

# Understanding Adolescent Nutritional Status: A Comprehensive Literature Review

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## Abstract

The review aimed at providing a comprehensive study of the multidimensional factors influencing adolescent nutritional status, with a focus on socio-economic determinants, demographic characteristics, and the outcome of wide-spread refugee situations. The review underlines the critical role of nutrition in the development and well-being of adolescents, highlighting the influence of household food insecurity, lifestyle factors, and chronic health conditions on their nutritional status. By producing findings from varied frameworks and disciplines, the review aims to inform future research, policy, and practice aimed at improving adolescent health and well-being on an overall scale. The review underscores the need for targeted interventions and policies to address the nutritional needs of adolescents worldwide, considering the multifaceted interaction of factors that outline their nutritional outcomes.

## Keywords

Adolescent, Nutrition, Refugee, Nutritional status

## Introduction

Adolescence is a crucial developmental stage that lasts from the start of puberty until the mid-20s and is marked by the maturation and development of important brain regions [1]. Over and beyond the child's surroundings, nutrition plays a crucial role in regulating the development of the brain in its early years [2]. A critical period for cognitive, emotional, and physical development occurs during adolescence, which paves the way for long-term well-being and health [2].

Central to this developmental trajectory is nutritional status, which profoundly influences growth, cognitive function, and overall health outcomes during this pivotal stage of life [3]. 90% of the world's 1.8 billion teenagers live in low and middle-income nations. Although infectious and injury-related factors contribute to the burden of disease among teenagers, undernutrition, inadequate linear development, and nutritional deficiencies remain serious public health issues, even when overweight may be on the rise in many situations [4].

Although they are typically ignored in the design of interventions, which prioritize the individual behavioral aspects, many environmental factors (interpersonal, organizational, communal, and social) impact teenagers' experiences of food insecurity [5]. As they travel, refugees encounter several nutritional difficulties, both during and after their trip [6]. This examines the state of refugees worldwide and how it affects teenage nutrition. In Asia and Africa, teenage undernutrition is more common, occurring at 32.6 - 65% and 4.3 - 30%, respectively [7].

Adolescent malnutrition is more common in Sub-Saharan Africa than in other African countries, with a prevalence rate ranging from 15 - 58% [8]. Nu-

trition has a crucial role in regulating early brain development, often surpassing environmental factors. The broader implications of undernutrition are explored, emphasizing its role as a key indicator of national development and its far-reaching consequences for individual health and economic productivity. Malnutrition emphasizes the far-reaching consequences of undernutrition for individual health and economic productivity, highlighting its role as a key indicator of national development [9].

Therefore, the review is aimed to evaluate the underlying determinants of adolescent nutritional status, including household food insecurity, lifestyle factors, and chronic health conditions. Overall, this review provides a comprehensive overview of the multifaceted factors influencing adolescent nutritional status, underscoring the need for targeted interventions and policies to address the nutritional needs of adolescents worldwide. Through creating results from various frameworks and disciplines, this review purposes to modernize the future research, policy, and practice meant at improving adolescent health and welfare on a wide-ranging scale.

## Literature Review

Adolescents' nutritional status is multifaceted, influenced by personal, household, and socioeconomic factors. Socioeconomic status, age, sex, and mother's educational status significantly impact nutritional status [10]. Additionally, access to nutritious food, household income, and community resources play crucial roles in shaping adolescents' dietary habits and overall health outcomes. Therefore, interventions addressing these factors are essential for improving adolescent nutrition and well-being.

### Global scene of refugees

Due to instability in many parts of the world, people of all ages have been forcibly relocated across national and regional borders. This has resulted in a shortage of basic services, such as food, water, shelter, and health care, which frequently raises the rate of morbidity and mortality [11]. Famine and violence are the most common reasons for forced mass population movements, with the majority of refugees today relying on international aid assistance to survive [12, 13].

