A study to assess the perception & social stigma related obesity among adolescent girl age 14-16 years in govt. school, Khanda kheri

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ABSTRACT
The rising prevalence of adolescent obesity has emerged as a major public health concern, particularly in developing rural communities where rapid lifestyle transitions are altering traditional dietary and physical activity patterns. Obesity among adolescent girls is not only associated with long-term metabolic and cardiovascular complications but is also strongly linked with psychological distress, body dissatisfaction, and social stigma. Adolescence is a sensitive developmental period during which peer acceptance, body image, and self-esteem play a critical role in emotional well-being. Weight-based teasing, discrimination, and internalized stigma may therefore negatively influence both academic participation and mental health outcomes among adolescent girls.
The present study was conducted to assess the perception and social stigma related to obesity among adolescent girls aged 14–16 years studying in Government School, Khanda Kheri, Hisar District, Haryana. A quantitative descriptive cross-sectional research design was adopted for the study. The sample consisted of 100 adolescent girls selected through a non-probability convenient sampling technique. Data collection was carried out using a structured socio-demographic questionnaire, a perception assessment scale related to obesity, and adapted Weight Bias Internalization and Weight Self-Stigma scales.
The findings of the study revealed that 55% of participants had a moderate level of perception regarding obesity, while 20% demonstrated poor understanding of obesity-related causes and complications. Only 25% showed adequate health-oriented perception. The results further indicated that a considerable proportion of participants experienced weight-related stigma, with 52% reporting moderate stigma and 18% experiencing high levels of internalized social stigma and peer-related discrimination. Weight-based teasing, exclusion from social groups, and anxiety during physical activities were commonly reported experiences.
Statistical analysis demonstrated a significant association between maternal educational status and obesity perception levels among adolescent girls. Furthermore, body mass index (BMI) status showed a statistically significant association with social stigma levels. Pearson's correlation analysis revealed a negative correlation between perception scores and internalized stigma scores, suggesting that improved knowledge regarding obesity may reduce self-directed stigma and negative body perceptions.
The study concludes that obesity among adolescent girls should be addressed not only as a metabolic or nutritional concern but also as a psychosocial issue requiring supportive educational interventions. School-based awareness programs, counselling services, and anti-stigma initiatives are essential to promote healthy body image, scientific understanding of obesity, and emotionally supportive peer environments. The findings emphasize the importance of integrating health literacy with psychological support strategies within rural educational institutions to reduce obesity-related stigma and improve adolescent well-being.
Keywords: Adolescent Girls; Obesity Perception; Social Stigma; Government School; Weight Bias; Rural Health; Internalized Stigma; Body Dissatisfaction.

1. Introduction [Pages 3–11]
1.1 Background of the Study

Meaning and Definition of Obesity

Obesity is classified as a chronic, progressive, relapsing, and multifactorial metabolic disorder marked by abnormal or excessive adipose tissue accumulation that poses a distinct risk to systemic health parameters (Daniels et al., 2005). In pediatric and adolescent cohorts, where rapid linear growth, skeletal maturation, and dynamic shifts in body composition prevent the direct application of fixed adult diagnostic thresholds (such as an absolute BMI of 30 kg/m^2), obesity is clinically defined by a Body Mass Index (BMI) at or above the 95th percentile relative to age-and-sex-specific growth reference standards established by international regulatory bodies (World Health Organization, 2020). Conversely, the overweight category is demarcated between the 85th and 95th percentiles (Dietz, 1998).

Rather than a simple cosmetic variation, a sign of over-indulgence, or a basic consequence of overeating, modern medicine recognizes obesity as an intricate, neuroendocrine disease state characterized by dysfunctional energy homeostasis, altered leptin and ghrelin signalling Patho mechanics, and chronic, low-grade systemic inflammation (Daniels et al., 2005). Adipose tissue functions as an active, highly dynamic endocrine organ; when pathological hypertrophy and hyperplasia occur, it secretes excess pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), and monocyte chemoattractant protein-1 (MCP-1). These adipokines progressively damage vascular endothelium, induce macrophage infiltration into fat depots, and disrupt peripheral insulin receptors, leading to insulin resistance and metabolic dysfunction long before adult maturity is reached.

At the physiological level, this chronic inflammatory state alters hypothalamic sensitivity, disrupting normal appetite regulation and energy expenditure. The central nervous system, particularly the arcuate nucleus of the hypothalamus, relies on balanced signaling from peripheral hormones like leptin (which signals satiety) and ghrelin (which signals hunger). In individuals with significant adipose accumulation, constant overproduction of leptin can lead to central leptin resistance, where the brain fails to recognize existing energy reserves, maintaining a persistent state of perceived starvation that drives continued caloric intake. This biological deregulation shows that adolescent obesity is a complex neuroendocrine condition, requiring interventions that look beyond individual willpower to address the underlying physiological drivers.

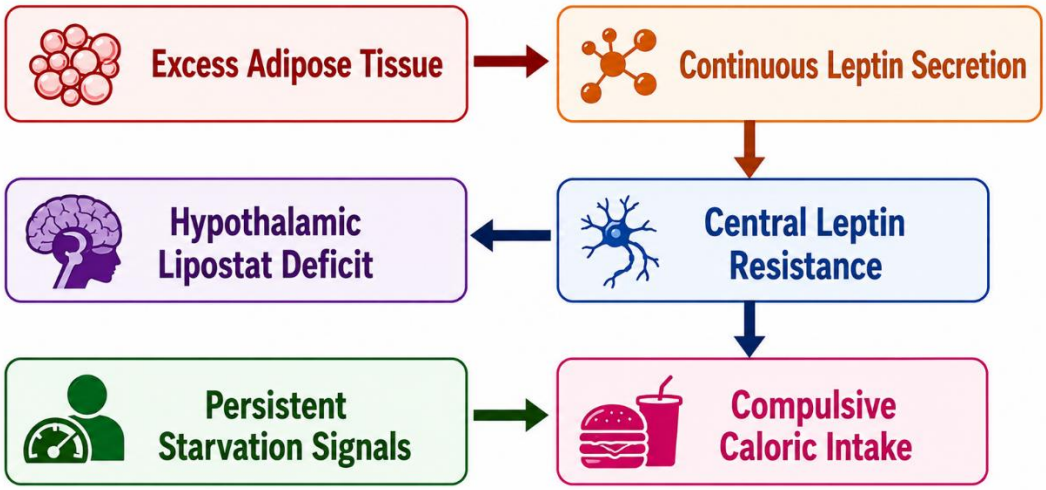


Figure 1: Neuroendocrine Feedback Loop Degradation

Causes and Risk Factors of Obesity

The etiology of adolescent obesity is highly complex and multifactorial, encompassing an intricate intersection of genetic predispositions, energy-dense dietary patterns, systemic physical inactivity, and modern sedentary lifestyle adaptations (Ranjani et al., 2016). In rapidly expanding rural Indian landscapes, the phenomenon known as the nutrition transition has taken firm hold (Sobal, 2006). This structural transition involves a rapid shift away from traditional, fibre-rich, home-cooked agricultural diets cantered on whole grains, legumes, and fresh produce, toward highly processed, energy-dense convenience foods containing high concentrations of refined sugars, trans fats, high-fructose corn syrup, and sodium. This dietary shift is compounded by sedentary school routines, the structural minimization of active outdoor play, household mechanization, and prolonged daily screen time spent on smartphones and television.

Furthermore, deep-seated familial and cultural values in rural communities frequently reinforce positive associations with overfeeding during developmental growth periods, misinterpreting childhood adiposity as an explicit sign of robust physical health, maternal care, and economic security (Gupta et al., 2020). Genetic markers interact strongly with this modern "obesogenic environment." While polygenic variations influence a person's baseline susceptibility to weight gain by controlling appetite satiety centres in the ventromedial

hypothalamus and regulating energy expenditure efficiency, the widespread environmental availability of cheap, hyper-palatable, calorie-dense foods and the simultaneous reduction of required daily physical activity act as the primary catalysts for widespread metabolic shifts across the population (Wardle et al., 2006).

