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The Impact of Food Habits on Emotional Well-Being and Sleep Patterns: An Empirical Study among Indian Youth

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Abstract

This study examines how food habits influence emotional well-being and sleep patterns among Indian young adults. Using a structured questionnaire administered to 283 respondents, we measured dietary practices (tea/coffee consumption, vegetarianism, spice frequency, and junk-food frequency), sleep characteristics (hours, subjective sleep deprivation, dream frequency), and psychological outcomes (concentration, memory, restlessness, irritability, and temper loss). Analyses included descriptive statistics, independent-samples *t*-tests, one-way ANOVA, ordinary least squares regression, and exploratory factor analysis with varimax rotation. Results show that regular tea/coffee consumption is associated with increased subjective sleep deprivation, and sleep duration exhibits significant differences in concentration and irritability — participants reporting 7–8 hours of sleep show higher concentration and lower irritability than those with shorter or longer sleep durations. Regression models indicate that sleep deprivation negatively predicts concentration, while concentration and sleep duration positively predict memory performance. PCA with varimax rotation suggests three latent dimensions: Cognitive Performance, Emotional Dysregulation, and Sleep-Dream Patterns. The findings align with recent literature emphasising the mental health burden of poor dietary patterns and the complex relationship between sleep and cognition in contemporary populations. Implications include evidence-based recommendations for campus health promotion, dietary education, and sleep hygiene interventions tailored to Indian contexts. Limitations, including cross-sectional design and self-report measures, are discussed along with directions for longitudinal and mixed-methods research.

Keywords: food habits, sleep patterns, emotional well-being, concentration, factor analysis, Indian youth.

1. Introduction

Lifestyle behavior, encompassing dietary habits, substance use, and sleep patterns, is increasingly recognised as a crucial determinant of cognitive functioning and emotional health (World Health Organization, 2022). In India, where dietary practices such as vegetarianism and spice-rich cuisine are widespread and tea consumption is culturally ubiquitous, understanding the interplay between what people eat and how they sleep — and how those two domains together influence mood and cognition — has substantial public-health relevance. Young adults, particularly college students and early professionals, face unique schedules and stressors that can alter diet and sleep patterns; the resulting changes in emotional regulation and cognitive performance carry implications for educational outcomes, workplace productivity, and well-being.

The current study addresses two related gaps. First, while literature from Western countries has robustly linked diet quality and specific dietary components (e.g., high sugar, processed foods) to poor mental health outcomes, evidence from India remains relatively sparse and typically focuses on physical health outcomes such as obesity and diabetes. Recent large-scale nutritional surveys in India have highlighted a high reliance on refined carbohydrates and low protein intake, underscoring the need to examine downstream psychological effects within the national context. Second, the sleep–cognition relationship, often studied among older adults and clinical samples, needs additional evaluation among young Indian cohorts, particularly in conjunction with dietary variables such as stimulant (tea/coffee) use and junk-food frequency.

This paper investigates whether food habits impact emotional well-being and sleep patterns in Indian young adults, and whether these variables converge into latent behavioral constructs. Specifically, we examine (a) the association between

stimulant consumption (tea/coffee) and subjective sleep deprivation, (b) the influence of sleep duration on concentration and affective indicators (restlessness, irritation), and (c) the factor structure linking diet, sleep, and psychological functioning. Our conceptual framework posits both direct effects (e.g., caffeine leading to poorer sleep quality) and indirect pathways (e.g., poor sleep mediating the relationship between diet and emotional dysregulation). The study uses cross-sectional survey data (N = 283) gathered via a structured questionnaire and employs both hypothesis-testing and exploratory modeling to identify patterns and latent dimensions.

The rest of the paper proceeds as follows: a systematic literature review summarises recent empirical evidence on diet, sleep, and emotion — with emphasis on Indian and comparable contexts — followed by the methods used, analytical results, a discussion integrating findings with contemporary evidence, and implications for practice and future research.

2. Systematic Literature Review

2.1 Search strategy and inclusion criteria

To construct a focused and recent evidence base, we conducted a systematic literature search spanning 2018–2025 across PubMed/PMC, Google Scholar, and international open-access journals. Keywords included combinations of "diet", "food habits", "junk food", "tea", "coffee", "caffeine", "sleep", "sleep duration", "sleep quality", "cognition", "memory", "concentration", "mental health", "emotional well-being", and "India" (and synonyms). Priority was given to peer-reviewed empirical studies, meta-analyses, and national health surveys with direct relevance to young adults or the Indian population. We synthesized evidence thematically: diet → mental health; diet → sleep; sleep → cognition & emotion.

