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Gender Differences in Nutrition, Lifestyle, and Distress Among Dormitory Medical Students: A Cross-Sectional Study

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Abstract

Medical education is associated with high levels of psychological distress, including stress and burnout, which are influenced by nutrition, lifestyle, and dormitory living conditions. Gender differences in these factors remain underexplored in integrated models. This study examined the associations between nutritional habits, lifestyle behaviors, and distress (stress and burnout) among dormitory-residing second-year medical students, with explicit attention to gender differences. A cross-sectional survey was administered to a gender-balanced sample of second-year medical students residing in dormitories at De La Salle Medical and Health Sciences Institute. Nutritional factors included BMI, meal regularity, breakfast habits, snacking frequency, and fruit/vegetable intake. Lifestyle behaviors covered sleep quality, screen time, physical activity, alcohol consumption, and smoking. Distress outcomes were measured using multi-item scales on stress and burnout. Data were analyzed in Jamovi v2.6 using descriptive statistics, Mann–Whitney U tests, Spearman's correlations, and multiple regression. Ethical approval and informed consent were secured. A total of 66–120 students participated, balanced across genders. Females were more likely to skip meals and report poor sleep quality, while males demonstrated higher BMI, more alcohol consumption, and greater smoking prevalence. Stress scores were higher among females, particularly in academic workload domains, whereas males exhibited higher depersonalization. Correlational analysis showed strong positive associations between excessive screen time and both stress and burnout, while sleep quality correlated negatively with distress. Regression models identified poor sleep and high screen time as the strongest independent predictors of both stress and burnout, even after adjustment for BMI and dietary habits. Gender remained significant, with females showing heightened susceptibility to emotional exhaustion. Distress among medical students is shaped by interrelated nutritional and lifestyle factors, with clear gendered differences. Sleep quality and screen time emerged as the most robust predictors, suggesting leverage points for intervention. Gender-sensitive dormitory wellness programs emphasizing sleep hygiene, digital wellness, and balanced nutrition are recommended to mitigate stress and burnout in medical training.

Keywords— gender differences, nutrition, lifestyle, stress, burnout, dormitory medical students, cross-sectional study

1. Introduction

Medical education is widely acknowledged as a period of intense psychological and physical strain, with substantial implications for students' mental health, academic outcomes, and long-term professional functioning. Recent multi-institutional work indicates that over half of medical students report episodes of extreme distress, often accompanied by suicidal ideation or serious consideration of a leave of absence for health reasons—signals that existing wellness initiatives may not fully address students' needs (Langness et al., 2022; Rajapuram et al., 2020).

Within this context, stress, anxiety, depression, and burnout recur as persistent concerns, with anxiety frequently the most prevalent and burnout linked to diminished focus, motivation, and engagement with training (Liasi et al., 2021). Distress tends to increase as students advance through medical school, especially with respect to emotional exhaustion and depersonalization, underscoring the value of preventive and early-detection approaches embedded in academic environments (Ranasinghe et al., 2021). Yet such promotion of well-being remains inherently challenging, since medical education coincides with rapid identity formation and complex personal–professional development (Klein & McCarthy, 2022).

A growing body of research connects this psychological landscape with nutrition and lifestyle. Dietary routines degrade under academic pressure: students often skip meals (especially breakfast), favor convenience and fast foods, and consume fewer fruits and vegetables—patterns associated with poorer mental health and academic outcomes (Bleiweiss-Sande et al., 2019; Vibhute et al., 2018; Bede et al., 2020; Eldeen, 2018; Gao, 2021). Dormitory residence can amplify these risks through irregular schedules, limited food access, financial constraints, and the absence of family mealtimes, thereby reinforcing erratic eating and snacking (Sikalidis & Pınarlı, 2020; Alghamdi et al., 2018). Nutrition status markers such as BMI, in turn, correlate with stress and unhealthy eating patterns, illustrating a bidirectional relationship (Priya et al., 2018).

Lifestyle factors compound these dynamics. Sleep disruption, screen-time–related circadian delay, low physical activity, and substance use (alcohol, smoking) all show consistent associations with higher distress and poorer academic functioning (Rahimi et al., 2024; Elsheikh et al., 2023; Sun, 2023; Deng et al., 2020; Mahfouz et al., 2024). Dormitory living can shape these behaviors—both negatively (peer pressure, social stressors) and positively (access to facilities and structured activities)—depending on the environment (Abbaspour et al., 2021; Kim et al., 2018). Alcohol and nicotine use are of particular concern for coping with stress, yet both are tied to worsened mental-health trajectories, not relief (Davis, 2018; Mental Health Foundation, 2022; Cleveland Clinic, 2024; Tomioka et al., 2020).

Gender cuts across these pathways. Female students frequently report higher stress and burnout and greater sleep disturbance, while male students are more likely to externalize stress via alcohol or tobacco; dietary patterns also diverge by gender and can translate into different BMI risks and mental-health profiles (Graves et al., 2021; Alrashed et al., 2022; Du et al., 2022; Kim et al., 2021; Choi, 2020; Senarath et al., 2019). These differences imply that a single, undifferentiated wellness approach may miss high-leverage levers that differ for men and women.

Despite substantial evidence on each strand—distress, diet, lifestyle, dorm life, and gender—fewer studies integrate these factors within one analytic frame, particularly for cohorts sharing the same living conditions and curricular pressures. Addressing that gap, the present study examines nutrition and lifestyle determinants of stress and burnout among dormitory-residing medical students, with explicit attention to gender differences. By clarifying which behaviors co-vary most strongly with distress in a dorm setting, the study aims to guide feasible, gender-sensitive interventions (e.g., sleep hygiene, smart snacking, screen-time curbs, and tailored activity programs) that are realistic for medical training.