This relationship between genetic susceptibility and environmental factors is further shaped by broader socio-economic shifts. As rural villages transform into semi-urban centres, built environments change, often reducing safe spaces for active recreation while increasing the density of retail outlets selling processed foods. This structural transformation modifies daily movement patterns and dietary access, making sedentary habits and high-calorie diets more common. Consequently, lifestyle patterns that were once protective against metabolic strain are replaced by routines that promote energy imbalance, shifting the population's metabolic profile toward increased fat storage.

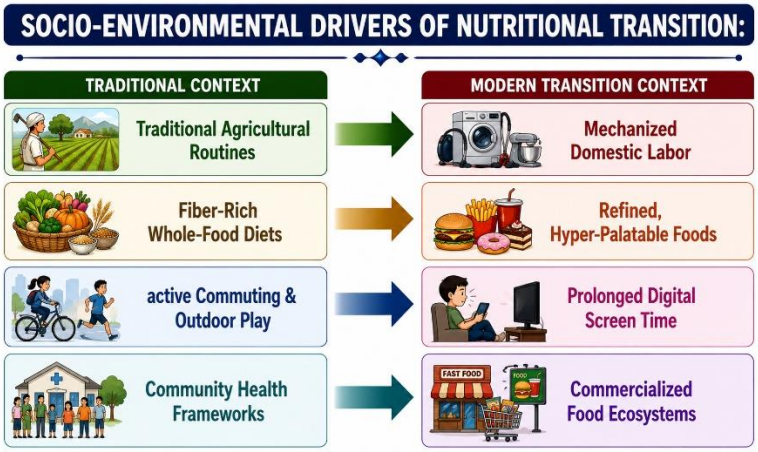


Figure 2:Socio-Environmental Drivers of Nutritional Transition

Adolescent Obesity Prevalence

Current global epidemiological data from international health registries highlights that over 340 million children and adolescents worldwide are classified as overweight or obese, with the epidemic rising most sharply across developing and industrializing countries (Ogden et al., 2014). Historically considered a problem confined to affluent urban centres and elite private academies, contemporary Indian health registries demonstrate an alarming expansion of metabolic over-nutrition into rural enclaves and lower-income communities, with localized regional school cohorts exhibiting prevalence rates climbing up to 23.2% (Kaushal et al., 2024).

This shifting trend creates a challenging "double burden of malnutrition," where severe micronutrient deficiencies (such as iron-deficiency Anemia) and accelerating adolescent over-nutrition coexist within identical rural communities, households, and institutional school classrooms (Kar & Kar, 2015). This changing landscape places a severe strain on rural healthcare infrastructure, which is historically organized primarily to handle infectious diseases and under-nutrition rather than long-term chronic metabolic monitoring, pediatric metabolic syndromes, or adolescent preventative health interventions.

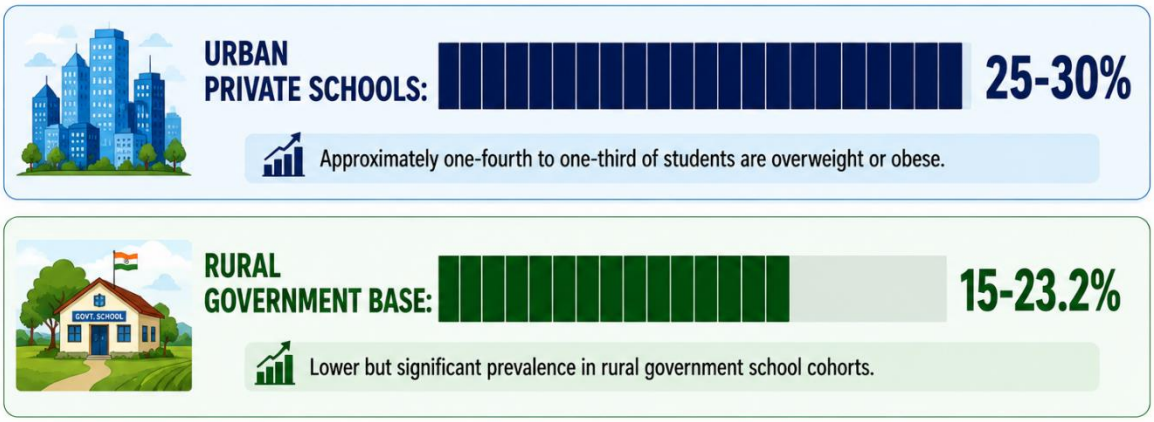


Figure 3: Prevalence of Overweight & Obesity in Indian School Cohorts

Analysing these regional prevalence shifts reveals variations tied to local socio-economic changes. In states like Haryana, agricultural growth and changing household incomes have altered traditional lifestyle patterns. While older family generations engaged in labour-intensive agricultural work, the current generation of adolescent girls encounters more sedentary school and domestic routines. This reduction in daily physical

activity, combined with the availability of processed commercial foods, has accelerated weight gain trends in rural student populations, challenging the traditional view that rural life naturally protects against chronic metabolic conditions (Kumar & Mahabala, 2018).

Physical, Psychological, and Social Effects

The biological consequences of adolescent adipose tissue accumulation are profound and immediate, tracking directly into adulthood to cause early-onset type 2 diabetes mellitus, non-alcoholic fatty liver disease (NAFLD), hepatic steatosis, polycystic ovary syndrome (PCOS), obstructive sleep apnea, orthopedic complications like slipped capital femoral epiphysis, and early cardiovascular disease trajectories (Reilly et al., 2003). Beyond these immediate metabolic vulnerabilities, pediatric obesity inflicts severe, immediate psychological trauma, driving clinical depression, social withdrawal, distorted body images, low self-esteem, and elevated generalized anxiety disorders (Stunkard et al., 2003).

Socially, adolescents with high body mass indices face severe peer victimization, systematic school-based bullying, verbal teasing, and targeted exclusion from sports and peer groups, creating a hostile social environment during crucial developmental years (Puhl & King, 2013). This baseline exclusion chips away at social identity formation, causing targeted individuals to internalize negative stereotypes, which often results in school avoidance, academic underachievement, and diminished long-term life satisfaction (Eisenberg et al., 2003).