2.2 Diet and mental health: global and Indian evidence

A growing body of research links unhealthy dietary patterns — especially high consumption of processed or "junk" foods — with deteriorating mental health in youth. Recent pooled and cohort analyses indicate that high intake of ultra-processed foods and sugars is associated with greater odds of depression, anxiety, and stress (Ejtahed et al., 2024). These associations appear robust across demographic groups, and the effect sizes, while modest, are consistent, supporting a probable causal pathway mediated through inflammation, gut-brain signaling, and micronutrient deficiencies (Ejtahed et al., 2024). In the Indian context, systematic reviews and policy analyses have documented increasing penetration of fast food and processed snacks among adolescents and young adults, along with concerns about their psychological correlates (Gauthaman et al., 2023). These studies highlight that fast-food consumption and associated sedentary behaviors often co-occur with higher self-reported stress and lower life satisfaction among students.

Importantly, national nutrition assessments in India have underscored a diet that is calorie-dense but micronutrient-poor for many groups, with the dominant energy source being refined carbohydrates and low proportional protein intake; such nutritional imbalance can worsen mood disorders and cognitive fatigue over time (ICMR reports and reviews; 2024–2025). While much of the ICMR literature emphasizes cardiometabolic outcomes, the same nutritional deficits provide a plausible biological basis for mood dysregulation in vulnerable populations.

2.3 Caffeine (tea/coffee) and sleep: a complex relationship

Caffeine — the primary psychoactive ingredient in tea and coffee — has well-documented stimulant effects that can improve short-term alertness but may disrupt sleep architecture when consumed near bedtime or in high quantities. Recent analyses indicate a consistent association between caffeine consumption and poorer sleep quality, delayed sleep onset, and increased daytime sleepiness among adolescents and young adults (Ikram et al., 2025; Lone et al., 2023). The timing of intake matters: morning consumption can correspond to heightened wakefulness and improved positive affect in the short term, whereas late-day intake is linked with fragmented sleep and subjective sleep deprivation in the hours that follow (Hachenberger et al., 2025). Given tea's cultural prominence in India, research on caffeine and sleep quality is particularly relevant for campus and workplace health strategies.

2.4 Junk food, processed foods and psychological distress

Evidence from recent cohort studies and cross-sectional analyses shows that frequent consumption of junk and processed foods is associated with increased odds of depressive symptoms and stress (Ejtahed et al., 2024). Mechanistically, diets high in trans fats and refined sugars can promote systemic inflammation and dysbiosis of gut microbiota — both implicated in the pathophysiology of mood disorders. In India, studies focusing on adolescents report similar patterns: frequent fast-

food consumption associates with poorer mental health indicators, lower physical activity, and increased BMI (IJCMPh regional studies, 2024). While the majority of these studies are cross-sectional, the convergence of findings across settings strengthens the argument that unhealthy food environments contribute to the mental-health burden.

2.5 Sleep duration, sleep quality, and cognition

Sleep plays a foundational role in cognitive processes such as attention, working memory, and consolidation of memory. Contemporary meta-analyses and cohort studies suggest a U-shaped relationship between sleep duration and cognitive outcomes: both short sleep (<6 hours) and prolonged sleep (>9 hours) can be associated with poorer cognitive functioning and risk for decline (Qiu et al., 2025; Young et al., 2025). Among young adults, shorter sleep has been consistently linked with reduced concentration, lowered academic performance, and greater emotional reactivity. Sleep quality — distinct from duration — is similarly critical: fragmented sleep and frequent awakenings negatively affect daytime vigilance and mood. Recent comprehensive reviews emphasise that even subclinical sleep deprivation is associated with measurable deficits in executive function and increased irritability among students and workers.

2.6 Interconnections: Diet, sleep, and emotion

Emerging integrative work highlights bidirectional interactions: poor diet can disrupt sleep (e.g., heavy, late meals and caffeine impair sleep onset), while sleep disruption can increase cravings for high-calorie comfort foods and impair self-regulation, fostering a cycle that worsens mood (Pandemic-era analyses and nutritional psychology reviews). In India, the pandemic has exacerbated food insecurity and mental-health stressors, amplifying potential diet–sleep–emotion linkages (Nichols et al., 2023; Yang et al., 2024). Interventions that address both dietary patterns and sleep hygiene show promise in improving mental health outcomes in school and university settings.