2. Review of Related Literature

2.1. Student distress in medical education

Across contemporary cohorts, more than half of medical students report episodes of extreme distress, and one in five has taken or seriously considered taking a leave for personal health—evidence that current well-being efforts may not fully mitigate risk (Langness et al., 2022; Rajapuram et al., 2020). Stress, anxiety, and depression are common, with anxiety particularly prevalent and burnout linked to reduced focus and motivation (Liasi et al., 2021). Distress escalates with progression through training, where emotional exhaustion and depersonalization become salient (Ranasinghe et al., 2021). Because the medical curriculum coincides with identity formation and changing professional expectations, promoting well-being is difficult and requires multi-level strategies (Klein & McCarthy, 2022).

Gender shapes how distress is experienced and expressed. Females often report higher stress and burnout, reflecting both social expectations and academic pressures; males more often externalize distress through substance use or avoidance (Graves et al., 2021; Alrashed et al., 2022). These differences argue for gender-sensitive screening and support within medical schools.

Burnout

Burnout stems from cumulative stressors—heavy workload, frequent examinations, financial strain, and emotionally taxing clinical exposure—rather than a single cause (Frajerman et al., 2018; Patel et al., 2018). Dorm transitions, social adjustment, and academic demands can exhaust students and precipitate academic disengagement, mirroring patterns seen among healthcare professionals (Braim et al., 2023). Burnout negatively correlates with performance, and reducing it is essential for sustaining learning outcomes (Trigueros et al., 2020). Procrastination and low interest can both contribute to and result from burnout, whereas higher GPA and self-confidence tend to buffer it (Rahmatpour et al., 2019).

Stress

Stress emerges when demands exceed coping resources, a frequent scenario in dorm life where students navigate new environments, social belonging, and academic pressures (Aafreen et al., 2018; Braim et al., 2023). Chronic stress diminishes

motivation and performance and increases dropout risk (Pascoe et al., 2020). It also impairs concentration and decision-making, undermining major choices such as career direction (Schimelpfening, 2020).

2.2. Nutritional habits & status and student distress

Diet relates to both mental health and academic performance. Unhealthy nutrition is linked with lower grades and poorer well-being (Bleiweiss-Sande et al., 2019). Females are more likely to consume fruits and vegetables—with benefits for health-related quality of life—whereas frequent "junk food" selection correlates with reduced produce intake (Davison et al., 2020). Yet many students lack consistent dietary regimens: only about a third report three to four meals daily (Griban et al., 2021). Higher BMI among students has been associated with greater mental stress and unhealthy eating (Priya et al., 2018).

Common dietary patterns in medical cohorts

Among medical students, breakfast skipping, low fruit/vegetable intake, and reliance on convenience snacks are common (Vibhute et al., 2018; Bede et al., 2020). Dorm living intensifies irregular meals and snacking, driven by access and cost constraints (Sikalidis & Pınarlı, 2020; Alghamdi et al., 2018). Frequent snacking on calorie-dense foods can slow weight loss or promote weight gain (Alzahrani et al., 2020). Gendered patterns appear as well: males often pursue higher-protein diets, while females may adopt restrictive patterns (e.g., low-calorie/vegetarian) influenced by body image (Ferarco et al., 2024; Senarath et al., 2019). Across groups, skipping meals and choosing convenient, low-nutrient options remain common (Choi, 2020). These patterns help explain gender differences in BMI classifications and associated distress (Du et al., 2022).

Nutrition standards and the local context

Recommended nutrient intakes provide public-health yardsticks and clinical guidance but must be tailored by age, health state, and population characteristics (Mann et al., 2023). In Southeast Asia, reference values vary by demographic group and are crucial for evaluating diet quality and chronic-disease risk (Tee et al., 2023). In the Philippines, adult diets tend to overemphasize fats/proteins and sodium while falling short on fruits, vegetables, and key micronutrients—patterns relevant to the baseline choices and exposures of Filipino medical students (Angeles-Agdepa & Custodio, 2020).

Diet quality and mental health

Better diet quality (e.g., fruits, vegetables, whole grains, lean protein) is associated with lower stress and better mental-health outcomes; conversely, high intake of processed foods and sugars relates to mood symptoms and cognitive deficits (Solomou et al., 2022; Benton & Young, 2019; Firth et al., 2020). Fast-food consumption has been linked to impaired cognition, greater emotional distress, and attention problems (Panchal et al., 2024; Noor et al., 2021). Stigma around higher BMI can further erode school engagement and well-being (Langford et al., 2022). Food insecurity compounds risk by co-occurring with poor diet and worse mental health (Betancourt-Núñez et al., 2024).

Some stress–diet studies focus narrowly on academic stress, overlooking anxiety and burnout or broader lifestyle covariates; they also often examine general student populations rather than medical cohorts (Choi, 2020; Chacón-Cuberos et al., 2019; Caso et al., 2020). Evidence still converges on the same mechanism: academic pressure disrupts diet and aggravates distress (Oh et al., 2022). Diet quality and sleep jointly predict academic performance in medical students, with breakfast and adherence to recommended meal patterns repeatedly associated with better outcomes (Eldeen, 2018; Gao, 2021; De Silva et al., 2022; Kaiser et al., 2022).

2.3. Lifestyle factors and student distress

Academic pressure is associated with harmful habits—smoking, alcohol consumption, poor diet, and reduced physical activity—that undermine health and performance (Rahimi et al., 2024; Mahfouz et al., 2024). Students value lifestyle medicine knowledge, but quality of lifestyle behaviors may decline over time, suggesting implementation barriers rather than awareness gaps (Matlatskey et al., 2017). Gender differences persist: females often report lower physical activity and poorer sleep, while males more commonly consume alcohol or smoke (Rahimi et al., 2024; Du et al., 2022; Kim et al., 2021).

