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Awareness, prevalence, and risk factor analysis of lifestyle diseases: A clinical study of patients at Dr. Hedgewar Rugnalaya

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Abstract
This study assesses the awareness, prevalence, and risk factors of lifestyle diseases among 50 participants at Dr. Hedgewar Rugnalaya, Chhatrapati Sambhajinagar, highlighting a critical gap between health knowledge and practical implementation. Utilizing a cross-sectional descriptive-analytical design, the research identified that while 95% of individuals believe lifestyle modifications can prevent non-communicable diseases (NCDs), significant barriers such as lack of motivation (29%), stress (24%), and time constraints (20%) hinder behavioral change. Anthropometric data revealed that over half the sample falls outside the normal health range, with 37.5% categorized as overweight and 12.5% as obese, while physiological risk factors were further compounded by inadequate sleep in 42% of participants and moderate to high stress levels in 77% of the cohort. Ultimately, the analysis demonstrates a strong correlation between urbanized living patterns characterized by sedentary behavior and processed diets and increased susceptibility to NCDs, suggesting that a shift from curative to preventive healthcare through structured community wellness programs and early lifestyle intervention is essential to mitigate the rising global health burden.

Keywords: Cross-sectional, non-communicable diseases, anthropometric, physiological, lifestyle diseases and global health

1. Introduction
The 21st century has been defined by rapid, compressed urbanization, deep technological dependence, and fast-paced socio-economic adaptations. While these structural societal updates have maximized infrastructural accessibility, increased convenience, and extended overall life expectancy, they have simultaneously catalyzed a profound epidemiological transition. Across the globe, traditional infectious vectors and microbiological agents have been largely replaced by chronic, non-communicable lifestyle conditions (NCDs) as the dominant contributors to the worldwide medical burden. According to global indices compiled by the World Health Organization (WHO), NCDs systematically generate over 74% of international mortality rates. Alarmingly, the majority of these cases are classified as premature and modifiable, highlighting a stark gap between modern medical capability and daily living practices.

1.1 Clinical Profiles and Pathogenesis
The major clinical profiles driving this modern health crisis include Type 2 diabetes, essential hypertension, severe atherogenic cardiovascular diseases (CVDs), stroke, metabolic obesity, and distinct localized malignancies. Unlike historical health threats, these pathogenetic conditions do not arise from immediate, external exposure to bacteria or viruses. Instead, they manifest via gradual, multi-stage physiological deterioration stemming from sustained behavioral misalignments. The human body is progressively compromised by long-term exposure to modifiable risk factors, most notably nutrient-deficient, hyper-caloric diets, localized physical inactivity, substance abuse, severe disruptions to the circadian rhythm, and unmitigated psychological stress. Over time, these factors culminate in metabolic syndrome, fundamentally altering human biochemistry and leading to chronic organ damage.

1.2 India's Unique Dual Health Burden

India currently finds itself at a critical crossroads, facing a complex dual disease burden. The healthcare system must simultaneously manage persistent, traditional infectious outbreaks while combating an exponential surge in metabolic and lifestyle anomalies. This crisis is no longer confined to older generations; it is increasingly prevalent among adolescents and young adults. The rapid adoption of westernized dietary models heavily characterized by processed fats, ultra-refined carbohydrates, and high caloric density combined with highly sedentary occupational structures and automated daily routines, has drastically accelerated the onset of metabolic disorders across diverse generational segments in the country.

1.3 Systemic Interventions and the "Missing Link"

Addressing this public health crisis requires a shift in how medicine is approached. While advanced pharmaceutical and medical interventions are widely available, research indicates that clinical treatment alone cannot halt the epidemic. Behavior change remains identified as the critical "missing link" in effective, long-term disease prevention. Consequently, evidence-based public health strategies emphasize comprehensive, multi-level approaches. This includes strengthening primary healthcare facilities for early detection, alongside launching community-based interventions to foster sustainable, localized lifestyle adjustments.

1.4 Policy Alignment and Localized Research

To systematically manage these widespread risks, national strategies must bridge the gap between large-scale policy and individual action. As outlined in the National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD) operational guidelines by the Ministry of Health & Family Welfare, effective mitigation requires combining robust epidemiological surveillance with systemic capacity building. Evaluating health awareness levels and identifying specific risk behaviors within targeted populations is an essential foundational step toward better health planning. The clinical study evaluating 50 participants at Dr. Hedgewar Rugnalaya in Chhatrapati Sambhajinagar serves as a direct, real-world application of this framework mapping the intricate relationship between daily lifestyle choices, health awareness, and baseline indicators of disease vulnerability to build effective, data-driven preventive practices.

