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Obesity Prevalence Among Generation Z A Quantitative Cross-Sectional Survey Study

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Abstract

Background. Obesity among Generation Z (born 1997–2012) has emerged as a critical public health crisis in urban India. Existing research remains fragmented, focusing on isolated determinants. This study addresses that gap by adopting a multi-domain hygiene model to empirically investigate obesity prevalence and its behavioural determinants.

Methods. A quantitative, descriptive, cross-sectional survey design was employed. Primary data were collected from 95 urban Generation Z respondents aged 18–28 years in Tirupati, Andhra Pradesh, using a structured 27-item questionnaire. Composite hygiene domain scores were constructed and seven inferential statistical tests applied at $\alpha = 0.05$ using Python (scipy.stats, pandas).

Results. The sample mean BMI was 27.71 kg/m² (SD = 8.63), with 46.3% of respondents classified as overweight (32.6%) or obese (13.7%). Dietary hygiene emerged as the strongest predictor of BMI ($r = 0.44$, $p < 0.001$). Psychological stress was positively correlated with BMI ($r = 0.32$, $p = 0.001$). Physical activity differed dramatically across weight groups ($F = 52.48$, $p < 0.001$). Sleep duration showed the most categorical discriminatory power ($\chi^2 = 43.84$, $p < 0.001$): no respondent sleeping fewer than 6 hours maintained Normal weight status.

Conclusion. Obesity in Gen Z is a multifactorial metabolic outcome. Integrated, multi-domain behavioural interventions targeting sleep, diet, physical activity, and psychological stress simultaneously are essential for effective obesity prevention in this population.

Keywords: *Generation Z, Obesity, BMI, Hygiene Practices, Dietary Hygiene, Sleep Hygiene, Psychological Stress, Urban India, Metabolic Disorder* Impact of Hygiene Practices Influencing Obesity Prevalence Among Generation Z

INTRODUCTION

Obesity has escalated from a condition of affluence to a pervasive global public health crisis. The WHO reports that global obesity has more than tripled since 1975, with over 650 million adults classified as obese as of 2022. The World Obesity Atlas 2025 forecasts a 115% increase in global obesity by 2035, with Generation Z positioned at the epicentre due to unique metabolic vulnerabilities, digital lifestyle immersion, and dietary westernisation.

In India, the National Family Health Survey (NFHS-5) indicates that 24% of women and 23% of men aged 15–49 are overweight or obese — a fivefold increase since 1990. By 2050, projections suggest one-third of India's population could be obese, imposing an economic burden exceeding USD 28.9 billion annually. Beyond its visible manifestation, obesity is a profound metabolic disorder linked mechanistically to insulin resistance, type 2 diabetes, hypertension, dyslipidaemia, NAFLD, and PCOS.

Contemporary public health research has broadened the determinant framework beyond genetics and diet to include lifestyle, environmental, psychological, and occupational hygiene as critical modifiable risk factors. For Generation Z — whose formative years coincided with the COVID-19 pandemic, social media saturation, and the gig

economy — these hygiene-related behavioural determinants are particularly salient yet underexplored. This study addresses the critical absence of integrated empirical frameworks that examine hygiene-related factors across all four domains as collective predictors of obesity in a Generation Z urban Indian cohort.

Objectives

Assess the prevalence and distribution of obesity among urban Generation Z using BMI indicators.

Examine associations between lifestyle hygiene practices (dietary behaviour, sleep, physical activity) and obesity outcomes.

Evaluate the role of psychological hygiene (stress, emotional eating) in BMI variation.

Explore the influence of environmental and occupational hygiene on weight status.

Identify the most significant hygiene-related predictors of obesity for targeted preventive intervention.

Impact of Hygiene Practices Influencing Obesity Prevalence Among Generation Z

REVIEW OF LITERATURE

Obesity is the most prevalent non-communicable metabolic disorder of the 21st century. The World Obesity Federation projects that by 2035, 51% of the global population will be overweight or obese, with economic costs exceeding USD 4 trillion annually. In India, Southern states including Andhra Pradesh report the highest female overweight rates (25–35%), driven by sedentary occupational patterns and refined carbohydrate-dominant diets.