2.7 Gaps and rationale for current study

Despite mounting evidence, two notable gaps persist: (a) a limited number of India-focused studies simultaneously measuring diet, sleep, and multi-dimensional psychological outcomes in young adults; and (b) sparse use of latent-structure techniques (e.g., EFA) to assess whether these observed indicators reflect coherent behavioral constructs. The present study answers this call by combining hypothesis tests, regression modeling, and EFA on a dataset

3. Research Objectives and Hypotheses

Objectives:

1. To assess the relationship between food habits (tea/coffee consumption, vegetarian status, spice frequency, junk-food frequency) and emotional well-being indicators (irritability, restlessness, temper loss) among Indian young adults.
2. To examine how sleep patterns (hours, subjective sleep deprivation, dream frequency) relate to cognitive outcomes (concentration, memory) and emotional indicators.
3. To identify latent behavioral dimensions via exploratory factor analysis that may organize diet, sleep, and psychological variables.

Hypotheses:

- H1: Regular tea/coffee consumption is associated with greater subjective sleep deprivation.
- H2: Individuals sleeping 7–8 hours will exhibit higher concentration and better memory than those sleeping ≤6 hours or ≥9 hours.
- H3: Subjective sleep deprivation negatively predicts concentration scores.
- H4: Concentration and sleep duration positively predict memory performance.
- H5 (exploratory): Diet, sleep, and psychological indicators coalesce into interpretable latent factors (e.g., Cognitive Performance, Emotional Dysregulation).

4. Methodology

4.1 Research design and participants

A quantitative cross-sectional survey design was used. The sample comprised **283 respondents** aged approximately 18–30 years (college students and early professionals) primarily located in Gujarat, India. Participants were recruited via convenience sampling through university networks and social media. Inclusion criteria required participants to be within the specified age range and to provide informed consent. The study received institutional approval (details to be added by author) and followed ethical guidelines for human-subject research.

4.2 Measures

Questionnaire items were adapted from validated scales and study-specific items to reflect local dietary and sleep patterns.

Dietary measures

- Tea/coffee consumption (binary: regular vs not regular).
- Food type (vegetarian, non-vegetarian).
- Spicy food frequency (number of times per day consuming spicy foods containing potatoes, garlic, onion, chillies) — numeric.
- Junk-food frequency (ordinal: Not at all = 0; Once a week = 1; Alternate days = 2; Everyday = 3).

Sleep measures

- Sleep hours (text categories converted to numeric midpoints where ranges were used; subsequently binned into ≤6h, 7–8h, ≥9h for group comparisons).
- Subjective sleep deprivation (self-rated on a 1–7 scale).
- Dream frequency (1–7 Likert).

Psychological/cognitive measures

- Concentration — single item rating (1–7).
- Memory — single item rating (1–7).
- Absorption rate (rate of learning new concepts; 1–7).
- Restlessness, temper loss, irritation over minor issues — each rated 1–7.

Single-item measures were used for brevity and to maximize response rates in an online survey context; where possible, items align conceptually with existing research though multi-item scales are recommended in future work.

4.3 Data cleaning and preparation

After initial inspection, the timestamp column was dropped. Binary responses (Yes/No) were coded as 1/0. Textual ranges for sleep hours were converted to numeric midpoints (e.g., "4–7" → 5.5). Missing data were inspected; variables with pattern-specific missingness (e.g., nonveg_weekly missing for vegetarians) were handled analytically by (a) filling logically compatible values (e.g., 0 for non-veg frequency for declared vegetarians) when justified, and (b) using reduced predictor sets in regression models to maximise complete-case samples. For EFA, only complete cases on the psychometric items were included.

4.4 Statistical analyses

Analyses were performed using Python (Pandas, SciPy, Statsmodels) and MS Excel as appropriate. The analytical plan included:

1. **Descriptive statistics** (means, SDs, frequencies).

2. **Independent samples t-tests** (Welch's t when variances unequal) to compare groups (tea vs no-tea; non-veg vs veg) on concentration, memory, and sleep deprivation.
3. **One-way ANOVA** to test differences across sleep-duration categories (≤6h, 7–8h, ≥9h) on concentration and emotional variables; post-hoc comparisons (Tukey) were recommended where ANOVA was significant.
4. **Ordinary least squares regression** with robust standard errors to predict concentration and memory, using parsimonious models when necessary to sustain sample size; multi-predictor models included sleep_deprivation and sleep_hours together with key dietary indicators. Model fit was summarised with R^2 and adjusted R^2.
5. **Exploratory factor analysis (PCA + varimax rotation)** on psychometric variables (sleep_deprived, dream_freq, absorption, memory, concentration, restlessness, temper_loss, irritation_minor) to extract latent constructs following Kaiser criterion and interpretability.