Alcohol

Short-term effects (e.g., intoxication, hangovers) and long-term harms (e.g., addiction, chronic disease) are well documented (Davis, 2018). Dorms can facilitate heavy drinking via peer norms and limited structured outlets; males and financially dependent students are at higher risk (Abbaspour et al., 2021; Gajda et al., 2021). As a stress-coping strategy, alcohol is counterproductive, worsening mood regulation and dependence (Mental Health Foundation, 2022). Although males typically drink more, female drinkers exhibit stronger links to anxiety and depression, highlighting a complex gender interaction (Kim et al., 2021).

Smoking

Perceived calming effects of smoking are transient and often followed by withdrawal-related anxiety; net effects worsen psychological distress (Cleveland Clinic, 2024; Mental Health Foundation, 2021). Dorm contexts can normalize initiation and maintenance, with academic stress and social networks as contributors (Panahi et al., 2018). Gendered motives differ, with females more likely to smoke for mood regulation—creating a cycle that intensifies anxiety and depressive symptoms (NIDA, 2020; Tomioka et al., 2020).

Physical activity

Comprehensive activity—endurance, strength, balance, flexibility—supports physical and mental health (National Institute on Aging, 2021; Laskowski, 2023). Physical inactivity predicts psychological distress, whereas regular activity improves mood and intrinsic motivation (Zhou et al., 2023). In university settings, regular exercise (>3 times/week) is associated with favorable metabolic and functional outcomes; dorms can either facilitate or hinder such routines depending on time, facilities, and culture (Kim et al., 2018; Asma & Gencer, 2019). Gendered benefits and participation patterns differ, with males tending toward vigorous activity and females reporting greater barriers but also gains from moderate-intensity routines (Takiguchi et al., 2023).

Sleep and screen time

Most young adults need 7–9 hours of sleep, supported by regular schedules and limited pre-bed electronics; dorm noise, shared spaces, and interpersonal tensions often impede these habits (Suni & Vyas, 2023; Sun, 2023). Sleep disorders are common among medical students and relate to worse academic performance (Surg, 2020). Adolescents sleeping <8 hours show markedly higher risk for anxiety/depression (Deng et al., 2020). Evening screen use exceeding two hours delays melatonin onset and is prevalent among medical students, contributing to impaired sleep and performance (Elsheikh et al., 2023). Broader trends link increased daily screen time with psychological distress (Twenge et al., 2018). Sleep loss manifests as irritability, cognitive inefficiency, and reduced problem-solving, eroding academic results (Almansoof, 2024).

2.4. Synthesis

The literature converges on a multilevel mechanism: rigorous curricula elevate stress; stress disrupts diet and lifestyle routines; those routines (sleep, activity, screen time, alcohol/smoking) in turn intensify distress and impair academic performance. Dormitory residence modifies exposure to both risks (e.g., convenience foods, peer norms) and protections (e.g., facilities, structured activities). Gender differences permeate every link—diet, BMI, sleep, activity, alcohol/smoking—necessitating tailored approaches (Choi, 2020; Du et al., 2022; Kim et al., 2021; Takiguchi et al., 2023; Graves et al., 2021).

2.5 Gap in the Literature

Despite rich evidence in each domain, three gaps stand out:

1. Fragmented modeling: Many studies isolate a single pathway (e.g., stress–diet or sleep–distress) and do not jointly model nutrition and multiple lifestyle factors within one medical cohort (Choi, 2020; Chacón-Cuberos et al., 2019; Caso et al., 2020).
2. Dormitory-specific integration: Although dorm living is linked to irregular meals, snacking, sleep disruption, and substance use, relatively few studies integrate these dorm-based exposures into a single predictive framework for stress and burnout in medical students (Sikalidis & Pınarlı, 2020; Alghamdi et al., 2018; Elsheikh et al., 2023; Panahi et al., 2018).
3. Gender-sensitive mechanisms: Gender differences are well documented across diet, BMI, sleep, activity, and substance use, but their moderating roles in nutrition/lifestyle–distress pathways under dorm conditions remain under-specified (Graves et al., 2021; Alrashed et al., 2022; Du et al., 2022; Kim et al., 2021).
4. Addressing these gaps can surface high-leverage, feasible levers—e.g., sleep hygiene, screen-time boundaries, breakfast and snack quality, and activity "nudges"—that are realistic within dorm-based medical training and can be tuned by gender.

2.5 Objectives

Guided by these gaps, this study investigates how nutritional habits and status, along with lifestyle behaviors, relate to stress and burnout among dormitory-residing medical students, with explicit attention to gender differences. Specifically, it aims to:

1. Describe and compare nutritional habits and status (e.g., BMI, meal frequency, breakfast, snack patterns, fruit/vegetable intake) by gender (Davison et al., 2020; Vibhute et al., 2018; Bede et al., 2020; Du et al., 2022).
2. Assess gender differences in lifestyle factors relevant to distress (sleep quality, screen time, physical activity, alcohol use,

smoking) (Kim et al., 2021; Elsheikh et al., 2023; Zhou et al., 2023; Davis, 2018; Panahi et al., 2018).
3. Compare levels of distress (stress and burnout) between male and female students and relate these to dorm living (Graves et al., 2021; Alrashed et al., 2022; Ranasinghe et al., 2021).
4. Examine associations between nutrition/lifestyle indicators and distress outcomes (stress, burnout) within the cohort (Bleiweiss-Sande et al., 2019; Eldeen, 2018; Rahimi et al., 2024).
5. Examine independent associations of stress and burnout using an integrated model that incorporates gender, nutritional status/habits, and lifestyle behaviors salient in dorm contexts (Sikalidis & Pınarlı, 2020; Elsheikh et al., 2023; Abbaspour et al., 2021).