In times of emergency, people need to be able to sustain their vitality, continue to grow physically and mentally, and allow themselves to recover from previous malnourishment in addition to avoiding hunger [14]. Based on statistical data from the United Nations Higher Commission for Refugees, there were 11.4 million refugees as of the end of 2007, of which 1.7 million were considered to be in conditions similar to those of refugees. 82% of the world's refugees are in developing nations, indicating that human displacement is widespread and becoming more complex, with children and adolescents making up the majority of the population in Asia and Africa. By the end of 2007, Europe and Africa had taken in 22% and 14% of the refugees, respectively, while Asia had only welcomed 5% [15].

Approximately 110,806 refugees from 14 different countries are presently housed in 12 camps in Ethiopia [16]. Most

of the refugees are from Sudan, Kenya, Somalia, and Eritrea. About 39.6% of the population is made up of refugees from Somalia; the remainder are from Eritrea, Sudan, Kenya, and other countries, accounting for 32.9%, 23.5%, 2.6%, and 1.5% of the total [17]. For almost 20 years, Ethiopia has been experiencing a refugee inflow due to the wars in the aforementioned counties [18, 19]. In light of the significant challenges faced by refugees, especially adolescents, policymakers should prioritize the provision of basic services, including food, water, shelter, and healthcare, to mitigate the risk of malnutrition. Strengthening international aid assistance and ensuring equitable distribution of resources can help address the nutritional needs of refugee populations and improve overall health outcomes.

### Magnitude of under nutrition during adolescent

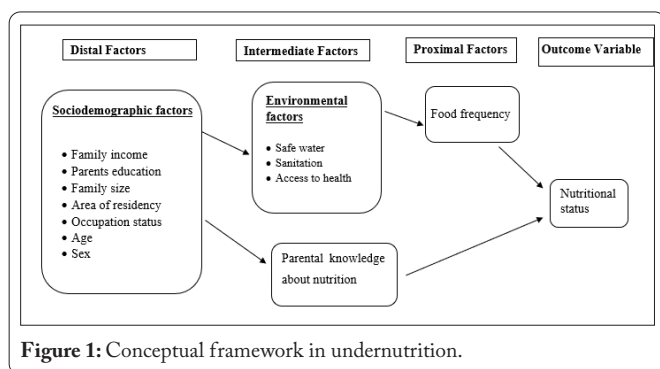
In Asia and Africa, where rates range from 32 - 65% and 4 - 30%, respectively, adolescent undernutrition is typically higher. Adolescent malnutrition is more common than in other African states in the Sub-Saharan area of Africa, where rates range from 15 - 58% [8].

Children and adolescents make up over 48% of the population of Ethiopia, with 25% being girls and 23% being males. According to a study done in India, showed that the incidence of stunting and thinness, when age and sex were both included, was 53.57% and 48.75%, respectively [20]. In a study conducted in northern Ethiopia revealed that the prevalence of stunting was 24.8% [21].

There is evidence of prevalence in Northeastern Brazil (20.7%), Southwest Nigeria (19.1%), and Northern Ethiopia (28.5%). Seychelles has the lowest percentage of slim people (27.7%) [22]. Adolescent thinness frequency was found to be significantly greater (80.8%) in the Jimma zone of Ethiopia, according to another study [23]. Other research, however, found Ethiopia at 6.2% [24] and Burkina Faso at 8.0% and 13.7% [25].

Adolescents constitute 25.2% of the total population in Ethiopia [26]. The prevalence of undernutrition among teenage students in a study done in Jimma was found to be 21.3% [27]. This figure is greater than in a study done in Addis Ababa city (13%) and lower than in a study done in Ambo (27.5%) [28]. Because of a protracted lack of well-balanced meals, stunting was common in Adama city (15.6%), particularly in children from low-income families [27]. A different study found that the prevalence of thinness was 13.6% in Southeast Ethiopia, 26.1% in Northern Ethiopia, 18.9% in Nigeria, and 28% in West Bengal, India [29].