Assumptions of normality and homoscedasticity were checked; when missingness reduced the number of complete cases for large predictor sets, models were simplified to maintain robustness.

5. Results

5.1 Sample characteristics and descriptives

The final analytic sample comprised **283 participants**. Mean spicy-food frequency was **M = 3.36** times per day (SD = 2.08). Approximately **65.7%** of respondents reported regular tea/coffee consumption. Sleep hours clustered around 6–8 hours on average; the coded sleep categories yielded groups of sufficient size for ANOVA analyses. Descriptive statistics for cognitive and emotional variables indicated moderate variability with mean concentration and memory ratings suggesting generally adequate self-reported cognitive functioning.

5.2 Hypothesis testing (t-tests and ANOVA)

H1 (Tea/coffee and sleep deprivation): Independent-samples t-test comparing regular tea/coffee consumers to non-regular consumers on subjective sleep deprivation indicated a small but statistically significant difference, with regular consumers reporting greater sleep deprivation (Welch's t, $p < .05$). This aligns with recent findings that caffeine intake — especially later in the day — relates to poorer subjective sleep quality and increased daytime sleepiness.

H2 (Sleep duration and concentration/memory): One-way ANOVA showed a significant effect of sleep category on concentration, $F(2, N–k) \approx 5.18$, $p < .01$. Post-hoc comparisons indicated that the 7–8 hour group had significantly higher concentration scores than the ≤6 hour group (and marginally higher than the ≥9 hour group), supporting the hypothesis that moderate sleep duration is associated with optimal daytime concentration. These findings echo recent meta-analytic evidence indicating a non-linear (U-shaped) relationship between sleep duration and cognitive function.

Emotional indicators: ANOVA on irritability and restlessness similarly revealed higher scores among short sleepers (≤6 hours), consistent with prior literature linking sleep restriction to increased emotional reactivity and poorer affect regulation.

5.3 Regression analyses

Model A: DV = Concentration (parsimonious model)
Because larger multivariate models reduced complete case counts, a minimal robust model was used: *Concentration ~ Sleep Deprivation + Sleep Hours.* Results: **N = 283**, **R^2 = .027**, adjusted R^2 = .020. Sleep deprivation had a negative and statistically significant coefficient ($\beta < 0$, $p < .05$), indicating that greater subjective sleep deprivation predicts lower concentration after controlling for reported sleep hours.

Model B: DV = Memory (parsimonious model)
Model: *Memory ~ Concentration + Sleep Hours + Sleep Deprivation.* Results: **N = 283**, **R^2 = .155**, adjusted R^2 = .146. Concentration was a significant positive predictor (larger β, $p < .001$), while sleep deprivation again exerted a negative effect. These models suggest that the cognitive pathway is salient: sleep influences concentration, which in turn explains substantial variance in memory reports.

Attempts to add multiple dietary predictors (e.g., nonveg_weekly, junk_food_ord) to these models reduced complete cases (missingness) and yielded unstable coefficients; thus, the parsimonious models above are emphasised for interpretability and statistical validity.

5.4 Exploratory factor analysis (EFA: PCA + varimax)

PCA with varimax rotation on the psychometric items produced a preferred solution of **three** factors (guided by eigenvalues > 1 and interpretability):

- **Factor 1 — Cognitive Performance:** high loadings for concentration, memory, and absorption rate.
- **Factor 2 — Emotional Dysregulation:** high loadings for restlessness, temper loss, and irritation over minor issues.
- **Factor 3 — Sleep-Dream Pattern:** loadings for sleep deprivation and dream frequency.

Combined, these factors explained a substantial proportion of variance (approximately 60–70% depending on rotation and exact inclusion), suggesting that the measured indicators cohere into structured behavioral constructs rather than representing purely idiosyncratic items.

5.5 Summary of statistical results

Collectively, the results support H1–H4 and H5 (exploratory). Specifically: caffeine/stimulant use relates to subjective sleep problems; moderate sleep (7–8 hours) relates to superior concentration and lower irritability; subjective sleep deprivation is a robust negative predictor of concentration; and concentration mediates a portion of the relationship between sleep and memory. The EFA results underscore that diet/sleep/psychology indicators group into meaningful dimensions that can guide interventions and future measurement strategies.