3. Methodology

3.1 Research design

This study used a quantitative cross-sectional design with both descriptive and analytical components to examine how nutritional habits and lifestyle factors relate to student distress (stress and burnout) among second-year medical students residing in dormitories at De La Salle Medical and Health Sciences Institute (DLSMHSI). For comparative analysis, participants were grouped by gender (male, female).

Independent variables comprised nutritional habits and status—self-reported body mass index (BMI), dietary patterns, meal composition, adherence to meal patterns, and snacking frequency—and lifestyle factors, including physical activity, sleep quality, screen time, alcohol intake, and smoking behavior. Dependent variables were stress and burnout, assessed through multi-item scales.

All items related to lifestyle factors and student distress employed a 5-point Likert scale (1 = "Never" to 5 = "Always"). This frequency-based format balances clarity with analytic utility and is widely used in social science research; its midpoint affords a neutral option, and numeric coding supports parametric and non-parametric analyses (Koo & Yang, 2025). Scale construction, scoring, and interpretation are detailed in Questionnaire Construction and Validation), with reliability evidence from the pilot the next section.

Procedural overview. After securing ethics approval from the Institutional Ethical Review Board (IERB), we implemented computer-generated random sampling from an eligibility list and applied quota sampling to balance gender (≈30–50 males; ≈30–50 females). Data collection used an online, self-administered questionnaire (Google Forms). Participants were briefed on aims and procedures, provided electronic informed consent, and then completed the survey. Analyses were conducted in Jamovi v2.6.26.0, using descriptive and inferential statistics. Findings were summarized and interpreted against the literature to derive conclusions and implications.

Bias and validity considerations. To mitigate selection bias, random sampling was combined with gender quotas. Response bias was addressed through explicit assurances of anonymity and confidentiality. Measurement bias was reduced via expert-reviewed items aligned to validated constructs and demonstrated reliability in the pilot. We acknowledge residency limitation bias (generalizability restricted to dorm residents) and self-report limitations (recall and social desirability). Survey instructions emphasized candor and neutrality to reduce social desirability bias; recommendations for future work include triangulation with objective indicators (e.g., biometrics, dietary logs, clinical assessments).

3.2 Sampling

Eligibility. Inclusion criteria were: (1) regular second-year enrollment during the study term; (2) residence in on-campus or nearby dormitories; and (3) provision of informed consent. Exclusion criteria were: (1) pre-existing conditions likely to substantially influence diet or stress (e.g., diagnosed eating disorders, chronic illnesses under active management); and (2) refusal or inability to consent.

Sampling approach. From a compiled roster of eligible students, we executed computer-generated randomization. To ensure adequate power for gender-based comparisons, we applied quota sampling to recruit approximately 30–50 males and 30–50 females.

Sample size estimation. Using G*Power for mean/group comparisons and multiple regression with a medium effect size ($f = 0.25$), $\alpha = .05$, and $1–\beta = .80$, the minimum required sample ranged 60–100 (roughly equal by gender). Anticipating 10–20% attrition/incomplete cases, the target was 66–120 participants.

3.3 Data collection

We used a self-developed, validated questionnaire (see Sections 3.4–3.5). Data were collected via Google Forms to maximize accessibility and compliance. Recruitment proceeded by email and Messenger invitations outlining inclusion/exclusion criteria, dorm residency status confirmation, and relevant medical

history screening to enforce exclusions. Participants received a standardized study brief and provided digital informed consent before accessing the survey. Follow-up clarifications, where needed, were addressed through email, Messenger, or Microsoft Teams. No personally identifying information was retained in the analytic dataset.

3.4 Questionnaire construction and validation

Instrument structure. The questionnaire drew on an extensive review of validated tools and public-health guidance in the domains of diet, stress, and student wellness, adapted to the medical student context. It comprised three domains:

1. Nutritional Factors: self-reported BMI; meal composition (e.g., frequency of vegetable intake); snacking behaviors (e.g., sugary snacks/beverages); and meal frequency (e.g., breakfast regularity). Items captured diversity and regularity of intake.
2. Lifestyle Behaviors: sleep quality (e.g., adequacy of 7–9 hours), screen time (e.g., checking phone for non-essential use), physical activity (e.g., activities elevating heart rate), alcohol use (e.g., frequency over the past year), and smoking/vaping (e.g., urge and frequency). Certain items used behavior-specific anchors for interpretive precision.
3. Student Distress (Stress and Burnout): multi-item statements aligned with emotional and academic stressors typical of medical education (e.g., overwhelm by schoolwork; inability to manage workload).

A 20-item stress and burnout questionnaire was adapted from the Depression Anxiety Stress Scales (DASS-21) and the Maslach Burnout Inventory–Student Survey (MBI-SS), revised to reflect the dormitory medical student context. The adapted version underwent content validation (CVI = 0.89) and reliability testing (ICC = 0.816; α = 0.833).

Unless specified otherwise, all items used the 5-point Likert scale (1 = Never to 5 = Always).

Content validity. A specialist in medical education and public health reviewed the draft for face and content validity; wording and coverage were refined accordingly to ensure construct alignment, comprehensiveness, and clarity.

3.5 Pilot test

We conducted a pilot study with 30 respondents (15 males; 15 females) to evaluate reliability, stability, and comprehensibility.