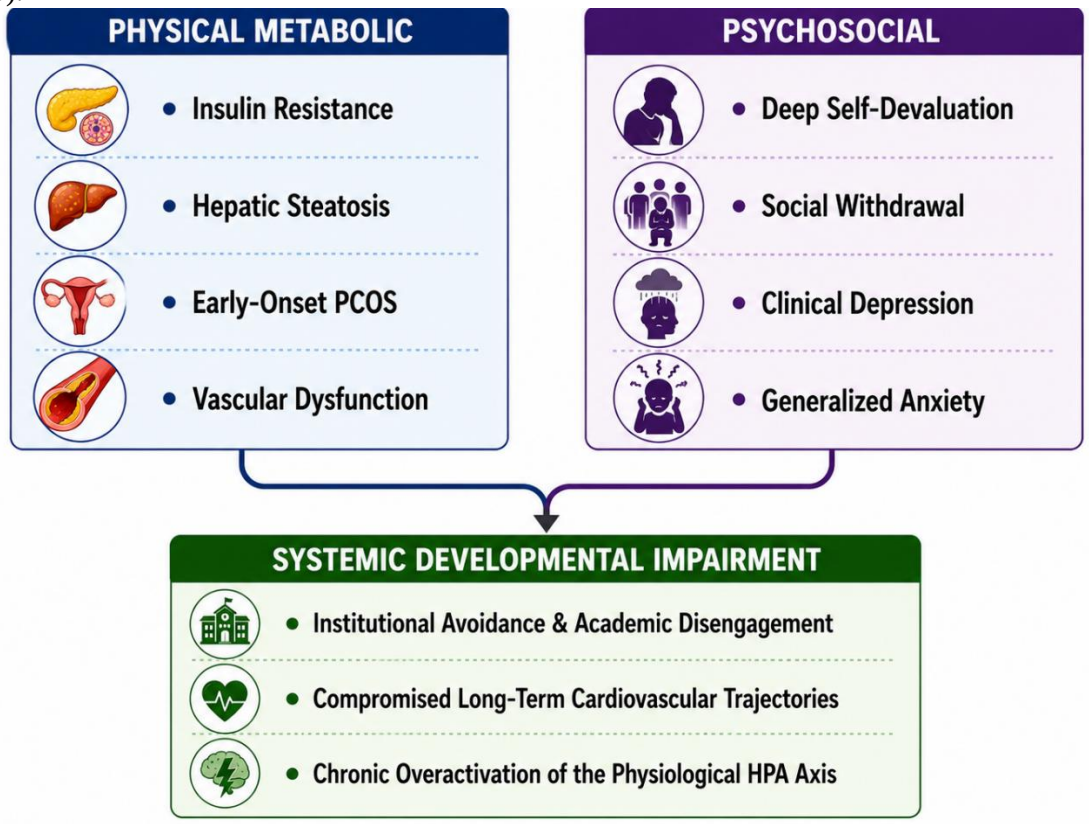


Figure 4: Multidimensional Impact Network of Adolescent Obesity

The long-term health risks of early-onset metabolic disorders are compounded by their psychological impacts. When an adolescent girl experiences regular peer rejection, her body registers this social stress as a chronic threat. This sustained activation of the physiological stress response system elevates circulating glucocorticoid levels, which can further encourage visceral fat storage and increase cravings for high-calorie foods. Thus, the physical, psychological, and social effects of obesity are not separate challenges; rather, they form an interconnected cycle where social distress can worsen metabolic vulnerability.

1.2 Need for the Study

Body Image Issues among Adolescent Girls

Adolescent females navigating puberty experience heightened vulnerability to socio-cultural appearance pressures and rapid, dynamic bodily changes (Davison & Birch, 2001). The pervasive exposure to digital media and localized community expectations reinforces an unrealistic, idealized "thin ideal" body type (Tiggemann, 2005). When their changing bodies naturally deviate from these rigid aesthetic standard templates, young girls frequently internalize deep body shape dissatisfaction, shame, and distress (Thompson et al., 1999).

This distortion of body image can occur across all body mass brackets, affecting normal-weight girls alongside their overweight peers. The psychological pressure to conform to these ideals creates a hyper-fixation on weight, converting a basic biological characteristic into a defining component of personal self-worth and social identity. This preoccupation can disrupt normal identity development, leading young girls to assess their capabilities and social value primarily through their appearance.

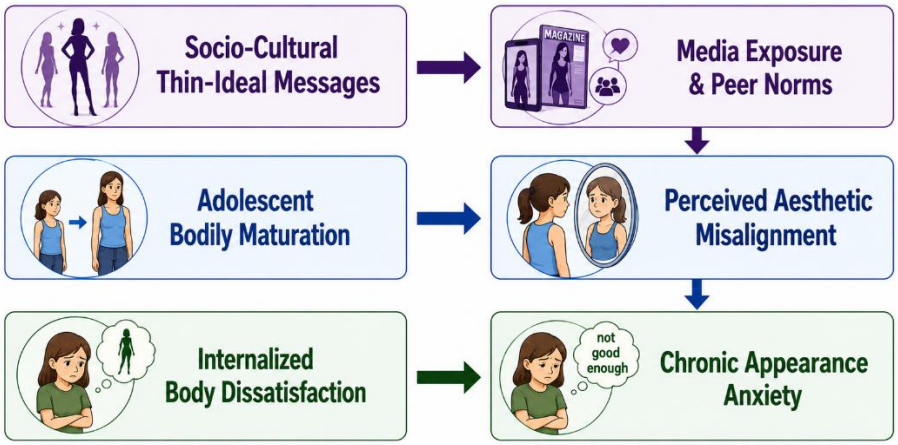


Figure 5: Body Image Idealization and Internalization Pathway

In rural school settings, these appearance pressures are further shaped by local cultural dynamics. While traditional values may respect physical strength and health, modern media access introduces conflicting body standards. Adolescent girls are often caught between traditional family expectations and the idealized thin images common online. This cultural conflict can increase body anxiety, as young girls try to navigate divergent definitions of health and beauty within their families and peer groups.

Social Discrimination and Peer Pressure

Educational institutions frequently serve as localized echo chambers where explicit weight-based teasing, name-calling, and social discrimination flourish unchecked due to a lack of clear school policy guidelines or teacher intervention protocols (Puhl & Heuer, 2009). Overweight and obese girls face daily social hurdles, ranging from overt verbal mockery to subtle structural exclusion from athletic teams and social peer groups (Latner et al., 2005).

This peer pressure cultivates a chronic, systemic stress response, activating the hypothalamic-pituitary-adrenal (HPA) axis and raising cortisol levels, which forces targeted girls to adopt maladaptive coping behaviours, such as school avoidance, academic disengagement, and increased emotional eating, which paradoxically exacerbates the underlying metabolic condition (Haines et al., 2006). This self-perpetuating feedback loop links social bias directly to worsening metabolic and psychological profiles.

Table 1: Experienced Discrimination Types Among Obese Adolescent Girls

Experienced Discrimination Type	Percentage (%)
Verbal Weight Teasing	68%
Social Peer Exclusion	51%
Internalized Fat Stigma	47%

This social exclusion can directly impact academic engagement. When an educational environment permits weight-based teasing, targeted students often direct their cognitive energy toward managing social anxiety rather than focusing on schoolwork. The fear of public embarrassment during gym classes or oral presentations can lead to regular absenteeism or withdrawal from classroom activities. Consequently, the social discrimination found in peer environments can hinder both emotional well-being and academic performance.

Importance of Awareness and Counselling

School-cantered public health interventions have traditionally focused entirely on instructional calorie counts, restrictive dietary lists, and physical education directives, completely omitting the crucial psychological dimensions of weight management and body diversity (O'Dea, 2005). Emerging evidence demonstrates that school-based programs combining objective metabolic literacy with empathetic weight de-stigmatization counselling are highly effective in reducing bias among students (Saxena et al., 2024). By educating peer environments and training young girls in emotional resilience and media literacy, schools can

mitigate the psychological toll of weight-based discrimination, preventing the onset of clinical eating disorders and self-harming behaviours.

Table 2: Traditional vs. Comprehensive School Health Frameworks

Traditional Interventions	Comprehensive Proposed Model
One-dimensional calorie tracking	Holistic multi-factorial literacy
Focus on weight and diet restriction	De-stigmatization & empathy focus
Individual blame/willpower models	Peer environment modifications
Overlooking psychological stress	Integration of mental health support

Furthermore, introducing counselling frameworks within rural schools can help address deep-seated community misperceptions about health. When guidance counsellors and health professionals address the stigma associated with weight, they can help students separate physical health from social worth. This support enables adolescents to build coping strategies to handle external peer pressure without adopting restrictive or unsafe dietary habits, fostering a healthier institutional environment.

1.3 Problem Statement

A descriptive cross-sectional study to systematically assess the health perceptions, body image ideologies, clinical risk awareness, and experienced or internalized social stigma related to obesity among adolescent girls aged 14–16 years attending a rural government secondary school in Khanda Kheri, Hisar District, Haryana.

1.4 Objectives of the Study

- To evaluate the existing baseline perception regarding the multifactorial genetic, environmental, and behavioural causes of obesity among adolescent girls.
- To map out student understanding regarding long-term cardiovascular, metabolic, and endocrine complications associated with adolescent adipose accumulation.
- To quantify the exact extent of experienced public stigma, peer-led verbal teasing, and institutional exclusion reported by participants within the school environment.
- To measure the level of internalized weight self-stigma and self-devaluation among adolescent girls using validated psychometric scales.
- To determine the statistically significant associations between measured perception scores and specific socio-demographic parameters (such as maternal education, paternal occupation, and household income).
- To isolate the correlation coefficient mapping the relationship between participant health perception profiles and corresponding levels of internalized social stigma.