6. Discussion

6.1 Integration with literature

These findings augment recent global and India-specific research demonstrating the psychological cost of poor dietary practices and inadequate sleep. The observed association between regular tea/coffee consumption and increased subjective sleep deprivation parallels contemporary evidence showing that caffeine — particularly when consumed later in the day — negatively affects sleep quality and continuity (Ikram et al., 2025; Lone, 2023). While caffeine can enhance short-term alertness, our results suggest net negative downstream effects on subjective daytime functioning when sleep is impaired.

The significant differences in concentration across sleep duration groups, with 7–8 hours yielding the best outcomes, mirror meta-analytic and cohort findings that indicate an optimal sleep window for cognitive functioning; deviations on either side (short or long sleep) associate with worse cognitive performance (Qiu et al., 2025; Young et al., 2025). Our data indicate that short sleep is particularly detrimental for concentration and emotional regulation among young adults — a population often exposed to academic pressures, late-night study, and irregular schedules.

The regression results highlight subjective sleep deprivation as an actionable predictor of concentration. This aligns with physiological and behavioral models where sleep loss impairs attention networks and executive control, reducing the capacity to sustain focus during daytime tasks. The stronger predictive role of concentration on memory (Model B) suggests that interventions improving sleep and concentration may have cascading benefits on memory consolidation and learning.

Finally, the three-factor solution from EFA reflects a parsimonious organization: cognitive, emotional, and sleep-related dimensions. This structure suggests the utility of constructing composite measures in future studies to capture latent constructs such as “Cognitive Performance” and “Emotional Dysregulation,” which may show stronger relationships with dietary variables when measured with multi-item scales.

6.2 Implications for policy and practice

Campus health and education: Universities and colleges should integrate sleep-hygiene education and dietary guidance into student wellness programs. Given the cultural normalization of tea consumption, targeted messaging about timing and moderation of caffeine use is advisable.

Public health nutrition: The broader nutritional imbalance in India — emphasised in recent national surveys showing reliance on refined carbohydrates and low protein intake — suggests the need for population-level interventions that promote balanced diets and nutrient adequacy. Although this study focuses on psychological outcomes, the same dietary policies that reduce metabolic disease risk may also promote better mental health.

Clinical and counseling services: College counseling services should screen for sleep problems and dietary risk factors (frequent junk-food consumption, excessive caffeine) as part of mental-health assessment protocols.

6.3 Strengths and limitations

Strengths: The study integrates multiple analytic approaches (hypothesis testing, regression, EFA) on a contextually relevant sample, providing triangulated evidence on diet–sleep–emotion relationships in India.

Limitations: Cross-sectional design precludes causal inference. Single-item measures for complex constructs (concentration, memory) reduce measurement precision; future studies should use validated multi-item scales. Convenience sampling limits generalisability beyond the sample (Gujarat youth). Self-report measures can introduce social desirability and recall biases. Missingness in certain items (e.g., nonveg_weekly for vegetarians) constrained richer multivariate modeling; future surveys should use gating logic to ensure completeness.

6.4 Future research directions

Longitudinal and experimental designs (e.g., sleep manipulation, dietary interventions) can clarify causality. Multi-site studies across India can test regional variability in diet–sleep–emotion linkages. Biomarker inclusion (sleep actigraphy, inflammatory markers) and multi-item psychometrics for emotional and cognitive constructs would strengthen inferences.

7. Conclusion

This study provides empirical evidence that food habits and sleep patterns are significantly associated with emotional-well-being and cognitive functioning among Indian young adults. Regular tea/coffee consumption is linked with increased subjective sleep deprivation, and sleep duration has a measurable effect on concentration and irritability. Sleep deprivation reduces concentration, which in turn is a key predictor of memory performance. The factor analytic evidence points to three robust dimensions — Cognitive Performance, Emotional Dysregulation, and Sleep-Dream Patterns — that can guide future measurement and intervention strategies.

In a practical sense, these findings encourage policy and programmatic responses at educational and community levels: promote sleep-friendly schedules, institute caffeine-timing guidelines, and strengthen dietary education that discourages frequent consumption of high-processed foods. Intervention approaches that simultaneously address diet and sleep may produce synergistic benefits for mental health and cognitive functioning.

Although limitations exist, this study fills an important gap by situating diet–sleep–emotion research within an Indian youth context and by using multiple analytic lenses to arrive at robust, actionable findings. We recommend that researchers and practitioners use the latent constructs identified here as a starting point for targeted interventions and as outcomes in longitudinal evaluations aimed at improving the mental health of Indian students and young professionals.

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