2. Methodology

2.1 Study Design and Population Setting

This research utilized a cross-sectional, descriptive-analytical design to measure behavioral risk variables, physiological indices, and health awareness metrics simultaneously. The clinical setting was centered at Dr. Hedgewar Rugnalaya, located in Chhatrapati Sambhajinagar. The target cohort comprised adult patients within an age distribution spanning 18 to 85 years.

2.2 Sample Metrics and Selection Protocols

A purposive, convenience-based sampling framework was used to recruit a final sample size (n = 55).

- **Inclusion Criteria:** Consenting adult patients (≥ 18 years of age) who demonstrated clear comprehension of the linguistic options (English/regional language) used in the instrumentation process.
- **Exclusion Criteria:** Individuals presenting with acute, unstable health emergencies during the evaluation window, individuals who declined to provide written informed consent and pregnant patients due to altered gustatory biometric baselines.

2.3 Data Collection Instruments and Measurement Techniques

Primary data collection relied on a pre-tested, translation-validated structured survey alongside localized anthropometric evaluations:

- **Socio demographic Mapping:** Tracking age, gender, occupational profiles, and residential locations.
- **Behavioral Variables:** Assessing dietary habits, alcohol and tobacco use, average sleep duration, and self-reported stress levels.
- **Health Awareness Index:** Measuring core understanding of the risk profiles and long-term pathologies of diabetes, hypertension, and cardiovascular diseases.
- **Anthropometric Protocols:** *Height and Weight:* Recorded using standard portable stadiometers and calibrated digital electronic scales.

Body Mass Index (BMI): Computed using the standard formula: $BMI = \text{Weight (kg)} / \text{Height (m)}^2$
Values were classified according to established World Health Organization reference ranges.

2.4 Data Analysis Models

The collected data was organized in Microsoft Excel and analyzed using descriptive and inferential statistical methods. Continuous variables are expressed as mean values accompanied by standard deviations (Mean ± SD), while categorical attributes are reported as absolute frequencies and percentages. Due to the small sample size (n = 55), inferential comparisons relied primarily on non-parametric tests to assess associations between lifestyle choices and metabolic indicators.

3. Results and Discussion

3.1 Demographic Disaggregation

The final analytical sample (n = 55) showed a highly balanced gender distribution, comprising 28 male participants and 27 female participants.

Table 1: Demographic Disaggregation of the respondents

Demographic Parameter	Cohort Sub-group	Percentage Representation
Gender Distribution	Male (n=28)	50.9%
	Female (n=27)	49.1%
Area of Residence	Urban	86.0%
	Semi-Urban	7.0%
	Rural	7.0%
Occupational Status	Employed Professionals	~53.0%
	Business Owners / Students	Remaining Cohort Balance

Table 1 outlines the profile of a study cohort (N = 55) with a highly balanced gender distribution of 50.9% males (n = 28) and 49.1% females (n = 27). Geographically, there is an overwhelming skew toward developed environments, with 86.0% of the participants residing in urban areas, compared to just 7.0% each in semi-urban and rural regions. Furthermore, the occupational status reveals that approximately 53.0% are employed professionals, with the remaining balance consisting of business owners and students. Collectively, this data highlights a population heavily dominated by urban-dwelling working professionals and students, a demographic segment characteristically bound to sedentary routines and high-stress schedules that elevate their vulnerability to lifestyle diseases.

3.2 Anthropometric Proportions (BMI Evaluation)

Categorization of the cohort's Body Mass Index scores based on standard WHO thresholds revealed significant shifts toward metabolic risk categories:

Table 2: Anthropometric Proportions (BMI Evaluation) of the respondents

Clinical Classification	Target BMI Spectrum	Percentage of Cohort Sample
Underweight	<18.5	~5.4%
Healthy/Normal Baselines	18.5-24.9	44.6%
Overweight	25.0-29.9	37.5%
Obese (Class I)	30.0-34.9	12.5%

Table 2 and Fig. 1 present the Body Mass Index (BMI)-based clinical classification of the respondents and shows the distribution of participants across different nutritional status categories. The findings indicate that the largest proportion of the cohort (44.6%) falls within the healthy or normal BMI range (18.5-24.9), suggesting that nearly half of the respondents maintained an appropriate body weight status. However, a considerable proportion of participants were categorized as overweight (37.5%), indicating an increased prevalence of excess body weight among the study population. Additionally, 12.5% of respondents were classified as Obese Class I (BMI 30.0-34.9), reflecting a notable risk of obesity-related health complications. In contrast, only 5.4% of the respondents were underweight (BMI <18.5), representing the smallest group in the cohort. Overall, the table demonstrates that overweight and obesity together account for nearly half of the study population, highlighting a growing concern regarding unhealthy weight gain and potential metabolic health risks among the respondents.