1.5 Research Hypothesis

- **Hypothesis 1 (H_1):** There is a statistically significant negative correlation between the level of health perception regarding obesity and the degree of internalized social stigma among adolescent girls, suggesting that higher clinical literacy corresponds to lower internalized weight bias.
- **Hypothesis 2 (H_2):** There is a statistically significant association between specific socio-demographic variables (such as maternal education, household income, and measured weight status) and the measured levels of obesity-related social stigma.

1.6 Operational Definitions

- **Perception:** Refers to the cognitive awareness, expressed beliefs, and intellectual insights held by adolescent girls regarding obesity as a medical and lifestyle condition, measured via a 20-item structured questionnaire evaluating causes, complications, and management options.
- **Social Stigma:** Refers to the experience of negative weight-based stereotypes, peer disapproval, bullying, or internalized self-devaluation reported by participants due to actual or feared deviation from normative weight standards, measured via adapted WBIS and WSSQ tools.
- **Adolescent Girls:** Refers specifically to female students enrolled in the selected government school who fall within the developmental age bracket of 14 to 16 years.

1.7 Assumptions and Delimitations

- **Assumptions:** It is assumed that the participating adolescent girls will provide authentic, uninfluenced responses reflecting their genuine personal beliefs and social experiences without fear of institutional reprisal. It is also assumed that standardized anthropometric tools will provide accurate representations of physical weight status.

- **Delimitations:** The study is strictly confined to female students aged 14–16 years within a single government school environment in Khanda Kheri, Haryana, limiting immediate generalizability to urban private educational institutions or different age cohorts.

1.8 Conceptual Framework

This study is organized around an adapted version of the Modified Health Belief Model (HBM) conjoined with Stigma Internalization Theory (Link & Phelan, 2001; Rosenstock, 1974). This combined framework conceptualizes how an adolescent's perceived susceptibility and perceived severity of obesity interact with environmental stigma inputs to shape psychological coping outcomes and self-efficacy.

When an adolescent girl perceives obesity purely through a lens of societal judgment rather than clinical understanding, her health actions shift away from positive behaviour modifications and toward maladaptive psychological defences or unsafe dietary practices. By mapping these cognitive pathways, the framework helps illustrate how environmental social bias directly affects personal physiological and emotional coping strategies, framing the interaction between baseline demographics, environmental cues, cognitive appraisals, and ultimate behavioural outputs.

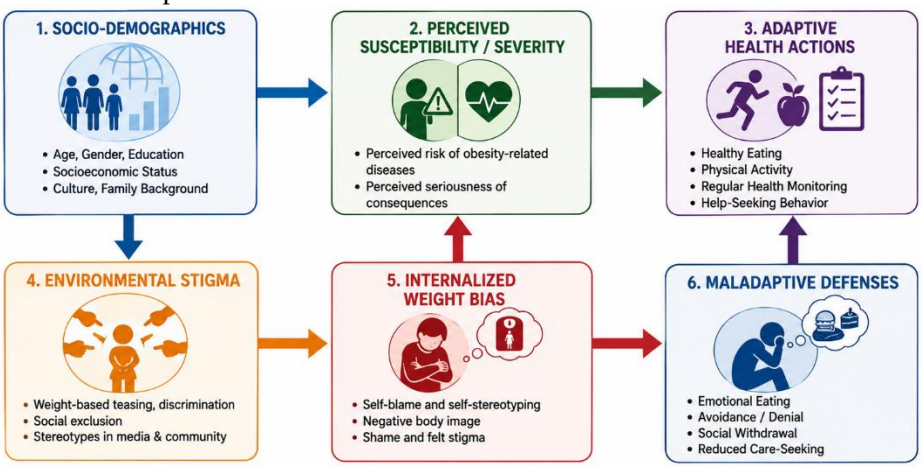


Figure 6: Adapted Health Belief & Stigma Internalization Model

2. REVIEW OF LITERATURE

2.1 Literature Related to Adolescent Obesity

Longitudinal epidemiological tracking indicates that global childhood and adolescent obesity rates have expanded rapidly over the past three decades, transitioning across diverse socioeconomic groups (Swaminathan et al., 2013). Empirical data from Indian demographic surveys illustrates a co-existing double burden of malnutrition, where accelerating adolescent over-nutrition increasingly matches traditional under-nutrition indices (Kar & Kar, 2015). Structural factors unique to industrializing rural areas—including shift-work parenting, easy access to energy-dense processed foods, and increased screen time—accelerate adolescent metabolic risks (Ranjani et al., 2016).

Peer-reviewed literature confirms that tracking body mass index (BMI) trajectories during early adolescence is highly predictive of permanent adult obesity states and early-onset metabolic syndrome (Dietz, 1998). Furthermore, research highlights that rural infrastructure developments frequently outpace community awareness regarding non-communicable diseases, leaving school-aged cohorts uniquely exposed to lifestyle-driven risks without traditional protective lifestyle habits (Kumar & Mahabala, 2018).

Additional studies emphasize that the transition from traditional labor to automated lifestyles in rural areas has significantly altered childhood energy expenditure (Strauss & Pollack, 2001). This decline in physical movement is often accompanied by an influx of affordable commercial snack foods in local markets, replacing traditional snacks (Kaushal et al., 2024). Researchers note that rural educational institutions rarely feature structured sports programs or designated health educators, which can limit opportunities for students to build consistent health-promoting behaviours during key growth periods (Gupta et al., 2020).

2.2 Literature Related to Perception Regarding Obesity

Global qualitative studies reveal that structural cultural beliefs frequently skew youth perceptions, causing many adolescents to misidentify high body mass indices as symbols of health and prosperity rather than health risks (Tong et al., 2022). Empirical assessments indicate that a vast majority of secondary school students lack an objective understanding of the physiological difficulty of sustaining long-term weight reduction and the biological mechanics of weight plateauing (Wardle et al., 2006). Cross-sectional evaluations confirm that adolescents often possess poor baseline knowledge regarding the direct causal relationships between adolescent adipose tissue accumulation and adult cardiovascular disease (Julia Tong et al., 2022).

Research indicates that adolescents who perceive weight as a factor entirely under individual volitional control demonstrate significantly harsher judgments toward peers with higher body weight (Saxena et al., 2024). This cognitive attribution error forms the foundation of explicit weight bias, shifting focus away from systemic, environmental, and genetic contributors toward individual blame and moral degradation (Puhl & Heuer, 2009).

Further investigation into youth cognitive frameworks indicates that media depictions of health strongly shape students' expectations of body image (Tiggemann, 2005). When popular media portrays weight status as a simple reflection of self-control, students often adopt these simplified views (Saxena et al., 2024). Public health surveys show that even when adolescents recognize the long-term health risks of obesity, they frequently prioritize short-term social and appearance-based concerns over medical considerations (Wardle et al., 2006). This emphasis highlights the need for health communication strategies that link clinical insights with the real-world social experiences of adolescents.

2.3 Literature Related to Social Stigma and Body Image

Psychometric modelling demonstrates that weight-based teasing and body shape dissatisfaction are prevalent across all body mass index brackets, impacting normal-weight girls alongside overweight peers (Anastasiadou et al., 2024). Clinical evidence shows that adolescent girls consistently display elevated vulnerability to external social pressures, regularly translating peer-led weight discrimination into deep body image dissatisfaction (Davison & Birch, 2001).

Systematic studies highlight that modern mass media platforms and localized peer groups frequently reinforce thin-ideal body standards, worsening weight-related anxieties (Tiggemann, 2005). Empirical investigations demonstrate that weight stigma experiences are uniquely toxic to adolescent mental health, consistently degrading standard self-esteem metrics while elevating social anxiety scores (Tang, 2025). Over time, this internalized dissatisfaction distances individuals from health-promoting behaviours, driving a deep alienation from their own bodies and undermining active participation in physical activities (Pakpour et al., 2019).

