyze the association between dietary patterns and Body Mass Index among medical students at the Faculty of Medicine, Universitas Prima Indonesia, Class of 2022. The research addresses a critical gap in current scientific understanding by providing empirical data on how dietary behaviors specifically influence nutritional status within this institutional and cultural context, where unique factors such as curriculum structure, campus food environments, and socioeconomic characteristics may distinctly shape eating patterns and weight outcomes. The findings are anticipated to generate scientific evidence supporting the development of targeted nutritional interventions, health promotion programs, and institutional policies designed to foster healthy dietary practices and maintain optimal body weight among medical students. Furthermore, this investigation contributes to the expanding body of literature on nutritional epidemiology in medical education settings, highlighting the imperative for educational institutions to integrate comprehensive wellness support systems that address both academic excellence and student health, ultimately cultivating healthcare professionals equipped with knowledge and practices conducive to lifelong wellness (Hanauli et al., 2022; Muñoz-Galeano et al., 2025; Yun et al., 2018).

II. METHODS

This study employed a quantitative correlational design with a cross-sectional approach to examine the association between dietary patterns and Body Mass Index (BMI) among medical students at Universitas Prima Indonesia, class of 2022. A cross-sectional design enables efficient measurement of both independent and dependent variables at a single time point without experimental manipulation, making it suitable for nutritional epidemiology in student populations (Creswell & Creswell, 2022; Sugiyono, 2021). The population comprised all active 2022-cohort students (N = 212), from which a simple random sample of 198 participants was drawn to ensure representativeness and minimize selection bias (Sutriyawan, 2021; Sudaryono, 2022).Data collection involved a structured questionnaire assessing dietary patterns through 15 items on consumption frequency and food type, rated on a four-point Likert scale (1 = never to 4 = always). Total scores were categorized as good (>75%), moderate (50–75%), or poor (<50%) dietary patterns, reflecting validated scoring methods (Emzir, 2021; Anyanwu et al., 2022).

Anthropometric measurements of weight and height followed World Health Organization protocols to calculate BMI (kg/m²), then classified according to Asia-Pacific criteria: underweight (<18.5), normal (18.5–22.9), overweight (23–24.9), and obese (≥25) (Li et al., 2022; WHO, 2020).Before main data

collection, the questionnaire underwent validity testing using item-total correlations (all $r > 0.138$, $p < 0.05$) and reliability assessment, yielding Cronbach's alpha = 0.959, indicating excellent internal consistency (Putra & Santosa, 2021; Emzir, 2021). Inclusion criteria were age 18–25 years, active enrollment, and informed consent; students on special diets or with incomplete data were excluded. Data analysis used SPSS for univariate description of demographic, dietary, and BMI distributions, normality testing via Kolmogorov–Smirnov, and bivariate association assessment through Spearman rank-order correlation, with significance set at $p < 0.05$ (Sudaryono, 2022; Sugiyono, 2021).

III. RESULT AND DISCUSSION

Characteristic Description

Table 1. Frequency Distribution by Force and Gender

Angkatan	Jenis Kelamin	Jumlah	Persentase
2023	Laki-laki	57	28,8%
	Perempuan	141	71,2%
Total		198	100%

Referring to Table 1, all 198 participants were from the class of 2023. Of these, 57 were male students (28.8%), while 141 were female students (71.2%). This finding indicates that female respondents were more involved than male respondents. Therefore, the majority of respondents in this study were female students.

Dietary Overview

Table 1. Distribution of Respondents' Dietary Patterns

		Frekuensi	Persentase
Kategori	Kurang	64	32.3%
	Cukup	33	16.7%
	Baik	101	51.0%
	Total	198	100.0%

Based on the results of the frequency distribution analysis presented in Figure 4.2, it is known that the majority of respondents had a diet in the good category, namely 101 people (51.0%). Meanwhile, respondents with a diet in the poor category were recorded at 64 people (32.3%), while those in the adequate category were 33 people (16.7%). Thus, it can be concluded that more than half of the respondents had a diet in the good category.