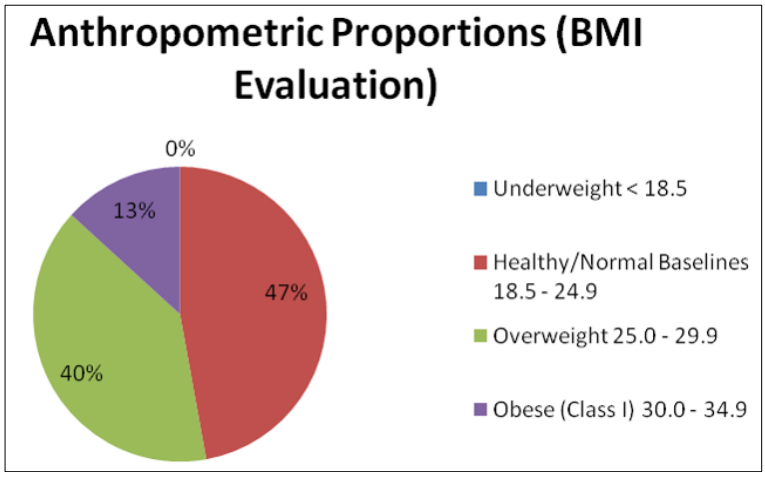

Fig 1: Anthropometric Proportions (BMI Evaluation) of the respondents

In fig.1 illustrates the nutritional and metabolic status of the studied cohort, revealing a significant inclination toward excess body weight. While nearly half of the participants fall within the Healthy/Normal Baseline range (BMI 18.5 - 24.9) at 47%, and 0% are classified as Underweight (BMI < 18.5), the remaining majority presents clear clinical indicators of metabolic vulnerability. Specifically, 40% of the cohort is classified as Overweight (BMI 25.0 - 29.9) and 13% fall into the Obese Class I category (BMI 30.0 - 34.9). When aggregated, a striking 53% of the total population carries excess body mass, directly validating the study's earlier assertions regarding the impact of sedentary urban occupations and hyper-caloric diets. This high prevalence of elevated BMI within the cohort highlights a critical public health concern, as more than half of the monitored individuals are currently exposed to a major, modifiable risk factor that heavily predisposes them to chronic non-communicable conditions like Type 2 diabetes, essential hypertension, and cardiovascular diseases.

3.3 Dietary Trends and Nutritional Alignment

The distribution of dietary habits within the cohort shows distinct nutritional preferences:

- **Vegetarian Preference:** 54% (n = 30) follow a strictly plant-based vegetarian diet.
- **Mixed Omnivorous Preference (Veg + Non-Veg):** 34% (n = 19) consume both plant and animal-derived proteins.
- **Eggetarian Model:** 12% (n = 7) exclude red meat and poultry but include eggs.

Dietary choices serve as a primary modifiable risk factor for chronic diseases. While vegetarian models often provide protective cardiovascular benefits due to higher fiber

content, they can result in micronutrient deficiencies (such as Vitamin B12 and iron) if poorly balanced. Conversely, modern processed foods, rich in trans fats, refined sugars, and sodium, are closely linked to high blood pressure and lipid imbalances.

3.4 Sleep and Stress Variables

The study evaluated sleep hygiene and self-reported psychological stress, which are critical but frequently overlooked behavioral drivers of NCD pathology:

- **Sleep Insufficiency:** While 47% of participants reported adequate sleep duration (7-8 hours per night), a notable 42% recorded chronic sleep deficits, averaging only 5-6 hours. Insufficient sleep can trigger neuroendocrine changes, including elevated cortisol levels and disruptions to hunger-regulating hormones like ghrelin and leptin, which promote weight gain.
- **Psychological Stress:** Moderate chronic stress was reported by 64% of the cohort, while 13% experienced high stress levels. Chronic stress stimulates the sympathetic nervous system, contributing over time to insulin resistance, systemic inflammation, and essential hypertension.