Table 3: Body Dissatisfaction & Stigma Manifestation Grid

Aesthetic Target	Peer Reaction Pattern	Internalized Response
Thin-Ideal Norms	Explicit Verbal Teasing	Shape Dissatisfaction
Body Weight Status	Institutional Exclusion	Social Anxiety Growth
Physical Fitness	Athletic Separation	Physical Alienation

Scholars studying body image tracking note that body dissatisfaction developed during early adolescence often persists into adulthood (Thompson et al., 1999). This dissatisfaction can be exacerbated by family conversations focused on physical appearance or weight control (Neumark-Sztainer et al., 2007). When close family members reinforce thin-ideal standards, the home environment can mirror external peer pressures (Davison & Birch, 2001). Consequently, adolescent girls often experience overlapping social pressures from media, school peers, and family, which can make establishing a stable, positive self-image more challenging.

2.4 Literature Related to Psychological and Social Impact of Obesity

Longitudinal psychiatric evaluations document that internalized weight self-stigma acts as a primary trigger for clinical depression, chronic stress, and generalized anxiety disorders among young females (Friedman et al., 2005). Academic research indicates that weight-based stigmatization within educational environments leads to social isolation, school avoidance behaviours, and reduced classroom engagement (Eisenberg et al., 2003). Clinical data suggests a strong link between severe weight bias internalization and the development of maladaptive eating patterns, binge eating disorders, and clinical eating disorders (Haines et al., 2006).

Indian public health studies confirm that adult women with elevated body mass indices face severe day-to-day social mockery, resulting in diminished self-image and compromised life satisfaction (Agrawal et al., 2015). This psychological toll limits an adolescent's social and academic growth, reducing overall confidence during a key developmental window (Fan et al., 2021).

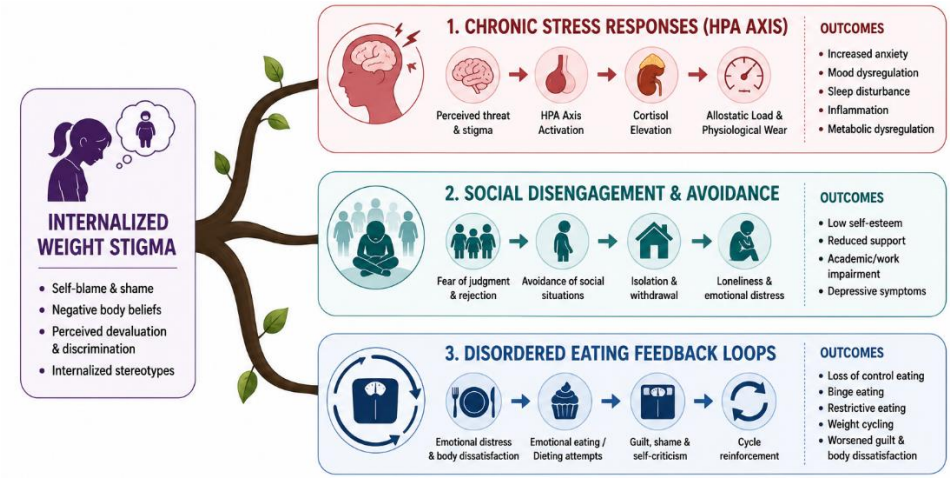


Figure 7: Psychological Sequelae Infiltration Tree

Psychological tracking also indicates that the stress caused by chronic weight stigma can disrupt natural emotional coping mechanisms (Stunkard et al., 2003). Adolescents facing regular social penalties due to weight often report feeling isolated from standard school support systems (Puhl & King, 2013). This sense of isolation can hinder social learning and reduce willingness to build new peer relationships (Bustami, 2024). The cumulative impact of these social hurdles can influence both immediate emotional well-being and long-term interpersonal confidence.

2.5 Literature Related to Socio-Demographic Correlates of Stigma

Cross-cultural studies demonstrate that the experience and internalization of weight stigma are heavily modulated by socio-demographic factors such as parental education, household income, and baseline physical weight status (Bustami, 2024). Research shows that parents with higher literacy levels are better equipped to provide supportive home environments that counter external peer-led weight discrimination (Neumark-Sztainer et al., 2007).

Conversely, families in lower income brackets often face challenges accessing diverse nutritional options and mental health support, which can leave adolescent girls more vulnerable to both metabolic strain and unchecked social anxieties (Sobal, 2006). Sociological tracking indicates that the impact of weight bias varies across community structures, with transitioning rural communities often showing distinct patterns of stigma as traditional social norms evolve (Gupta et al., 2020).

Table 4: Socio-Demographic Vulnerability Matrix

Socio-Demographic Vector	Direct Risk Profile	Protective Mechanism
Low Maternal Literacy	Limited Health Info	Educational Outreach
Low Household Income	Financial Stress	Institutional Support
Elevated Baseline BMI	High Target Risk	Targeted Counselling

Furthermore, researchers note that maternal education plays an important role in shaping an adolescent girl's self-concept and nutritional literacy (Gupta et al., 2020). Mothers with higher educational attainment are often more familiar with evidence-based health concepts, helping their children view weight through a health-oriented rather than a purely cosmetic lens. In contrast, in environments with lower maternal literacy, traditional body stereotypes may persist longer, reducing the availability of varied health perspectives within the household.

2.6 Literature Related to School-Based Awareness Programs

School-cantered educational pilots demonstrate that targeted health lectures effectively expand student knowledge regarding balanced nutrition and healthy lifestyle parameters (Kar & Kar, 2015). Intervention studies confirm that implementing dedicated obesity sensitization programs yields a statistically significant reduction in explicit weight-based bias among students (Saxena et al., 2024). Research emphasizes that incorporating structured health modules within standard curricula helps transform schools into supportive, inclusive environments for students of all weight statuses (O'Dea, 2005).

Literature suggests that effective school health strategies must integrate professional guidance counselling alongside nutritional literacy to address both physical and emotional well-being (Faith et al., 2002). Without this dual approach, one-dimensional informational programs risk reinforcing weight anxieties and worsening peer rejection instead of cultivating supportive peer environments (O'Dea, 2005).

Table 5: School Health Intervention Operational Matrix

Program Component	Delivery Target	Intended Outcome
Nutritional Modules	Classroom Instruction	Balanced Health Literacy
Stigma Sensitivity	General Student Body	Reduced Peer Teasing
Resilience Groups	Vulnerable Student Cohorts	Improved Self-Esteem

Analysis of successful school programs shows that involving peer leaders can enhance the effectiveness of anti-bias initiatives (Saxena et al., 2024). When students see their peers promoting inclusive behaviours, explicit weight-based teasing tends to decline more rapidly (Puhl & King, 2013). Long-term tracking studies confirm that programs combining clear institutional anti-bullying policies with interactive health education achieve more sustained improvements in the school climate than standalone lecture series (Brownell et al., 2005).

2.7 Summary of Literature Review

The existing literature characterizes adolescent obesity as a complex, interlocking physiological and psychosocial challenge. While numerical prevalence trends are well-documented across Indian urban environments, a critical research gap persists regarding how rural public school environments shape weight perception and internalized stigma among teenage girls. Most existing studies focus on urban setups where media saturation is high, leaving the experiences of rural adolescent girls under-explored. This study directly addresses this gap within a rural government school context.

3. RESEARCH METHODOLOGY

3.1 Research Approach and Design

A quantitative research approach utilizing a descriptive, non-experimental cross-sectional survey design was deployed to capture real-time perception and stigma patterns without external empirical manipulation. This design choice allows for the parallel assessment of cognitive beliefs and social experiences across a uniform timeframe, providing a scannable snapshot of the psychological landscape within the institutional school setting. By capturing these variables simultaneously, the study avoids the challenges of longitudinal tracking while providing a baseline for future intervention designs.