Body Mass Index Overview

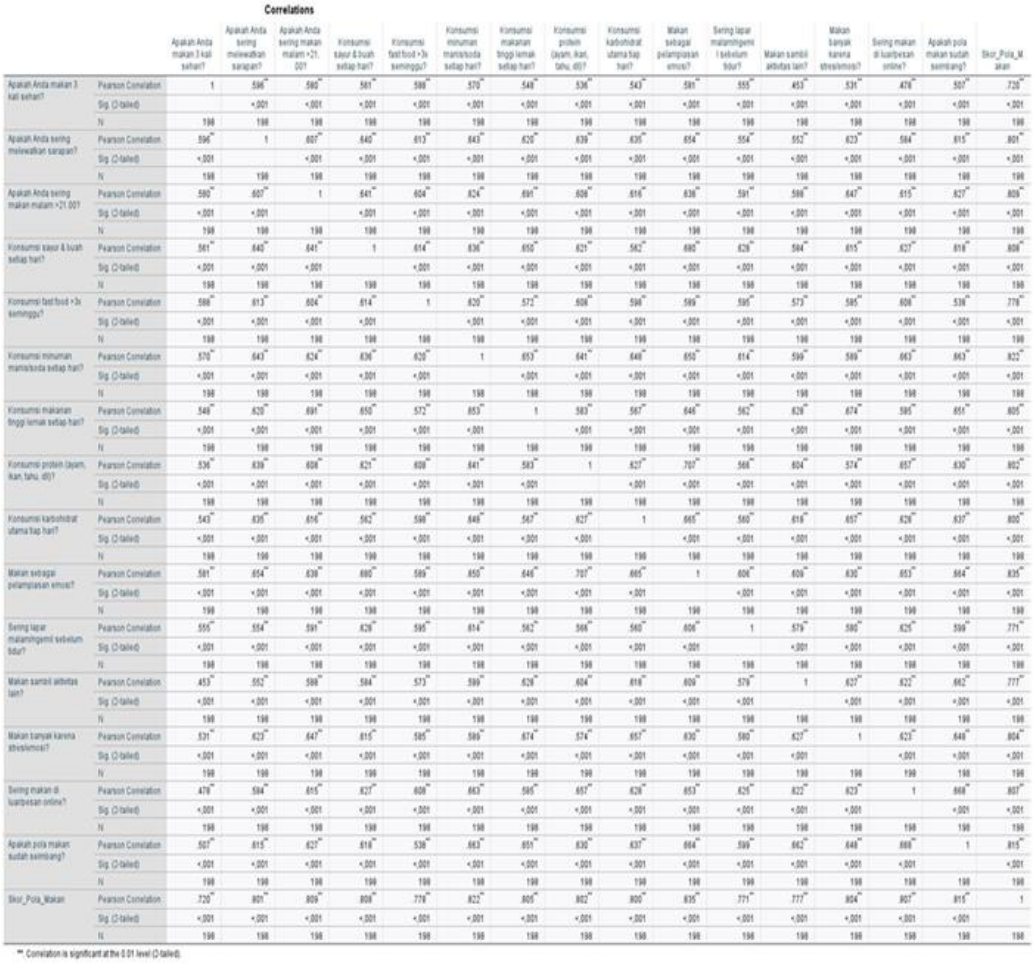
		Frekuensi	Persentase
Kategori	Underweight	2	1%
	Normal	77	38.9%
	Overweight	45	22.7%
	Obesitas	74	37.4%
	Total	198	100%

Table 2. Distribution of Respondents' BMI

The frequency distribution analysis shown in Figure 4.3 shows that the majority of respondents had a body mass index (BMI) in the normal category, namely 77 people (38.9%), and the obesity category was 74 people (37.4%). Meanwhile, respondents in the overweight category were recorded at 45 people (22.7%), and the underweight category was experienced by only 2 respondents (1.0%). Therefore, it can be concluded that more than half of the respondents (61.1%) were included in the group with an abnormal BMI, either underweight, overweight, or obese.