3.5 Exercise Pattern of the Respondents

Physical activity levels among participants showed clear tracking variations:

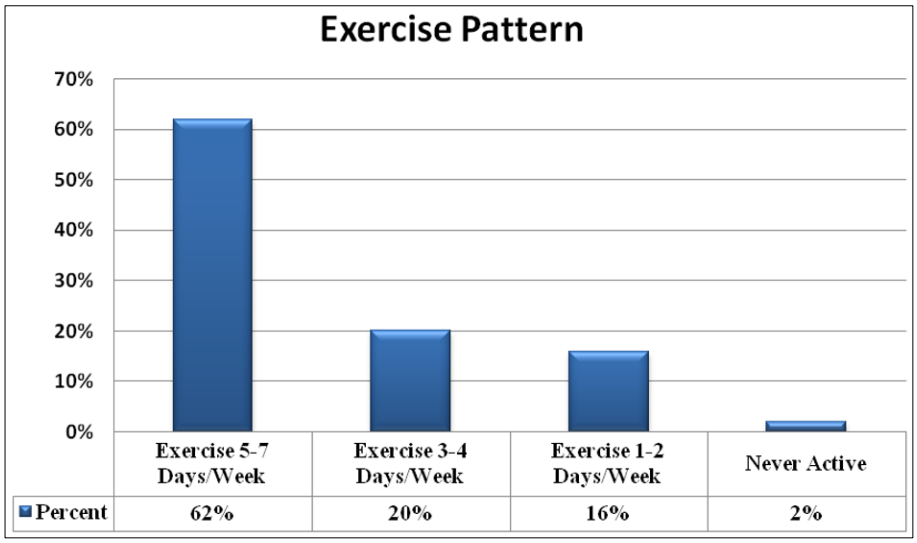

Fig 2: Exercise Patterns among participants

According fig. 2, 62% of respondents report exercising 5 to 7 days a week, a combined 36% show occasional or lower engagement in regular physical activity. Sedentary routines and extended screen time contributes to reduced metabolic rates, poor circulatory health, and increased visceral fat accumulation around major organs.

3.6 Substance Avoidance and Mental Well-being

The sample group demonstrated high compliance regarding substance avoidance:

- **Alcohol Abstinence:** 82% of participants reported completely abstaining from alcohol use.
- **Tobacco Abstinence:** 98% of the surveyed group reported being non-smokers.

This lower prevalence of substance use helps isolate dietary patterns, stress levels, and sleep quality as the primary behavioral risk factors driving metabolic imbalances within this specific study group. Additionally, 80% of participants reported consistent, healthy social interactions, which can serve as a protective asset for psychological resilience and mental well-being.

3.7 Compliance Challenges and the Intention-Behavior Gap

A significant finding is the pronounced gap between abstract health awareness and daily behavioral choice:

- **Belief in Lifestyle Intervention:** 95% of participants understand and believe that proactive behavioral changes can effectively prevent chronic lifestyle conditions.
- **Primary Behavioral Obstacles:** Despite this high awareness, participants cited key structural barriers that disrupt regular healthy practices:

1. Lack of intrinsic motivation and consistency: 29%
2. Occupational workload and systemic stress: 24%
3. Acute time scarcity: 20%

This misalignment demonstrates that educational outreach alone is rarely sufficient to change behavior. Interventions must also focus on systemic support, building healthy routines, and managing workplace stress to bridge the gap between knowledge and practice.

4. Conclusion and Recommendations

- High Awareness vs. Low Practice: Although many people have basic awareness of diabetes and hypertension, few understand the long-term cardiovascular risks in detail. This knowledge gap, combined with behavioral barriers, results in low rates of practical preventative actions.
- High Prevalence of Metabolic Risk Factors: Exactly half of the evaluated cohort falls within the overweight or obese BMI classifications, driven by high rates of sedentary behavior, chronic stress, and disrupted sleep cycles.
- The Role of Structural Barriers: Behavioral choices are significantly constrained by occupational workload,

acute time scarcity, and lack of consistent motivation. These factors cause people to rely on processed, hyper-palatable convenience foods rather than balanced nutrition.

5. Preventative Strategy Matrix

To address the rising burden of lifestyle diseases, healthcare systems should shift from a purely reactive, curative framework toward a proactive, preventative paradigm:

Table 3: Preventative Strategy Matrix

SYSTEMIC ACTION PLAN FOR PREVENTION	
PRIMORDIAL TIER	Implement institutional health guidelines and tax incentives on high-sugar, highly processed foods.
PRIMARY CARE TIER	Deploy digital monitoring tools, such as wearable trackers and tailored lifestyle counseling apps.
SECONDARY TIER	Establish community screening camps for regular blood pressure and metabolic biomarker tracking.
BEHAVIORAL INTERV.	Introduce workplace wellness programs focusing on mindfulness, stress management, and sleep hygiene.