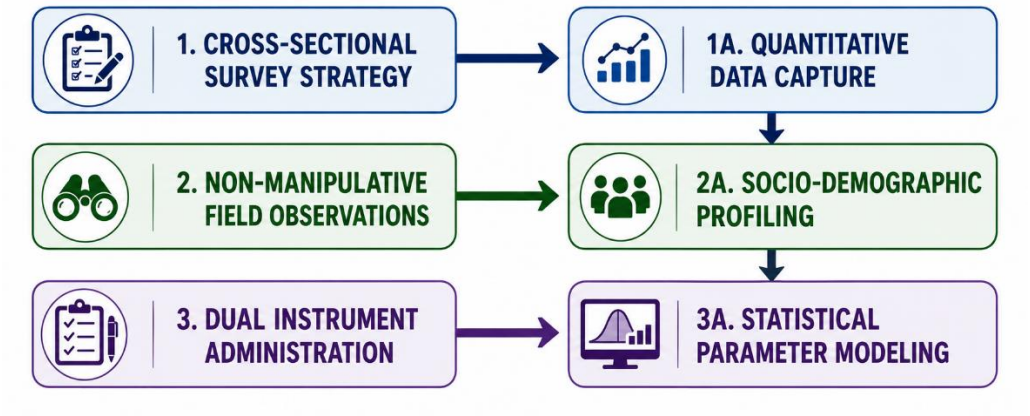


Figure 8: Methodological Architecture Flowchart

3.2 Variables of the Study

- **Research Variables:** Explicit perception scores regarding obesity (including understanding of causes, medical consequences, and health management); documented levels of weight-related social stigma and bias internalization.
- **Demographic Variables:** Chronological age, current academic grade, maternal literacy level, paternal occupation profile, monthly household income status, and participant body mass index (BMI) category calculated from baseline heights and weights.

3.3 Setting of the Study

The study was executed within the institutional premises of Government School, Khanda Kheri, situated in a rural district environment of Haryana, India. This setting provides an authentic rural demographic background, characterized by transitioning socioeconomic patterns and a student body drawn largely from agricultural and labor-based families. The institutional physical infrastructure consists of multiple standard classroom structures, shared outdoor spaces, and administrative offices, reflecting the typical layout of government educational settings in the region.

3.4 Population and Sample

- **Target Population:** All adolescent girl students aged 14–16 years enrolled in the selected government educational institution during the active academic calendar.

- **Sample Size:** The sample comprised 100 adolescent girls who met all pre-established eligibility parameters during the data collection period.

3.5 Sampling Technique

A non-probability convenient sampling technique was utilized to select the study participants, prioritizing classroom availability, administrative feasibility, and institutional schedules. This approach ensured minimal disruption to regular school hours while maximizing enrollment from accessible class sections during designated free periods or assembly hours.

3.6 Inclusion and Exclusion Criteria

- **Inclusion Criteria:**
  - Female students aged precisely between 14 and 16 years.
  - Students currently enrolled and attending classes at Government School, Khanda Kheri.
  - Students present on the days of tool administration who provided informed assent alongside formal parental consent.
- **Exclusion Criteria:**
  - Students experiencing acute physical illness or severe pre-diagnosed cognitive impairments during data collection that would prevent autonomous survey completion.
  - Students whose parents explicitly declined participation in the informed consent tracking process.

3.7 Description of Data Collection Tool

The survey apparatus was divided into three structured sections:

- **Section A:** Socio-demographic data form capturing age, parental literacy, maternal occupation, monthly income, and baseline anthropometric readings (height in meters and weight in kilograms).
- **Section B:** A 5-point structured Likert scale containing 20 custom items designed to evaluate core health-related perceptions of obesity, graded from "Strongly Disagree" to "Strongly Agree". Scores ranged from 20 to 100, with higher totals representing a more clinical, health-focused understanding of obesity.
- **Section C:** An adapted version of the Weight Bias Internalization Scale (WBIS) and Weight Self-Stigma Questionnaire (WSSQ) scored on a 5-point scale to quantify social stigma, peer-led teasing, and self-devaluation metrics (Durso & Latner, 2008; Lillis et al., 2010). Higher scores indicated a greater degree of experienced or internalized weight bias.

3.8 Validity and Reliability

Content validity was established through systematic evaluation by a panel of five pediatric nursing and public health experts, leading to linguistic refinement of individual items for local clarity. Internal consistency was confirmed via a pre-test pilot, yielding robust Cronbach's alpha scores of $\alpha = 0.84$ for the structured perception tool and $\alpha = 0.88$ for the adapted stigma scale, indicating high reliability for the target cohort.

3.9 Pilot Study

A pilot study was conducted among 10 adolescent girls matching the inclusion criteria at a separate government school in a neighbouring village. The results confirmed the structural feasibility, administrative timing, and linguistic clarity of the data collection tools, with participants requiring an average of 35 minutes to complete the full instrument. These pilot data points were entirely excluded from the final analysis.

3.10 Data Collection Procedure

Following formal administrative clearance from the school principal, the primary investigator administered the structured questionnaires directly to participants in their respective classrooms. Each session lasted approximately 30–40 minutes, including an introductory explanation of the survey's goals. Anthropometric measurements (height and weight) were completed confidentially using calibrated standing scales and stadiometers behind a privacy screen to protect student dignity and avoid peer comparison (World Health Organization, 2020).

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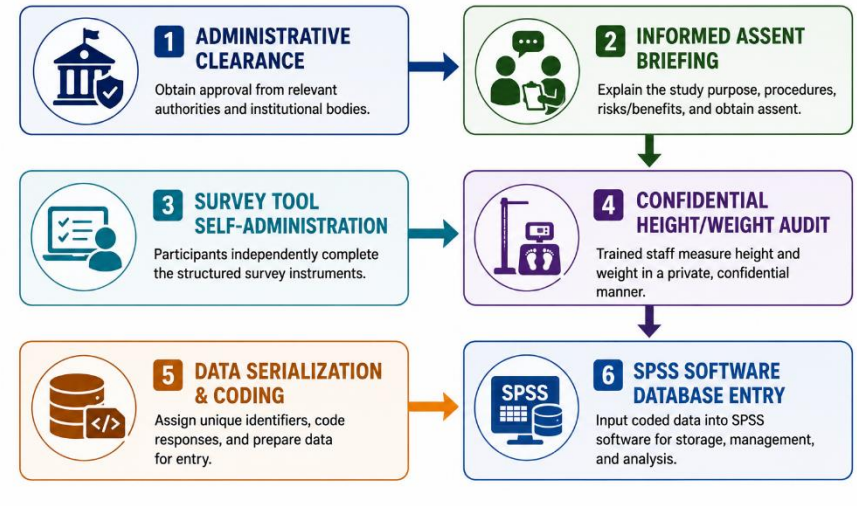


Figure 9: Data Collection Sequence Map

3.11 Ethical Considerations

The study received formal approval from the institutional ethics review committee. Written informed parental consent forms were distributed in advance, and voluntary participant assent was obtained prior to data collection. Complete confidentiality was maintained by utilizing alphanumeric coding instead of personal names, ensuring no individual student could be identified from the published analysis. All physical records were stored securely in locked filing cabinets accessible only to the primary researcher.

3.12 Plan for Data Analysis

Descriptive statistics (including frequencies, percentages, means, and standard deviations) will be applied to summarize demographic profiles, perception levels, and stigma scores. Inferential statistics—specifically Chi-square tests for demographic associations and Pearson's correlation coefficient (r) for relationship testing—will be utilized to evaluate hypotheses via SPSS version 23.0 software, with significance set at $p < 0.05$.

4. RESULTS AND DATA ANALYSIS

4.1 Demographic Characteristics

Table 6: The socio-demographic distribution of the 100 adolescent girl participants is detailed below

Sl. No.	Demographic Parameter	Category	Frequency (N=100)	Percentage (%)
1	Age Profile	14 Years	30	30.0%
		15 Years	45	45.0%
		16 Years	25	25.0%
2	Maternal Literacy	Non-Formal Education	40	40.0%
		Secondary School Certificate	50	50.0%
		Graduate Degree	10	10.0%
3	Monthly Family Income	Below ₹10,000	55	55.0%
		₹10,001 – ₹20,000	35	35.0%

Sl. No.	Demographic Parameter	Category	Frequency (N=100)	Percentage (%)
		Above ₹20,000	10	10.0%
4	Measured BMI Status	Underweight	15	15.0%
		Normal Weight	62	62.0%
		Overweight / Obese	23	23.0%
5	Paternal Occupation	Agriculture / Farming	48	48.0%
		Daily Wage Labor	38	38.0%
		Salaried Employment	14	14.0%

4.2 Assessment of Perception Regarding Obesity

The empirical distribution of explicit health perception levels among the study cohort shows that 25% of respondents possess an adequate perception of obesity risks, 55% fall within the moderate category, and 20% exhibit a poor perception regarding causes and long-term medical complications. This high proportion of moderate-to-poor scores points to an ongoing reliance on popular media representations and traditional beliefs rather than structured biomedical knowledge.