Malnourished adolescents are more prone to common illnesses such as respiratory infections and diarrhea because they have a poorer immune system [8]. In this context, it is critical to consider the complex character of adolescent undernutrition. Figure 1 presents a conceptual framework based on the literature review that illustrates the relationships between socioeconomic factors, past and present medical history, demographics, environment, and diet-related factors in adolescents between the ages of 10 and 19. This paradigm provides a comprehensive understanding of the



variables influencing teenagers' nutritional status. The high prevalence of adolescent undernutrition in regions like Asia and Africa, targeted interventions are essential to address this issue. Policymakers should focus on implementing nutrition programs and school-based interventions aimed at improving dietary quality, promoting healthy eating habits, and addressing food insecurity among adolescents. Additionally, investing in healthcare infrastructure and refugee support policies can help address the unique nutritional challenges faced by adolescent refugees.

### Socio-demographic characteristics of the adolescents

The number of people in the household, ethnicity, parents' educational attainment, occupation, family income, housing status, urbanization, poverty, unemployment, politics, social structures, religion, beliefs, and ideological factors, as well as the monthly food expenditure for the family, are among the fundamental causes of malnutrition. While rising incomes might help reduce undernourishment, other factors like education level can also have a significant impact. People with high levels of education can obtain and apply the knowledge necessary to achieve a healthy diet [30].

Teenagers from low-income homes in urban areas had a 22.4% prevalence rate of thinness, per a study done in Bangladesh [31]. Because they have been exposed to the outside world, women with higher levels of education are more conscious of preventive and curative healthcare as well as personal hygiene than illiterate or less educated women. In addition to giving women more access to family resources—which are essential to their nutritional well-being—education can also help them become more independent decision-makers [32].

A further study carried out in Adama city revealed that one significant risk factor for stunting is the mother's level of education. Offspring of educated mothers were less likely to suffer from malnutrition. The use of healthcare facilities, better feeding practices, and higher production may all be correlated with education [25]. Households with more than six individuals had a higher incidence of stunting, while households with three to four members had the lowest prevalence of stunting [33]. Socioeconomic factors such as household income, parental education, and urbanization significantly impact adolescent nutritional status. Policymakers should prioritize poverty alleviation programs, education initiatives, and social protection schemes aimed at addressing the underlying determinants of malnutrition. By improving access to education and economic opportunities, policymakers can empower adolescents and

their families to make healthier dietary choices and improve overall nutritional outcomes.

### Under nutrition

Undernutrition serves as a gauge of a country's progress. In the process of development, nutrition is both an input and an outcome [34]. The most widely used method for determining a person's nutritional status is the body mass index (BMI). The weight-to-height ratio, which forms the basis of BMI, is regarded as a reliable indicator of body fat and protein reserves. The stores that the body needs to deal with physiological stress brought on by decreased intake, increased demands for greater activity, and illnesses are reflected in body storage [35].

For both the present and the future generations, adequate nourishment is essential to life, health, and development. The leading cause of death globally, undernutrition is a silent killer that goes unreported, unaddressed, and hence unprioritized [36]. Decreased energy intakes contribute to impairments of several human functions such as disease response, work output, and activity. The cyclical pattern of undernourishment leads to low productivity and low productivity generated low wages, which in turn leads to undernourishment [37].

According to a study done in Nigeria, teenage boys in the study region had a high prevalence of underweight, overweight, and low prevalence of obesity, whereas girls had a high prevalence of underweight, overweight, and low prevalence of obesity [38]. Physical development is an important sign of a child's health, and this is especially true during puberty. The global prevalence of childhood and adolescent thinness is 8.4% for girls and 12.4% for boys, classified as a BMI lower than 2 SDs below the median (BMI) by age and sex. In the last three decades, prevalence has been relatively stable [39].

The highest rate of moderate and extreme thinness is seen in South Asia, where one in five girls between the ages of five and nineteen and nearly one-third of their male counterparts are underweight [39]. Approximately 4% of girls aged 13 – 15 are considered thin by the global school-based student health survey, although in Mauritius, Sudan, Bangladesh, the Maldives, Cambodia, and Vietnam, over 10% of the girls examined met these criteria [40]. Undernutrition was found to be more common among teenage pupils (21.3%), which is higher than the Addis Ababa city research (13%) but lower than the Ambo study (27.5%) [41].