The systemic action plan for prevention is based on a comprehensive and multi-level approach to reduce the risk of obesity, metabolic disorders and other lifestyle-related diseases. Institutional health policies and tax incentives on high-sugar and highly processed foods are recommended at the primordial level to discourage unhealthy dietary practices and to create a supportive public health environment. The focus at the primary care level is on the use of digital monitoring tools, wearable fitness trackers and personalized lifestyle counseling apps to encourage people to eat healthy, engage in regular physical activity and monitor their health. It is proposed to establish community based screening camps at the secondary level for regular monitoring of blood pressure, glucose levels and other metabolic biomarkers for early detection and timely management of health risks. And behavioral interventions through workplace wellness programs.

6. Future Research Opportunities

6.1 Expanded Sample Size and Socio-Economic Disaggregation

To address the geographic and economic limitations of single-center exploratory research, future studies must implement a multi-centric, stratified cluster sampling architecture. This macro-level methodology involves scaling the cohort across distinct geographical regions—specifically categorizing participants into high-density tier-1 urban centers, transitional peri-urban zones, and traditional rural sectors. Stratifying the population using standardized socio-economic scales (such as the updated Kuppuswamy or BG Prasad indices) allows researchers to systematically control for variables like disposable income, educational attainment, and occupational demands. This disaggregation is essential for isolating how financial barriers affect an individual's capacity to access nutrient-dense foods or active recreation spaces versus cheaper, calorie-dense alternatives. Expanding the sample size to a statistically powered cohort ($n \geq 1500$) ensures that multi-variable regression models can effectively isolate these structural determinants from confounding biological variables like age, sex, and genetic predisposition, thereby delivering truly generalizable epidemiological insights.

6.2 Longitudinal Tracking Protocols

Transitioning from a cross-sectional design to a five-year prospective cohort framework is necessary to establish direct chronological causality between daily behavior patterns and chronic health outcomes. Rather than relying on self-reported clinical history at a single point in time, a longitudinal protocol establishes continuous data tracking alongside annual clinical audits. Over a multi-year timeline, researchers can monitor objective metabolic and vascular biomarkers, including glycated hemoglobin (HbA1c), fasting insulin levels, complete lipid profiles, and automated ambulatory blood pressure readings. Furthermore, incorporating bioelectrical impedance analysis (BIA) or Dual-Energy X-ray Absorptiometry (DEXA) scans allows investigators to track changes in visceral adipose tissue independently of total body weight. This deep clinical monitoring clarifies the exact timelines through which chronic sleep debt, unmitigated psychological stress, and physical inactivity drive cellular inflammation, insulin resistance, and the eventual clinical onset or regression of non-communicable diseases.

6.3 Technology Integration and Digital Health Interventions

Overcoming persistent behavioral barriers like low personal motivation and time scarcity requires moving away from static educational materials toward interactive mobile health (mHealth) platforms and wearable ecosystems. Future research frameworks should combine continuous biometric tracking via consumer wearables (monitoring real-time sleep architecture, heart rate variability, and physical activity) with continuous glucose monitoring (CGM) patches to give participants immediate feedback on their metabolic choices. By feeding these dynamic datasets into localized artificial intelligence engines, interventions can deliver context-aware behavioral prompts tailored to an individual's daily routine. For instance, if an individual shows signs of high occupational stress and poor sleep, the platform can pivot from high-intensity exercise suggestions to guided mindfulness or circadian alignment protocols. Incorporating gamified rewards, tracking consistency streaks, and building social accountability networks within these apps can help transform healthy habits from high-effort daily choices into sustainable long-term routines.

6.4 Psychosocial and Environmental Mapping

Because individual behaviors are heavily shaped by broader physical and cultural environments, future studies should integrate macro-level environmental mapping with qualitative psychosocial assessments. Utilizing Geographic Information Systems (GIS) allows researchers to conduct objective built-environment audits, mapping a participant's precise proximity to urban green spaces and fresh-food markets against their exposure to high-calorie fast-food outlets. Simultaneously, structured focus groups and behavioral interviews can explore how socio-cultural factors such as family dietary traditions, peer group influences, and deep-seated habits around food and leisure affect long-term lifestyle choices. Evaluating this intersection of physical infrastructure and cultural habits allows researchers to move past generic wellness advice and design targeted, practical

interventions that fit the real-world environments where patients live and work.

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