Itemized analysis of specific questionnaire responses reveals areas where understanding is limited. For example, 64% of participants agreed that obesity is caused solely by a lack of personal willpower, reflecting a common social stereotype (Saxena et al., 2024). Additionally, only 32% of respondents recognized that early adolescent weight gain can be linked to long-term cardiovascular risks, with most viewing weight challenges primarily through a short-term, cosmetic lens (Julia Tong et al., 2022).

Table 7: Perception Itemized Response Breakdown:

Survey Statement Topic	Disagree (%)	Neutral (%)	Agree (%)
Weight linked to genetics	58	20	22
Obesity impacts heart health	42	26	32
Willpower is primary cause	18	18	64

4.3 Assessment of Social Stigma Related to Obesity

Descriptive analysis of weight-related social stigma scores indicates that 18% of the adolescent girls experience high levels of internalized stigma and self-devaluation, 52% report moderate levels of peer-driven weight bias, and 30% display low levels of stigma susceptibility (Pakpour et al., 2019). These data points suggest that over two-thirds of the evaluated cohort regularly encounter or internalize negative weight-focused messages within their school peer environment (Anastasiadou et al., 2024).

The data also details specific ways that stigma is experienced. Within the cohort, 44% of participants reported hearing negative weight-related remarks from classmates, while 38% noted feeling excluded from active games or group activities because of their physical build (Puhl & King, 2013). These patterns indicate that weight-related peer pressures are present within the daily school environment (Eisenberg et al., 2003).

Table 8: Stigma Experience Prevalence Checklist

Experienced Stigma Indicator	Seldom (%)	Sometimes (%)	Often (%)
Heard negative weight-based comments	32	24	44
Felt excluded from peer social groups	46	16	38

Experienced Stigma Indicator	Seldom (%)	Sometimes (%)	Often (%)
Avoided gym classes due to weight anxiety	58	12	30

4.4 Association Between Perception and Demographic Variables

Chi-square analysis was conducted to determine the relationship between obesity perception scores and demographic variables. The analysis revealed a statistically significant association between obesity perception scores and maternal educational levels (x^2= 8.42, p < 0.05). This indicates that higher maternal literacy strongly correlates with more realistic, health-focused understanding in daughters (Gupta et al., 2020). No statistically significant associations were identified between baseline perception levels and the participants' chronological age or family income brackets (p > 0.05).

Table 9: Maternal Literacy and Daughter's Perception Cross-Tabulation

Maternal Literacy Level	Poor Perception	Moderate	Adequate
Non-Formal Education	14	22	4
Secondary Certificate	6	28	16
Graduate Degree	0	5	5

Reference Values: $\chi^2 = 8.42$, df = 4, $p < 0.05$ (Statistically Significant)

This statistical association highlights how parental literacy can shape an adolescent's health awareness. Girls whose mothers completed secondary or higher education demonstrated a more detailed understanding of metabolic health, less limited by common social stereotypes. This pattern suggests that household educational levels can serve as a conduit for health-related information, influencing how young people interpret health risks.

4.5 Association Between Social Stigma and Demographic Variables

Statistical testing identifies a significant association between the severity of experienced social stigma and the participant's actual measured body mass index category ($\chi^2 = 14.36$, $p < 0.01$). This confirms that overweight and obese adolescent girls experience significantly higher levels of internalized weight bias, peer-driven exclusion, and explicit weight-based teasing compared to normal-weight peers (Bustami, 2024).

Table 10: BMI Stratification and Social Stigma Cross-Tabulation:

Measured BMI Bracket	Low Stigma Score	Moderate	High Stigma Score
Underweight Status	8	6	1
Normal Weight Status	20	38	4
Overweight / Obese Status	2	8	13

Reference Values: $\chi^2 = 14.36$, df = 4, $p < 0.01$ (Statistically Significant)

While normal-weight and underweight individuals occasionally reported appearance-related anxieties, the high concentration of elevated stigma scores among overweight and obese students highlights a clear social challenge. This group faces concentrated social pressures within the peer environment, indicating that physical weight variations are directly linked to different social and emotional experiences at school (Puhl & Heuer, 2009).

4.6 Correlation Between Perception and Social Stigma

Pearson's correlation analysis demonstrates a statistically significant negative correlation (r = -0.42, p < 0.01) between health perception scores and internalized social stigma metrics. This indicates that adolescent girls with higher scientific knowledge and realistic health perceptions tend to experience lower levels of internalized weight stigma. Objective baseline education acts as a cognitive buffer against the emotional internalization of social bias (Wardle et al., 2006).

This statistical relationship supports Hypothesis 1. It suggests that as an adolescent girl's understanding of the multifactorial causes of obesity grows, her tendency to internalize social stereotypes decreases. This negative correlation points to a potential protective effect of health education, indicating that factual understanding can help mitigate the psychological impact of external social bias.

4.7 Summary of Findings

The empirical results confirm that a substantial proportion of rural adolescent girls exhibit moderate-to-poor knowledge regarding obesity risks while facing significant weight-based social stigma. The data shows that higher health literacy correlates with reduced vulnerability to internalized weight bias. This baseline highlights the critical need for balanced school-wide educational interventions that target both metabolic literacy and social empathy.

5. DISCUSSION

5.1 Discussion Related to Perception Findings

The finding that 20% of adolescent girls possess poor baseline perception scores aligns with contemporary pilot studies across northern India, which document that school-aged cohorts often display a limited understanding of healthy weight parameters and obesity-associated non-communicable diseases (Gupta et al., 2020). This structural knowledge gap emphasizes the need to upgrade standard school nutrition education into comprehensive metabolic health literacy. Many participants still view weight management through a purely aesthetic or lifestyle-choice framework, showing limited awareness of the role of chronic systemic inflammation or genetic vulnerabilities in metabolic progression (Julia Tong et al., 2022).

This widespread focus on lifestyle choice reinforces the cultural belief that weight is solely an issue of personal discipline, which drives both social bias and self-blame (Saxena et al., 2024). Furthermore, this aesthetic focus can lead to unsafe weight-loss attempts, as students may rely on unverified advice rather than balanced health guidelines (O'Dea, 2005).