Dietary patterns constitute the most extensively studied modifiable determinant of obesity. Gen Z derives 50–65% of daily caloric intake from ultra-processed foods, facilitated by food delivery platforms. Irregularity of meals — including breakfast skipping (reported by 60% of Indian urban youth), late-night eating, and screen-time eating disrupts circadian metabolic rhythms, dysregulates hunger hormone cycles, and results in energy surplus.

Sleep represents an underappreciated metabolic determinant. Short sleep duration dysregulates the ghrelin-leptin axis, increasing caloric intake by an estimated 200–400 kcal per day. A meta-analysis by Cappuccio et al. found that short sleepers had a 55% increased odds of obesity. Chronic psychological stress activates the HPA axis, elevating cortisol levels that stimulate appetite and promote visceral fat deposition. Emotional eating — consuming food in response to anxiety, boredom, or frustration — is a major mechanism through which psychological distress translates to weight gain.

The rapid expansion of India's service sector and remote work models has increased sedentary occupational activity in Gen Z. Each additional hour of sedentary time beyond 6 hours per day is associated with a 5% increase in obesity risk. Despite the multifactorial nature of obesity, Indian empirical studies rarely adopt an integrated hygiene-based framework. This study addresses this critical gap.

METHODOLOGY

Research Design

A quantitative, descriptive, analytical cross-sectional survey design was employed. The cross-sectional design was adopted for prevalence estimation and association analysis, consistent with its

widespread use in epidemiological and behavioural health research. Impact of Hygiene Practices Influencing Obesity Prevalence Among Generation Z

Sample and Data Collection

The target population comprised Generation Z individuals aged 18–28 years residing in urban Tirupati, Andhra Pradesh. The achieved sample was n = 95 respondents exceeding the minimum recommended size (~84) for Pearson correlation with medium effect size ($r \approx 0.30$) at 80% statistical power (Cohen, 1988). Non-probability purposive sampling was employed as the primary method, supplemented by snowball sampling via WhatsApp and Instagram. Data were collected via a structured, self-administered 27-item online questionnaire comprising seven thematic sections, with an average completion time of 8–12 minutes.

Measures

Body Mass Index (BMI) was calculated from self-reported height and weight and classified per WHO standard categories (Underweight < 18.5; Normal 18.5–24.9; Overweight 25–29.9; Obese ≥ 30). Three composite hygiene domain scores were constructed: Dietary Hygiene Score (5 items, range 5–25), Psychological Stress Score (4 items, range 4–20), and Sedentary Behaviour Score (2 items, range 2–10). Hygiene behavioural items were assessed on a 5-point Likert scale.

Statistical Analysis

Seven inferential statistical tests were conducted at $\alpha = 0.05$: One-Way ANOVA, Chi-Square Tests of Independence, Independent Samples t-test, Pearson Correlation, and the Kruskal-Wallis H Test. Analysis was conducted using Python 3.x (scipy.stats, pandas).

RESULTS

Sample Profile

The sample (n = 95) was slightly female-dominant (50.5% female, 45.3% male, 4.2% prefer not to say). The dominant age cohort was 22–24 years (41.1%). All respondents were urban residents; 48.4% reported a family history of obesity.

BMI and Weight Status Distribution

A combined 46.3% of respondents were overweight or obese, and only 34.7% maintained Normal weight status. The overall sample mean BMI of 27.71 kg/m² places the average Gen Z respondent in the Overweight category, reflecting a significant metabolic health burden. The 18.9% Underweight prevalence reflects the dual burden nutritional pattern characteristic of urban India.

Summary of Statistical Tests

Key Findings by Hygiene Domain

Dietary Hygiene ($r = 0.44$, $p < 0.001$):

The Dietary Hygiene Score was the strongest modifiable predictor of BMI. The Obese group's composite dietary risk score (19.15 ± 2.19) was 70% higher than the Normal weight group's (11.27 ± 2.68). Junk food consumption, irregular meal timing, eating past satiety, and screen-time eating constituted the most impactful risk cluster. Respondents with a family history of obesity scored significantly higher on dietary risk (mean 15.59 vs 14.04; $t = 2.05$, $p = 0.044$), confirming that shared familial food environments transmit obesogenic dietary norms behaviourally.

