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"A Review-Based Study of the Role of Hidden Hunger in Obesity Among Medical Undergraduates"

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Abstract

Background:
Hidden hunger refers to a state of micronutrient deficiency that persists despite adequate or excessive caloric intake. This form of malnutrition is increasingly observed among young adults, particularly in academic environments. Medical undergraduates, despite possessing theoretical knowledge of nutrition, often adopt unhealthy dietary practices due to academic stress, irregular meal patterns, and sedentary lifestyles. This paradoxical coexistence of micronutrient deficiency and obesity represents an emerging public health concern.

Objective:
To review existing literature on the prevalence of hidden hunger and its association with overweight and obesity among medical undergraduates.

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Methods:
A narrative review of national and international studies was conducted focusing on dietary patterns, micronutrient deficiencies, lifestyle factors, and obesity among medical students.

Conclusion:
The evidence suggests that high caloric intake coupled with poor dietary quality contributes to both micronutrient deficiencies and weight gain among medical undergraduates. Early nutritional screening, dietary education, and institutional interventions are essential to address this dual burden and prevent long-term metabolic and health consequences.

Keywords:
Hidden hunger, Medical students, Micronutrient deficiency, Obesity, Dietary habits

Introduction

Hidden hunger is a form of malnutrition characterized by insufficient intake or absorption of essential vitamins and minerals despite adequate or excessive energy consumption. Unlike overt hunger, which presents with visible signs of undernutrition, hidden hunger often remains undetected due to the absence of immediate clinical symptoms (FAO, 2013)[1].

The World Health Organization estimates that more than two billion people worldwide suffer from deficiencies in one or more essential micronutrients, making hidden hunger a significant global health concern (WHO, 2020)[2]. These deficiencies adversely affect immune function, cognitive performance, physical development, and metabolic health.

Malnutrition encompasses both undernutrition and overnutrition. While undernutrition involves deficiencies in energy, protein, and micronutrients, overnutrition refers to excessive caloric intake that predisposes individuals to overweight and obesity. Increasingly, these conditions coexist, particularly in low- and middle-income countries undergoing rapid nutritional transition (von Grebmer et al., 2013)[3].

Conceptual Framework

- **Hunger:** Distress resulting from lack of food
- **Malnutrition:** Abnormal physiological condition due to inadequate or excessive nutrient intake
- **Undernutrition:** Deficiency of energy, protein, and/or micronutrients
- **Micronutrient Deficiency (Hidden Hunger):** Inadequate intake or absorption of essential vitamins and minerals
- **Overnutrition:** Excessive intake of calories leading to overweight and obesity

Review of Literature

Traditionally, obesity and micronutrient deficiencies were viewed as mutually exclusive forms of malnutrition. However, growing evidence indicates that they frequently coexist, particularly among young adults consuming energy-dense but nutrient-poor diets[4]. Hidden hunger describes a condition where caloric intake meets or exceeds requirements, yet essential micronutrients such as iron, zinc, vitamin D, and vitamin B12 remain deficient[5].

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Medical students are especially vulnerable to this paradox. Academic stress, irregular schedules, hostel living, frequent consumption of fast foods, and reduced physical activity contribute to poor dietary quality. Despite their knowledge of nutrition, practical adherence to healthy eating remains suboptimal in this population.

Clinical manifestations of severe micronutrient deficiencies—such as night blindness from vitamin A deficiency or goiter from iodine deficiency—appear only at advanced stages. However, subclinical deficiencies affect a much larger proportion of individuals, impairing immunity, cognition, and metabolic health. This silent nature underlies the term "hidden hunger."

Indian Scenario: Dual Burden of Malnutrition

India ranks 105th out of 127 countries in the Global Hunger Index 2024, reflecting persistent undernutrition. Simultaneously, obesity is rising rapidly, particularly among adults aged 15–49 years. NFHS-5 data report that 24% of women and 22.9% of men in this age group are overweight or obese[6].