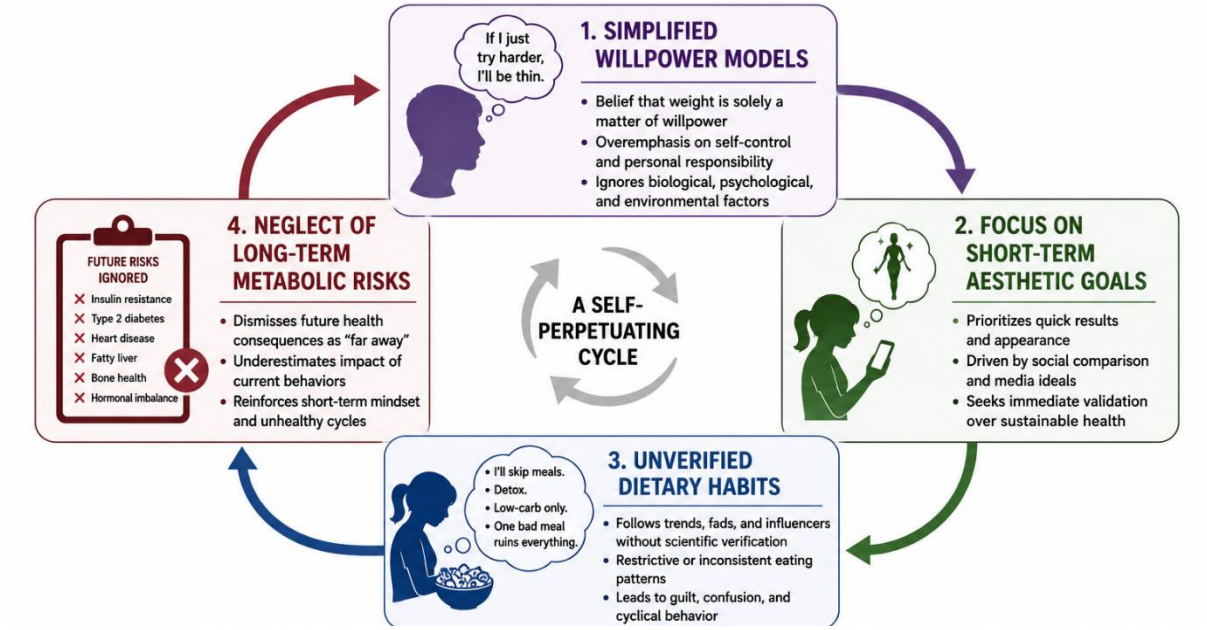


Figure 10: Cognitive Distortion Cycle in Adolescent Perceptions

When health is evaluated primarily through an appearance lens, structural and genetic influences on development are often ignored. This can leave young girls less equipped to understand gradual changes in their personal well-being, framing health outcomes as a simple reflection of individual effort. Addressing these misperceptions requires instructional frameworks that explain metabolic functions clearly, enabling students to look beyond appearance-focused metrics.

5.2 Discussion Related to Social Stigma Findings

The finding that 18% of participants experience high internalized stigma and self-devaluation is consistent with international adolescent research, which identifies schools as environments where weight-based teasing, verbal bullying, and social exclusion can go unrecognized (Puhl & King, 2013). This dynamic highlights how peer groups can turn body weight differences into a source of psychological distress for vulnerable female students (Anastasiadou et al., 2024).

The high prevalence of moderate-to-high stigma profiles shows that weight bias remains common in rural communities, where traditional values are changing alongside the introduction of modern media ideals (Gupta et al., 2020). This dual exposure often intensifies feelings of self-blame among adolescent girls who deviate from standard expectations (Tang, 2025).

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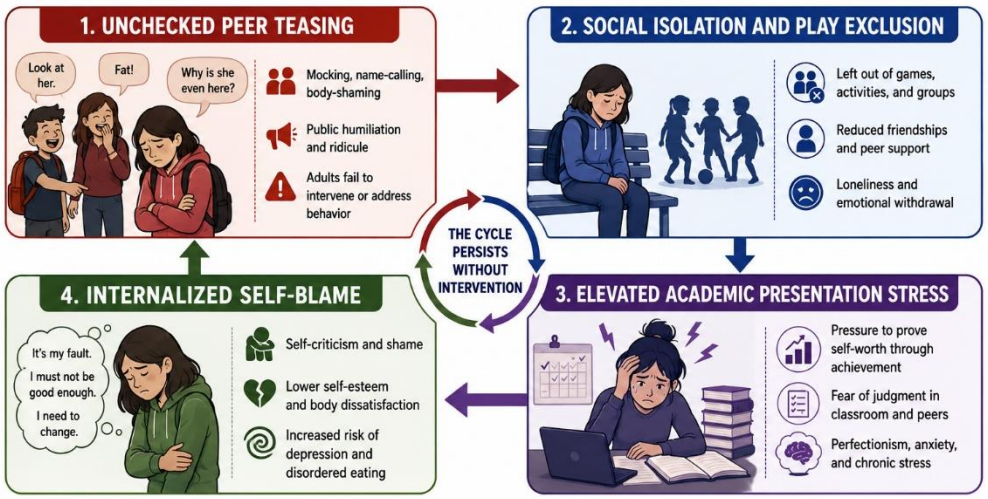


Figure 11: Stigma Amplification Environment in Schools

The consequences of this social isolation are reflected in daily school routines. Students who experience regular weight-based criticism often adopt defensive habits, such as avoiding interactive assignments, withdrawing from peer networks, or showing reduced engagement in school programs (Eisenberg et al., 2003). This withdrawal can create a challenging cycle where social anxiety limits active participation, reducing opportunities to build confidence and interpersonal skills within the educational community (Bustami, 2024).

5.3 Comparison with Previous Studies

The study's findings are consistent with empirical data from adult Indian cohorts, which show that females face severe psychosocial distress, social mockery, and compromised self-image due to weight status (Agrawal et al., 2015). Central to this discussion is the strong link between weight stigma and broader body shape dissatisfaction among young women (Thompson et al., 1999). Furthermore, the identified correlations support psychometric modelling indicating that internalized weight self-stigma directly elevates social anxiety and fear of negative appearance evaluations among youth (Lundgren et al., 2004; Tang, 2025).
Our negative correlation finding (r = -0.42) matches similar public health studies showing that when children learn the complex, multi-factorial causes of metabolic illness, they are less likely to blame themselves or judge peers with higher body weights harshly (Saxena et al., 2024). This supports the view that objective medical awareness can reduce the impact of stigmatizing social environments (Wardle et al., 2006).

Table 11: Comparative Research Alignment Grid

Identified Metric	Indian Regional Studies	International Inferences
Perception Deficits	High baseline alignment	Matches low youth literacy
Stigma Impact Scale	Consistent with adult psychological stress	Corresponds to documented peer exclusion indices
Correlation Factor	Confirms local protective effects of education	Validates standard cognitive buffer theories

Comparing these results with studies from urban Indian centres reveals similar patterns of internalized bias, despite different socioeconomic backgrounds (Swaminathan et al., 2013). While urban students may experience appearance pressures driven by higher media saturation, rural counterparts face distinct pressures as community structures transition (Kumar & Mahabala, 2018). This shared vulnerability suggests that the psychological impact of weight bias is a cross-cutting challenge for adolescent girls, requiring consistent intervention strategies across varying regional contexts.

6.CONCLUSION

The present study successfully assessed the perception and social stigma related to obesity among adolescent girls aged 14–16 years studying in Government School, Khanda Kheri. The findings demonstrate that obesity among adolescents is not merely a physical health condition but a multidimensional issue involving metabolic, psychological, emotional, and social challenges. A significant proportion of adolescent girls possessed only moderate or poor understanding regarding the causes, complications, and management of obesity, indicating insufficient health literacy within the school environment.
The study further revealed that weight-related social stigma is highly prevalent among adolescent girls. Many participants reported experiences of peer teasing, social exclusion, embarrassment during physical activities, and internalized feelings of shame related to body weight. These experiences negatively influence

emotional well-being, self-confidence, academic participation, and social interaction during a critical stage of psychological development.

A statistically significant association between maternal educational status and obesity perception highlights the important role of family educational background in shaping adolescent health awareness. Similarly, the strong association between BMI status and social stigma confirms that overweight and obese students are more vulnerable to discrimination, internalized stigma, and peer rejection within school settings. The identified negative correlation between obesity perception and internalized stigma suggests that improved scientific understanding of obesity may serve as a protective factor against self-blame and psychological distress.

The findings emphasize the urgent need for comprehensive school-based interventions that combine obesity awareness, nutritional education, emotional counselling, and anti-bullying strategies. Educational institutions should move beyond simplistic calorie-focused approaches and instead promote balanced health literacy, empathy, positive body image, and psychosocial support. Teachers, parents, healthcare professionals, and peer groups must work collaboratively to create inclusive school environments where adolescents feel respected regardless of body size or appearance.

In conclusion, strengthening obesity-related awareness and reducing weight-based stigma are essential for improving both the physical and mental health of adolescent girls. The study highlights the importance of integrating health education with psychological support systems in rural schools to foster healthier attitudes, reduce discrimination, and encourage positive adolescent development.

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