Validity and Reliability Test

Validity Test



Correlations

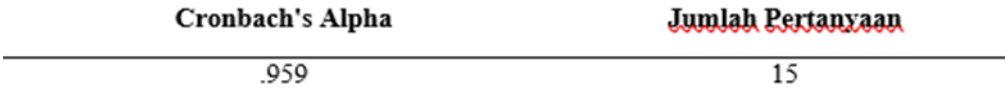
		Apakah Anda makan 3 kali sehari?	Apakah Anda sering melewatkan sarapan?	Apakah Anda sering makan malam >21.00?	Konsumsi sayur & buah setiap hari?	Konsumsi fast food >3x seminggu?	Konsumsi minuman manis/soda setiap hari?	Konsumsi makanan tinggi lemak setiap hari?	Konsumsi protein (ayam, ikan, tahu, dll)?	Konsumsi karbohidrat utama tiap hari?	Makan sebagai pelampiasan emosi?	Sering lapar malamhingga sebelum tidur?	Makan camilan aktivitas lain?	Makan banyak karena stress/emosi?	Sering makan di luar/pesan online?	Apakah pola makan sudah seimbang?	Skor_Pola_Makan
Apakah Anda makan 3 kali sehari?	Pearson Correlation	1	.596**	.580**	.581**	.598**	.570**	.548**	.536**	.543**	.591**	.555**	.453**	.531**	.478**	.507**	.720**
	Sig. (2-tailed)		<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Apakah Anda sering melewatkan sarapan?	Pearson Correlation	.596**	1	.607**	.640**	.613**	.643**	.620**	.639**	.635**	.654**	.554**	.552**	.623**	.584**	.615**	.801**
	Sig. (2-tailed)	<.001		<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Apakah Anda sering makan malam >21.00?	Pearson Correlation	.580**	.607**	1	.641**	.604**	.624**	.691**	.606**	.616**	.636**	.591**	.588**	.647**	.615**	.627**	.809**
	Sig. (2-tailed)	<.001	<.001		<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Konsumsi sayur & buah setiap hari?	Pearson Correlation	.581**	.640**	.641**	1	.614**	.636**	.650**	.621**	.562**	.680**	.628**	.594**	.615**	.627**	.618**	.808**
	Sig. (2-tailed)	<.001	<.001	<.001		<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Konsumsi fast food >3x seminggu?	Pearson Correlation	.598**	.613**	.604**	.614**	1	.620**	.572**	.606**	.598**	.589**	.595**	.573**	.585**	.608**	.538**	.778**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001		<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Konsumsi minuman manis/soda setiap hari?	Pearson Correlation	.570**	.643**	.624**	.636**	.620**	1	.653**	.641**	.648**	.650**	.614**	.599**	.589**	.663**	.663**	.822**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001		<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Konsumsi makanan tinggi lemak setiap hari?	Pearson Correlation	.548**	.620**	.691**	.650**	.572**	.653**	1	.583**	.567**	.646**	.562**	.628**	.674**	.585**	.651**	.805**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001		<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Konsumsi protein (ayam, ikan, tahu, dll)?	Pearson Correlation	.536**	.639**	.606**	.621**	.606**	.641**	.583**	1	.627**	.707**	.568**	.604**	.574**	.657**	.630**	.802**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001		<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Konsumsi karbohidrat utama tiap hari?	Pearson Correlation	.543**	.635**	.616**	.562**	.598**	.648**	.567**	.627**	1	.665**	.560**	.618**	.657**	.628**	.637**	.800**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001		<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Makan sebagai pelampiasan emosi?	Pearson Correlation	.591**	.654**	.636**	.680**	.589**	.650**	.646**	.707**	.665**	1	.606**	.609**	.630**	.653**	.664**	.835**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001		<.001	<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Sering lapar malamhingga sebelum tidur?	Pearson Correlation	.555**	.554**	.591**	.628**	.595**	.614**	.562**	.568**	.560**	.606**	1	.579**	.580**	.625**	.599**	.771**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001		<.001	<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Makan camilan aktivitas lain?	Pearson Correlation	.453**	.552**	.588**	.594**	.573**	.599**	.628**	.604**	.618**	.609**	.579**	1	.627**	.622**	.662**	.777**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001		<.001	<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Makan banyak karena stress/emosi?	Pearson Correlation	.531**	.623**	.647**	.615**	.595**	.589**	.674**	.574**	.657**	.630**	.580**	.627**	1	.623**	.648**	.804**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001		<.001	<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Sering makan di luar/pesan online?	Pearson Correlation	.478**	.584**	.615**	.627**	.608**	.663**	.585**	.657**	.628**	.653**	.625**	.622**	.623**	1	.668**	.807**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001		<.001	<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Apakah pola makan sudah seimbang?	Pearson Correlation	.507**	.615**	.627**	.618**	.538**	.663**	.651**	.630**	.637**	.664**	.599**	.662**	.648**	.668**	1	.815**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001		<.001
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Skor_Pola_Makan	Pearson Correlation	.720**	.801**	.809**	.808**	.778**	.822**	.805**	.802**	.800**	.835**	.771**	.777**	.804**	.807**	.815**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	
	N	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198

** Correlation is significant at the 0.01 level (2-tailed).

Table 4. Distribution of Respondents' BMI

Validity testing of the 15 dietary pattern questionnaire items showed that each item had a correlation coefficient with the total score that exceeded the critical limit of r table (0.138) and reached statistical significance, $p < 0.05$. This finding indicates that all items meet the instrument's validity requirements, meaning that each question accurately reflects the intended construct and provides consistent responses. Therefore, all items were declared suitable for use in this study without requiring modification or deletion.

Reliability Test



Cronbach's Alpha	Jumlah Pertanyaan
.959	15

Fig 5. Test Results

The reliability test results for the 15 questions regarding dietary patterns showed a Cronbach's Alpha value of 0.959. This figure is well above the minimum limit of 0.70, thus concluding that the questionnaire instrument has a very high level of reliability and consistency, making it suitable for use as a measurement tool in this study.