India is currently experiencing a nutritional transition marked by the coexistence of undernutrition and overnutrition. Urbanisation, dietary shifts, increased consumption of processed foods, and sedentary lifestyles have contributed to this dual burden[7],[8]. However, public health programmes continue to focus predominantly on undernutrition, limiting effective strategies to address obesity and hidden hunger.

Dietary Transitions and Snack Consumption

Snacks are commonly consumed between meals and vary widely in nutritional value[9]. Rapid urbanisation and lifestyle changes in low- and middle-income countries have led to increased consumption of processed and packaged snacks prepared outside the home[10–12].

In India, diets are increasingly characterized by high intake of refined carbohydrates, saturated fats, and added sugars, with declining consumption of traditional, nutrient-rich foods[13–15]. Aggressive marketing, convenience, and affordability have fueled demand for packaged snacks and sugar-sweetened beverages[16].

These foods contribute significantly to "empty calorie" intake—high energy with minimal micronutrients—resulting in poor dietary quality, weight gain, and increased risk of non-communicable diseases[17]. Regular consumption of such foods is associated with increased BMI, central obesity, impaired glucose metabolism, and hypertension[18–20].

Hidden Hunger Among Medical Students

Several studies have documented a high prevalence of micronutrient deficiencies among medical students in India and globally[23]. Common deficiencies include:

- **Iron deficiency anemia:** Affecting 30–40% of female medical students

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- **Vitamin D deficiency:** Due to indoor lifestyles and limited sun exposure
- **B-vitamin deficiencies:** Associated with stress, fatigue, and impaired cognitive function[24]

Contributing Factors

- Irregular meals and frequent skipping of breakfast
- High caffeine intake and inadequate hydration
- Reliance on junk food due to hostel life and time constraints
- Sedentary lifestyle and limited outdoor activity

Health and Academic Consequences

Micronutrient deficiencies adversely affect:

- **Cognitive function:** Reduced concentration and memory (vitamin B12, folate)
- **Mental health:** Depression and irritability (vitamin D, magnesium)
- **Immunity:** Increased susceptibility to infections (zinc, vitamin C)
- **Physical health:** Fatigue, weakness, menstrual irregularities (iron, calcium)

Table 1. Hidden Hunger–Obesity Link in Medical Undergraduates (Concise Analysis)

Factor	Hidden Hunger Effect	Obesity Effect
Poor diet quality	Low intake of iron, vitamin D, B12, zinc	Excess empty calories
Irregular meals	Reduced micronutrient intake	Compensatory overeating
Sedentary lifestyle	Vitamin D deficiency	Weight gain
Academic stress	Impaired nutrient absorption	Stress-related eating
Processed food intake	Micronutrient-poor diet	Increased BMI
Hostel food environment	Limited dietary diversity	High fat and sugar intake