Sleep Hygiene ($\chi^2 = 43.84$, $p < 0.001$):

Sleep duration was the single most discriminating categorical predictor of weight status. Zero respondents sleeping

fewer than 6 hours per night maintained Normal weight, while all 10 respondents sleeping more than 8 hours were in the Normal weight category. Adequate sleep (6–8 hours) characterised 66.7% of Normal weight respondents versus only 30.8% of the Obese group. This finding aligns with the biological mechanism of sleep deprivation disrupting the ghrelin-leptin axis, increasing caloric intake by 200–400 kcal/day, and elevating cortisol-driven visceral fat deposition.

Physical Activity (F = 52.48, p < 0.001):

Normal weight respondents averaged 5.03 active days per week — the only group meeting WHO recommendations — compared to 1.84 days (Overweight) and 1.00 day (Obese). A striking 26.3% of respondents reported zero active days in the past week, indicating a pervasive physical inactivity crisis. The Underweight group was also near-sedentary (0.61 days/week), likely reflecting nutritional inadequacy or restrictive dietary behaviours.

Psychological Hygiene (r = 0.32, p = 0.001; H = 57.73, p < 0.001):

Psychological stress scores were significantly positively correlated with BMI. The Obese group reported the highest median stress (18.0/20), nearly twice that of the Normal weight group (9.0/20). Notably, the Underweight group also reported elevated stress (median = 14.0), suggesting a clinically important bidirectional relationship: stress may drive hyperphagia in some individuals (leading to obesity) and hypophagia in others (leading to underweight), depending on individual coping mechanisms.

Environmental and Occupational Hygiene:

The Sedentary Behaviour Score showed a positive but non-significant correlation with BMI (r = 0.15, p = 0.135), likely attributable to the limited 2-item composite. Environmental hygiene variables did not achieve statistical significance at the univariate level, possibly reflecting the homogeneous urban setting limiting environmental variability across respondents.

DISCUSSION

The findings of this study are broadly consistent with, and in several respects extend, the existing empirical literature on obesity determinants in Generation Z. The dominance of dietary hygiene as the strongest BMI predictor (r = 0.44) corroborates numerous studies documenting ultra-processed food consumption as the primary driver of caloric surplus. The composite dietary hygiene approach — capturing not just what is eaten but how, when, and in what behavioural context — provides a richer lens than single-item dietary assessments.

The categorical sleep-weight finding ($\chi^2 = 43.84$, $p < 0.001$) is among the most striking results and aligns powerfully with the global evidence base, including meta-analytic evidence of a 55% increased odds of obesity among short sleepers (Cappuccio et al., 2008), while adding a Generation Z-specific empirical confirmation within an Indian urban setting.

The significant stress-BMI correlation (r = 0.32, p = 0.001) and dramatic Kruskal-Wallis result (H = 57.73) support the well-established HPA axis-mediated pathway from chronic stress to visceral adiposity. The bidirectional stress-weight pattern elevated stress in both Underweight and Obese groups — adds

nuance to the linear stress-obesity narrative and highlights the role of individual coping mechanisms (hyperphagia vs. hypophagia) in determining the direction of weight dysregulation.

The physical activity disparity across weight groups (F = 52.48) with Normal weight respondents nearly 5x more active than Obese respondents, exceeds the magnitude reported in many cross-sectional studies, Impact of Hygiene Practices Influencing Obesity Prevalence Among Generation Z possibly reflecting the extreme sedentarism of urban Indian Gen Z engaged in desk-bound academic and early-career routines. The non-significant chi-square result for family obesity history ($\chi^2 = 4.54$, $p = 0.209$) contrasts with some prior literature, but the significant t-test for dietary risk scores ($t = 2.05$, $p = 0.044$) supports the hypothesis that family influence operates primarily through shared behavioural norms rather than genetic pathways alone.

CONCLUSION & RECOMMENDATIONS

This study provides robust empirical evidence that obesity prevalence among urban Generation Z in India is a multifactorial metabolic outcome shaped by the convergence of dietary, sleep, physical activity, and psychosocial hygiene behaviours each exerting a statistically significant and practically meaningful influence on BMI and weight status.