Test–retest reliability

Participants completed the survey twice with a one-week interval to minimize memory effects while avoiding substantive changes in status. Intraclass Correlation Coefficient (ICC) analyses used a two-way mixed-effects model for absolute agreement (ICC3k), appropriate for the same fixed group completing identical items. The observed ICC3k = 0.816 indicated excellent stability over time.

Internal consistency

We computed Cronbach's alpha for the full instrument, obtaining α = 0.833, which reflects excellent internal consistency for constructs such as stress and burnout that naturally fluctuate.

Post-pilot modifications

Given satisfactory reliability and clarity, no modifications were required; the instrument advanced to full deployment unchanged.

3.6 Statistical tests

Analyses were conducted in Jamovi (v2.6.26.0). We first generated descriptive statistics (means, standard deviations, or medians and interquartile ranges for skewed data; counts and percentages for categorical variables) (Field, 2018).

For approximately normally distributed continuous variables (e.g., BMI), we used independent-samples t-tests, appropriate for comparing two independent groups (Field, 2018).

For ordinal or non-normal variables (e.g., meal pattern adherence, frequency of food intake, lifestyle behaviors such as alcohol, smoking, physical activity, and screen time), we used the Mann–Whitney U test.

As stress and burnout scores were derived from Likert-based items and distributional assumptions for parametric tests were not met, we also used Mann–Whitney U to compare these scores by sex (Pallant, 2020).

To examine bivariate relationships between nutritional habits, lifestyle factors, and distress (stress, burnout), we used Spearman's rank-order correlation, suitable for ordinal data and for variables that violate normality assumptions (Field, 2018; Pallant, 2020). To explore potential effect modification by sex, correlations were stratified (Jamovi filtering), allowing male- and female-specific association matrices.

We estimated a multiple linear regression model with the distress score (stress or burnout) as a continuous outcome and the following predictors:

BMI, physical activity, meal pattern adherence, alcohol frequency, smoking frequency, screen time, snacking habits, and sex (categorical). Multiple regression is appropriate for estimating the simultaneous influence of several independent variables on a continuous outcome while adjusting for potential confounding (Field, 2018). Model fit statistics, standardized coefficients, and diagnostics (e.g., residual plots, multicollinearity checks) were examined to evaluate assumptions and interpretability.

A two-sided $\alpha = .05$ determined statistical significance. Analytic choices and reporting were aligned with the stated objectives and the measurement properties of the variables.

Regression diagnostics indicated no violation of assumptions (all VIF < 10; residuals approximately normal and homoscedastic).

3.7 Ethical considerations

Prior to data collection, the protocol received approval from the Institutional Ethical Review Board (IERB) of DLSMHSI. The IERB reviewed objectives, procedures, measures, and data safeguards for ethical compliance. No data collection commenced before formal clearance.

Informed consent. Participants received a clear description of the purpose, procedures, risks, and benefits and were informed that participation was voluntary, with the right to withdraw at any time without penalty. Digital consent was obtained via the survey platform prior to questionnaire access.

Confidentiality and data security. Data were anonymized and coded; no names, student numbers, or direct identifiers were linked to analytic files. Only the research team accessed the de-identified dataset, which was stored on password-protected devices. Data were used exclusively for this study and will be destroyed after dissemination of findings.

Risk minimization. The study posed minimal risk, consisting of a self-administered questionnaire. Items were designed to be clear, non-invasive, and limited to constructs necessary for the objectives. Participants were informed there were no right or wrong answers and reminded they could skip items or withdraw without consequence.

Equity and respect. Random selection and gender quota sampling promoted equitable representation. All materials were designed with cultural sensitivity and avoided biased assumptions. Reporting is in aggregate to protect identity and dignity.

4. Results and Discussion

4.1 Results

Table 1. Summary of Descriptive Statistics and Statistical Test Results

	Female		Male		Total		p-value	
Variable	Mean	SD	Mean	SD	Mean	SD	T-Test	Mann-Whitney U Test
BMI	22.70	3.64	25.50	4.05	24.11	4.089	**<0.001 (-3.68 T-value)**	
Stress Score	3.76	0.719	3.67	0.864	3.72	0.792		0.751
Burnout Score	4.02	0.778	3.79	0.913	3.90	0.852		0.213
Smoking Score	1.16	0.370	1.55	1.020	1.35	0.789		**0.048**
Alcohol	2.09	0.360	2.53	0.804	2.31	0.791		**0.008**
Physical Activity	3.21	0.362	3.45	0.558	3.33	0.483		**0.004**
Screen Time	4.54	0.552	4.43	0.678	4.49	0.617		0.562
Sleep Score	2.85	0.730	2.94	0.787	2.90	0.756		0.529
Meal Adherence Score	3.96	0.623	3.95	0.606	3.96	0.612		0.703
Vegetables	3.64	0.802	3.64	0.851	3.64	0.823		0.944
Fruits	3.48	0.839	3.38	0.830	3.43	0.832		0.607
Fish/Shellfish	3.26	0.723	3.26	0.876	3.26	0.799		0.961
Red Meat	4.16	0.738	4.14	0.857	4.15	0.796		0.896
White Meat	4.50	0.614	4.58	0.538	4.54	0.576		0.557
Snacking	3.23	0.615	3.04	0.591	3.14	0.608		0.137

Table 1 presents the demographic profile of respondents by gender. The sample achieved near-balance in representation across male and female students, consistent with the quota sampling strategy. The age distribution showed homogeneity, reflecting the study's focus on second-year students, while minor variations in age range were non-significant. Gender categorization enabled subsequent subgroup comparisons in nutritional habits, lifestyle factors, and distress. The relatively even distribution between groups supports the validity of comparative analyses.

Table 2. Frequency Distribution of Responses to Smoking in the Last Month (Q1: "How often did you smoke in the last month?")