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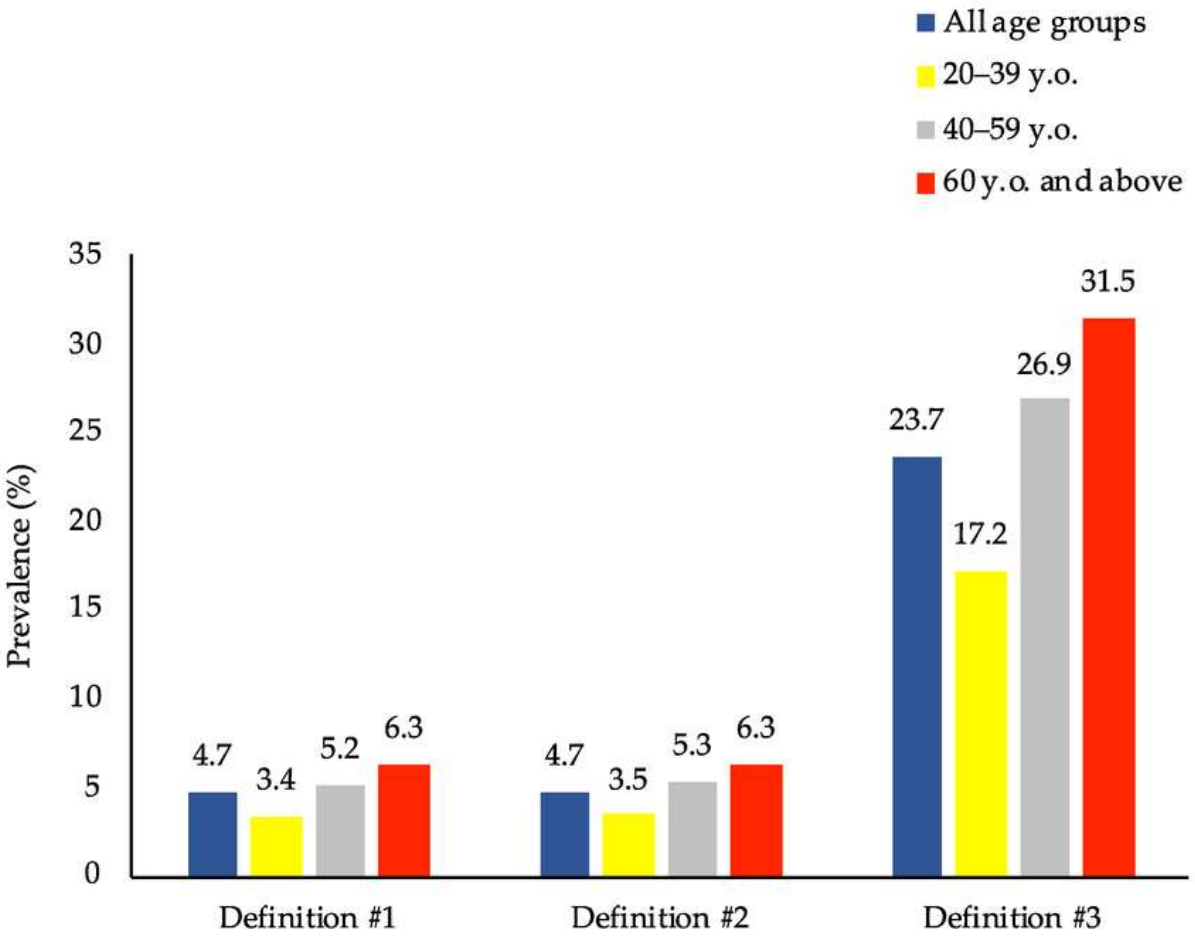

Figure 2. Graphical representation of the dual burden of hidden hunger and obesity among medical undergraduates

Discussion

This review highlights the paradoxical coexistence of hidden hunger and obesity among medical undergraduates. Despite high caloric intake from refined and processed foods, poor dietary diversity leads to multiple micronutrient deficiencies. Similar patterns have been reported in studies from India and other countries.

Vitamin D deficiency is linked to limited sun exposure, sedentary habits, and higher BMI. Iron and vitamin B12 deficiencies—common in vegetarian diets—result in fatigue and reduced physical activity, indirectly contributing to weight gain. Academic stress further exacerbates unhealthy dietary choices, reinforcing this vicious cycle.

Conclusion

The coexistence of hidden hunger and obesity among medical students represents a significant yet under-recognized public health challenge. Addressing this issue requires a shift from calorie-centric approaches to comprehensive nutritional quality. Medical institutions must

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prioritize nutritional screening, counselling, and supportive food environments to safeguard student health and future workforce productivity.

Recommendations

- Regular screening for micronutrient deficiencies
- Nutrition education and awareness programs
- Promotion of balanced, nutrient-dense cafeteria meals
- Encouragement of physical activity, sunlight exposure, and stress-management strategies

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