Bivariate Analysis

The Spearman correlation test between dietary pattern and body mass index (BMI) categories showed a correlation coefficient of $r = -0.639$ with a significance level of $p < 0.001$ ($p < 0.05$). This finding confirms a strong and meaningful relationship between dietary pattern and BMI. This negative correlation indicates that the better a person's diet, the greater the likelihood of their BMI being in the normal category. Conversely, the lower the quality of their diet, the higher the likelihood of the respondent being overweight or obese.

Discussion

			Kategori Pola Makan	Kategori IMT
Spearman's rho	Kategori Pola Makan	Correlation Coefficient	1.000	-.639**
		Sig. (2-tailed)	.	.000
		N	198	198
	Kategori IMT	Correlation Coefficient	-.639**	1.000
		Sig. (2-tailed)	.000	.
		N	198	198

The findings of this study indicate a significant association between dietary patterns and Body Mass Index (BMI) in students from the Faculty of Medicine, Prima Indonesia University, class of 2022. Based on the Spearman correlation test, a correlation coefficient of -0.639 was obtained with a significance value of $p < 0.001$, indicating a negative association between the two variables with a strong degree of closeness. This indicates that students with better dietary patterns tend to have a BMI within the normal range, while poor dietary patterns are associated with excessive weight gain or loss.The majority of respondents in this study demonstrated a healthy diet (51%), but 61.1% of students still had a BMI outside the normal range. This fact illustrates that nutritional knowledge is not always followed by healthy and consistent eating behaviors. Busy class schedules, academic stress, and the habit of choosing convenience foods like fast food can affect the quality of students' daily intake. These results are similar to the study(Silva et al., 2025), which explains that academic pressure can trigger changes in eating patterns, including increased consumption of high-calorie foods as an adaptation mechanism to stress.The results of this study also support the findings.(Ganesrau et al., 2023)And(Rostami-Tabar et al., 2023)

Which states that consuming foods high in fat and sugar but low in fiber is associated with increased BMI among college students. Physiologically, when energy intake exceeds body needs and is not balanced with sufficient physical activity, the excess energy is stored as body fat, leading to weight gain.(Bschaden et al., 2025)Conversely, adopting a regular diet with a balanced nutritional composition of protein, minerals, fat, carbohydrates, and vitamins will help maintain a stable BMI and metabolic health.Besides dietary factors, low physical activity also contributes to abnormal BMI results. Some students tend to spend a lot of time indoors for academic activities, severely limiting their daily physical activity. This is similar to the study.(Cuyan-Zumaeta et al., 2025)This states that a sedentary lifestyle is the dominant factor causing increased BMI in medical students. Therefore, it is important for students to combine a balanced diet with adequate physical activity to maintain an ideal nutritional status. Overall, this study confirms that diet plays a significant role in student nutritional status. Healthy and regular eating habits, coupled with increased physical activity, can maintain BMI within the normal range. Universities play a crucial role in supporting this, for example, by providing sports facilities, conducting nutrition education, and encouraging healthy lifestyle habits within the academic environment. Therefore, the results of this study can serve as a basis for promotive and preventive efforts to maintain student health, particularly in medical education settings.

IV. CONCLUSION

The study demonstrated a strong, statistically significant negative correlation between dietary patterns and BMI among UNPRI medical students, class of 2022 ($r = –0.639$, $p < 0.001$). Over half of participants exhibited good dietary habits, yet 61.1% had BMIs outside the normal range, indicating that healthy eating behaviors alone do not guarantee optimal nutritional status. Key factors such as frequent fast food consumption, irregular meal timings, and emotional eating under academic stress contributed to

increased overweight and obesity prevalence in this cohort. These findings align with global and regional studies linking poor dietary patterns with elevated BMI in young adults, underscoring the critical influence of eating behaviors on weight outcomes in medically trained populations.However, the cross-sectional design limits causal inference, and reliance on self-reported dietary data may introduce recall and social desirability biases. The single-institution sample also limits generalizability to other medical schools with different campus food environments and cultural contexts.

Future research should employ longitudinal methods, incorporate objective dietary and physical activity measurements, and explore mediating factors such as stress, sleep quality, and socioeconomic status. Interventional studies assessing the effectiveness of campus-based nutrition education, structured meal planning workshops, and stress management programs are also warranted to establish evidence-based strategies for improving dietary behaviors and BMI outcomes. Practically, these results highlight an urgent need for medical schools to integrate comprehensive wellness initiatives that promote balanced dietary patterns and regular physical activity. Implementing healthy cafeteria options, mandatory nutrition modules within the curriculum, and peer-led support groups can foster sustainable behavior change. Additionally, routine BMI and dietary pattern screening with personalized feedback may enable early identification of at-risk students and timely intervention. By addressing dietary and lifestyle determinants of BMI, medical institutions can enhance student health, academic performance, and long-term professional well-being.

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