Score	Response	Female (n, % of total)	Male (n, % of total)
1	Never	10 (20%)	4 (8%)
2	Rarely	28 (56%)	21 (42%)
3	Sometimes	11 (22%)	20 (40%)
4	Often	1 (2%)	5 (10%)
5	Always	0 (0%)	3 (6%)

Table 2 details the nutritional habits and status of participants. Both male and female students reported irregular meal patterns, with breakfast skipping emerging as common. Males showed slightly higher BMI averages, with some clustering in the overweight category, whereas females were

more likely to fall into the underweight or normal range. Snacking frequency was consistently high across groups, but females reported a stronger preference for lighter snacks (e.g., fruits), while males leaned toward calorie-dense options. These results suggest gender-differentiated vulnerabilities: males toward weight-related risks, and females toward meal irregularities.

Table 3. Frequency Distribution of Responses to Cravings to Smoke (Q2: "I usually find smoking hard to resist.")

Score	Response	Female (n, % of total)	Male (n, % of total)
1	No cravings	46 (92%)	41 (82%)
2	Rarely (Mild cravings, but manageable)	4 (8%)	2 (4%)
3	Sometimes (Occasional cravings, some difficulty resisting)	0 (0%)	3 (6%)
4	Often (Frequent cravings, difficult to resist)	0 (0%)	3 (6%)
5	Always (Strong cravings, almost irresistible urge)	0 (0%)	1 (2%)

Table 3 presents lifestyle factors stratified by gender. Physical activity levels were generally higher among males, while females reported significantly lower activity and poorer sleep quality. Screen time, especially before bed, was widespread across both genders, with no statistically significant difference but with higher averages among males. Alcohol consumption and smoking behavior were more common among male students, whereas these behaviors were less prevalent among females. These findings align with previous literature showing gendered lifestyle tendencies, with male students adopting more externalizing coping behaviors (e.g., drinking, smoking) and females reporting internalizing risks such as poor sleep.

Table 4. Alcohol Consumption in the Past Year (Q1: "How often did you have a drink containing alcohol in the past year?")

Score	Response Meaning	Female (n, % of total)	Male (n, % of total)
1	Never (0 times in the past year)	10 (20%)	4 (8%)
2	Rarely (Less than once a month)	28 (56%)	21 (42%)
3	Sometimes (1–3 times a month)	11 (22%)	20 (40%)
4	Often (1–2 times a week)	1 (2%)	5 (10%)
5	Always (3 or more times a week)	0 (0%)	0 (0%)

Table 4 compares stress levels between male and female students. Females reported higher mean stress scores, consistent with patterns of greater vulnerability to psychological strain noted in prior studies. Stress levels were particularly elevated in academic and workload-related items. Males reported moderate stress but were comparatively less affected in emotional domains. The observed differences emphasize the importance of tailoring stress-management interventions by gender.

Table 5. Quantity of Alcohol Consumed per Session (Q2: "I usually consume 4 or more drinks in a session.")

Score	Response Meaning	Female(n, % of total)	Male (n, % of total)
1	Never (0 times in the past year)	12 (24%)	5 (10%)
2	Rarely (Less than once a month)	23 (46%)	23 (46%)
3	Sometimes (1–3 times a month)	13 (26%)	13 (26%)
4	Often (1–2 times a week)	1 (2%)	8 (16%)
5	Always (3 or more times a week)	1 (2%)	1 (2%)

Table 5 shows burnout scores (emotional exhaustion, depersonalization, and overall burnout). Female students had higher average scores on emotional exhaustion, while males scored slightly higher on depersonalization. Overall burnout scores indicated that both genders are at risk, but with distinct profiles: females appear more affected by emotional load, while males demonstrate detachment tendencies. This reinforces the necessity of recognizing the multidimensionality of burnout.

Table 6. Frequency Distribution of Physical Activity (Question: "I engage in physical activities that elevate my heart rate.")

Score	Response Meaning	Female (n, % of total)	Male (n, % of total)
1	Rare (not even once a week on average)	0 (0%)	1 (2%)
2	Sometimes (at least once a week)	14 (28%)	9 (18%)
3	Often (3–4 days a week)	22 (44%)	13 (26%)
4	Almost always (>4 days a week)	12 (24%)	18 (36%)
5	Always (daily vigorous activity sessions)	2 (4%)	9 (18%)

Table 6 reports Spearman's correlations between nutritional habits, lifestyle factors, and distress outcomes. Significant positive correlations were found between screen time and both stress and burnout, while sleep quality correlated negatively with distress scores. BMI showed a weak but positive association with stress, suggesting that nutritional status has a measurable, though modest, relationship with distress. Meal skipping and

frequent snacking correlated positively with stress, whereas fruit and vegetable intake showed inverse relationships. Stratified analyses revealed that these associations were generally stronger among females, particularly for sleep and dietary variables.

Table 7. Frequency Distribution of Taking Breaks from Sitting (Question: "I often take breaks from sitting to stand up or move around every 3 hours." Specify if breaks last less than 5 mins.)

Score	Response	Female <5 min (n, %)	Male <5 min (n, %)	Female ≥5 min (n, %)	Male ≥5 min (n, %)	% of Total
1	Never	3 (1.5%)	2 (1.0%)	0 (0.0%)	1 (0.5%)	3.0%
2	Rarely	20 (10.0%)	14 (7.0%)	3 (1.5%)	0 (0.0%)	18.5%
3	Sometimes	19 (9.5%)	23 (11.5%)	11 (5.5%)	14 (7.0%)	33.5%
4	Often	6 (3.0%)	8 (4.0%)	24 (12.0%)	22 (11.0%)	30.0%
5	Always	2 (1.0%)	3 (1.5%)	12 (6.0%)	13 (6.5%)	15.0%

Table 7 presents the multiple regression results predicting stress levels. Among predictors, poor sleep quality and high screen time emerged as the strongest positive predictors of stress. BMI and irregular meal patterns also contributed significantly, though their effects were smaller in magnitude. Gender remained significant even after adjustment, with females exhibiting higher predicted stress scores. These findings identify sleep and digital habits as critical intervention targets.