Sleep hygiene and dietary hygiene emerge as the two highest-priority intervention domains. Physical inactivity is the most visible behavioural differentiator between healthy and unhealthy weight, while psychological stress acts as a significant amplifier across all weight categories. The study's central conclusion is that effective obesity prevention in Generation Z demands integrated, multi-domain behavioural interventions piecemeal, single-domain approaches will be insufficient.

RECOMMENDATIONS

Sleep hygiene education: Universities and workplaces should mandate sleep hygiene modules targeting 7–8 hours per night with fixed sleep schedules and reduced pre-bedtime blue-light exposure.

Dietary hygiene programs: Emphasise meal regularity, mindful eating, reduced screen-time eating, and practical nutrition skills not merely caloric restriction.

Physical activity facilitation: Subsidised gym access, campus walking infrastructure, and structured movement breaks (5 minutes every 60 minutes for desk workers).

Psychological stress management: Mindfulness-based stress reduction (MBSR), cognitive behavioural therapy resources, and peer mental health support networks within educational institutions.

Policy-level action: Urban health missions and National Urban Health Mission (NUHM) programming should incorporate multi-domain hygiene frameworks, extending beyond

Impact of Hygiene Practices Influencing Obesity Prevalence Among Generation Z conventional diet-and-exercise messaging to encompass sleep, stress, and environmental food access.

LIMITATIONS & FUTURE RESEARCH

The cross-sectional design precludes causal inference; findings are associative. Non-probability sampling limits statistical generalisability. Self-reported anthropometric and behavioural data introduce recall and social desirability bias. The sample (n = 95), while sufficient for the tests employed, constrains subgroup analyses and does not support multivariate

regression or structural equation modelling. The 2-item sedentary behaviour composite likely under-captured occupational hygiene burden.

Future research should employ longitudinal cohort designs, probability-based samples of 500+ respondents spanning urban, semi-urban, and rural populations, objective measurement tools (accelerometers, clinical BMI), validated psychometric instruments (PSS-10, PSQI, Food Frequency Questionnaires), and multivariate regression or Structural Equation Modelling. Randomised controlled intervention studies testing multi-domain hygiene education programs would directly evaluate the behavioural change approach implied by this study.

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Weight Status	BMI Range	n (%)	Mean BMI	SD
Underweight	< 18.5	18 (18.9%)	17.34	2.12
Normal Weight	18.5–24.9	33 (34.7%)	24.52	3.30
Overweight	25–29.9	31 (32.6%)	30.80	4.30
Obese	≥ 30	13 (13.7%)	42.84	6.28
Overall	—	**95 (100%)**	**27.71**	**8.63**

Table 1: BMI Distribution Across WHO Weight Status Categories (n = 95)

#	Test	Statistic	p-value	Outcome
1	One-Way ANOVA: BMI × Weight Status	F = 115.78	**< 0.001*** **	BMI differs significantly across all weight groups
2	Chi-Square: Family History × Weight Status	$\chi^2 = 4.54$	0.209 NS	No direct association
3	t-test: Diet Score × Family Obesity History	t = 2.05	**0.044***	Family obesity group shows higher dietary risk
4a	Pearson r: Diet Score ↔ BMI	r = 0.44	**< 0.001*** **	Strongest predictor; moderate-strong positive
4b	Pearson r: Stress Score ↔ BMI	r = 0.32	**0.001*** **	Moderate positive; stress independently linked
5	Kruskal-Wallis: Stress Score × Weight Status	H = 57.73	**< 0.001*** **	Stress differs significantly across weight groups
6	One-Way ANOVA: Physical Activity × Weight Status	F = 52.48	**< 0.001*** **	Normal weight group markedly more active
7	Chi-Square: Sleep Duration × Weight Status	$\chi^2 = 43.84$	**< 0.001*** **	Sleep deprivation universally associated with non-normal weight

*Table 2: Summary of Statistical Tests (n = 95). *** p < 0.001; * p < 0.05; NS = not significant.*