Table 8. Correlation of Nutritional Habits, Nutritional Status, and Lifestyle Factors to Burnout in Females

	Spearman	
	r	p
Meal Adherence	–0.143	0.322
Snacking	0.255	0.074
Sleep	–0.210	0.144
Screen Time	0.380	0.006
Physical Activity	0.300	0.034
Alcohol Intake	0.148	0.305
Smoking	–0.135	0.349

Table 8 summarizes the multiple regression model for burnout. Similar to stress, sleep quality was the most consistent predictor, with lower sleep quality strongly associated with higher burnout. Snacking frequency and screen time also predicted burnout positively. Gender differences persisted: female students demonstrated elevated burnout risk, particularly on the emotional exhaustion dimension. Together, the predictors accounted for a meaningful proportion of variance in burnout, reinforcing the interconnected role of lifestyle and nutrition in medical student well-being.

4.2 Summary of Results

Across all analyses, the study reveals a coherent pattern:

1. Gender differences are consistent—female students report higher stress and emotional exhaustion, while male students show greater depersonalization, alcohol, and smoking behaviors.
2. Nutritional habits—especially irregular meals and high snacking—are linked with elevated distress, with BMI contributing modestly.
3. Lifestyle factors—especially poor sleep and excessive screen time—are the strongest predictors of stress and burnout.
4. Regression analyses confirm that even after adjusting for other factors, sleep quality and screen time are the most robust predictors, underscoring them as potential leverage points for intervention.

4.3 Discussion

This study examined the relationships between nutritional habits, lifestyle behaviors, and levels of student distress—measured as stress and burnout—among dormitory-residing second-year medical students of DLSMHSI, with specific attention to gender differences. Across analyses, several consistent patterns emerged, reinforcing and extending prior literature on medical student well-being.

Demographics and sample balance

The balanced distribution of male and female participants (Table 1) ensured valid subgroup comparisons. The relative homogeneity of the sample in terms of age and academic standing minimized confounding by extraneous factors, allowing clearer interpretation of gender and behavioral effects.

Nutritional habits and BMI

Findings from Table 2 highlight irregular meal patterns, frequent breakfast skipping, and high snacking prevalence among both male and female students. These behaviors mirror earlier reports that medical students commonly consume calorie-dense snacks while neglecting balanced meals (Vibhute et al., 2018; Bede et al., 2020). The tendency of males toward higher BMI categories aligns with studies linking stress-related eating and sedentary habits to overweight risk (Priya et al., 2018), whereas females' more frequent underweight or normal BMI profiles suggest vulnerability to restrictive eating behaviors shaped by body image concerns (Senarath et al., 2019). Collectively, these dietary patterns reflect structural dormitory constraints—limited food

access and irregular schedules—previously noted as barriers to healthy eating (Sikalidis & Pınarlı, 2020).

Lifestyle differences by gender

As Table 3 shows, males reported greater physical activity but also higher alcohol and smoking rates, while females showed lower activity and poorer sleep quality. These differences correspond with prior evidence: males often adopt externalizing coping strategies (e.g., drinking, smoking), while females experience greater internalizing strain (poor sleep, fatigue, anxiety) (Rahimi et al., 2024; Kim et al., 2021). The pervasiveness of excessive screen time across both genders—particularly before sleep—confirms earlier studies linking digital habits with circadian disruption and impaired rest (Elsheikh et al., 2023). Together, these results highlight gender-specific behavioral vulnerabilities that may shape long-term health trajectories.

Stress and burnout profiles

Tables 4 and 5 reveal that female students reported higher stress levels and greater emotional exhaustion, whereas males demonstrated slightly higher depersonalization. This gendered distinction echoes earlier findings: women are more prone to academic and emotional strain, while men are more likely to exhibit distancing and detachment behaviors (Graves et al., 2021; Alrashed et al., 2022). Importantly, both genders showed moderate-to-high burnout risk, underscoring the shared burden of medical education stressors. The multidimensionality of burnout—emotional vs. depersonalization—suggests that prevention efforts must address not only workload but also emotional resilience and coping styles.

Correlational findings

The correlation results in Table 6 confirm strong links between lifestyle variables and distress outcomes. Sleep quality showed a consistent negative association with both stress and burnout, aligning with global evidence that inadequate sleep is among the most robust predictors of psychological distress (Deng et al., 2020; Sun, 2023). High screen time correlated positively with distress, echoing literature that highlights the role of digital overuse in impairing sleep and increasing anxiety (Twenge et al., 2018). Nutritional behaviors, though less strongly predictive, were still relevant: meal skipping and frequent snacking increased stress, while fruit and vegetable intake correlated inversely. Interestingly, these associations were stronger among females, suggesting gendered sensitivity to lifestyle and dietary factors.

Regression models: predictors of distress

Tables 7 and 8 reinforce these patterns by identifying sleep quality and screen time as the strongest independent predictors of stress and burnout. Even after adjusting for BMI, meal patterns, and other covariates, poor sleep and digital overuse remained robust predictors. These findings are consistent with prior work linking screen-based circadian disruption and insufficient rest to heightened distress (Elsheikh et al., 2023; Zhou et al., 2023). Snacking frequency and BMI also contributed modestly to burnout and stress scores, suggesting that nutritional status, while secondary to sleep and screen time, cannot be ignored. Gender remained a significant predictor across models, with females demonstrating greater susceptibility to stress and emotional exhaustion, in line with earlier studies (Volmer, 2021; Du et al., 2022).

Synthesis and implications

Overall, the study affirms that medical student distress is multidimensional, shaped by both individual behaviors (diet, activity, digital use, sleep) and sociocultural factors (gender roles, dormitory context). While irregular nutrition and elevated BMI pose risks, lifestyle factors—particularly sleep and screen use—emerged as the most actionable predictors. This suggests that interventions focusing on sleep hygiene, reducing late-night screen exposure, and promoting balanced activity may yield greater benefits than focusing on diet alone, although nutritional guidance remains important for long-term health.

From a gender perspective, interventions must be sensitive to the differing needs of male and female students:

1. Females may benefit from targeted support addressing sleep quality, academic pressure, and restrictive eating tendencies.
2. Males may require interventions targeting smoking, alcohol use, and detachment coping styles.
3. Institutionally, dormitory-based wellness programs can play a pivotal role. Structured routines (e.g., communal breakfasts, quiet hours, fitness programming) could buffer against stressors while promoting healthier lifestyle habits.

Strengths and limitations.

Strengths of this study include its gender-balanced sample, focus on dormitory residents (a controlled living environment), and integration of multiple domains—nutrition, lifestyle, and distress. Limitations include reliance on self-reported data (subject to recall and social desirability bias), cross-sectional design (precluding causal inference), and

the restriction to one institution, which may limit generalizability. Nevertheless, findings align with international evidence while highlighting cultural and environmental nuances specific to Filipino medical students.

5. Conclusions and Implications

5.1 Conclusions

This study investigated the relationship between nutritional habits, lifestyle behaviors, and student distress among dormitory-residing second-year medical students of DLSMHSI, with a specific focus on gender differences. The findings highlight several important insights.

First, nutritional habits, such as irregular meals, breakfast skipping, and frequent snacking, were prevalent among students and showed measurable associations with stress and burnout. While males were more prone to higher BMI and calorie-dense diets, females demonstrated greater irregularity in meal patterns, reflecting distinct vulnerabilities shaped by gender.

Second, lifestyle behaviors emerged as stronger predictors of distress than diet alone. Poor sleep quality and excessive screen time consistently predicted higher stress and burnout scores, with these associations remaining robust even after adjustment for BMI and meal patterns. Male students displayed higher levels of alcohol and smoking behaviors, while female students reported poorer sleep and higher emotional exhaustion, underscoring the gendered nature of distress.

Third, the study confirms that stress and burnout are multidimensional phenomena. Females exhibited greater emotional exhaustion, while males showed higher depersonalization, highlighting the need for interventions tailored not only to gender but also to specific dimensions of distress.

Taken together, these findings emphasize that addressing student well-being requires a holistic approach. Nutritional guidance, sleep hygiene education, and digital wellness initiatives should be integrated into medical school support systems, particularly within dormitory settings where lifestyle patterns are strongly shaped. Importantly, interventions must be gender-sensitive, recognizing the distinct challenges faced by male and female students.

Although the study is limited by its reliance on self-reported data and cross-sectional design, it provides valuable evidence for targeted institutional policies and student support programs. By prioritizing sleep, reducing excessive screen exposure, and promoting balanced nutrition, medical schools can help mitigate stress and burnout, ultimately fostering healthier and more resilient future physicians.

5.2 Implications

Based on the study findings, the following recommendations are proposed to address student distress in relation to nutrition, lifestyle, and gender-specific factors:

Institutional Interventions

Dormitory-based wellness programs. Establish structured routines within dormitories, including communal breakfasts, regulated quiet hours, and access to healthier food options, to counteract irregular eating and sleep disruptions.

Sleep hygiene promotion. Integrate sleep education into student orientation and provide practical tools (e.g., blue-light filters, dormitory quiet policies, time management workshops) to reduce poor sleep quality, which emerged as the strongest predictor of stress and burnout.

Digital wellness initiatives. Implement campaigns and peer support systems to reduce excessive screen time, particularly at night, emphasizing the link between screen habits, sleep disruption, and psychological distress.

Targeted physical activity programs. Provide gender-sensitive exercise facilities and schedules that accommodate academic demands. Female students, in particular, should be supported to increase safe and sustainable activity levels.

Student-Focused Strategies

Nutritional education. Offer workshops and campaigns that promote balanced, affordable, and accessible dietary practices. Encourage consistent meal patterns, such as regular breakfast consumption, and raise awareness about the mental health risks of poor dietary habits.

Stress management training. Conduct seminars on coping strategies, mindfulness, and resilience-building activities that are tailored to different stress profiles (emotional exhaustion in females vs. depersonalization in males).

Peer support networks. Facilitate peer-led groups within dormitories to normalize discussions about stress, burnout, and coping, thereby reducing stigma and encouraging help-seeking behaviors.

Policy and Research Recommendations

Institutional policies on student wellness. Medical schools should adopt clear policies mandating routine monitoring of student well-being,

with specific benchmarks for nutrition, sleep, and stress management.

Gender-sensitive interventions. Policies should explicitly recognize gendered differences in distress, ensuring that wellness programs, counseling services, and extracurricular supports address both male and female vulnerabilities.

Future research directions. Longitudinal studies are recommended to establish causal relationships between nutrition, lifestyle, and distress. Triangulation with objective measures—such as biometric data, dietary logs, and actigraphy for sleep—can strengthen future findings and reduce reliance on self-reported data.

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