In 2016, it was estimated that the mean BMI of adolescents in South Asia, Southeast Asia, East Africa, West Africa, and Central Africa was between 10 and 19. The countries with the lowest BMIs were Ethiopia, Niger, Senegal, India, Bangladesh, Myanmar, and Cambodia. East Africa has the lowest mean BMI in South Asia for adolescents [39], despite having the lowest mean BMI for children (ages 5 – 9).

According to a study done in Adama city, adolescents whose mothers had not received any formal education were substantially more likely to be undernourished [27]. This result is consistent with a study conducted in the urban slums of Dibrugarh, which found that adolescents from families where the mother was illiterate had a significantly higher prevalence of both stunting (41.80) and thinness (44.26%)



[42]. Recognizing undernutrition as both a health and development issue, policymakers should prioritize nutrition-sensitive interventions aimed at improving food security, promoting healthy lifestyles, and addressing the root causes of malnutrition. Implementing school feeding programs, community-based nutrition education, and poverty reduction strategies can help alleviate the burden of undernutrition among adolescents and contribute to long-term development goals.

### Adolescent nutritional status

Inadequate dietary quality and quantity are the main causes of nutrition difficulties for a large number of teenagers, according to [43, 44]. These situations could result from a lack of understanding about nutrition, livelihood insecurity, intra-home food distribution that does not satisfy their whole nutritional needs, and household food insecurity. Poor food is the main cause of micronutrient malnutrition and chronic energy insufficiency, which lead to stunting and thinness (low BMI for age). Undernutrition may also be caused by infections and excessive physical activity habits, such as traveling long distances and taking on severe workloads.

The fundamental factors are considered pertinent to teenagers regardless of location or socioeconomic status; however, the severity of issues and top concerns may vary across and even within nations. Obesity is one of the nutritional issues of industrialized countries that is becoming more common in low and middle-income countries due to the epidemiological and nutritional transition along with economic globalization.

It is common for middle-class, low-income, and rich people to have obesity, diabetes, and hypertension. In adolescent groups, the seven extremes of undernutrition and overnutrition are known to frequently coexist as issues. Deficiencies can be observed in the better-off group due to poor dietary habits, and in poor civilizations due to poverty. The same causes are always at work: nutritional deficiencies are the main underlying cause, sometimes accompanied by lifestyle choices and medical disorders that further impair nutritional status. Though teenagers are highly exposed to HIV, infection may not be as significant a role in malnutrition as it is in under-five children, with lifestyle factors becoming increasingly relevant.

Early pregnancy is a significant risk factor for adolescents everywhere; poor body nutrient stores or previous malnutrition are background risks that could have an impact on adolescents or raise the risk of chronic disease in later life. For example, stunting starts throughout fetal life, infancy, or childhood. Numerous factors contribute to nutritional deficiencies; they have been categorized as socioeconomic and psycho-social issues, although it is acknowledged that they are correlated [45].

Moreover, many pathological conditions—diabetes and HIV/AIDS, in particular—alter nutritional status or call for special nutritional therapy. HIV/AIDS symptoms are linked to decreased food intake as well as issues with digestion and vitamin absorption. Moreover, it modifies metabolism, or how the body absorbs, uses, stores, and eliminates a variety

of nutrients. In HIV-positive and AIDS-positive patients, nutritional issues play a major role in both health and mortality [46].

In this context, the study aims to correlate the determinants by concentrating solely on the health status of adolescents. The underlying determinants include socioeconomic factors, medical history, both past and present, including the status of viral loads, demographic factors, environmental factors, and diet-related factors in adolescents aged 10–19. Policymakers should adopt a comprehensive approach to addressing adolescent nutritional status, recognizing the complex interplay of socioeconomic, environmental, and behavioral factors. Investing in research, policy, and practice aimed at improving adolescent nutrition and well-being is crucial for achieving sustainable development outcomes and ensuring the health and prosperity of future generations.

Through the implementation of these policy recommendations, policymakers can work towards addressing the multifaceted factors influencing adolescent nutritional status and improving the health and well-being of adolescents worldwide.

## Management of Undernutrition

### Usage of high-value food products

Enhancing the production of high-value food products and ingredients involves optimizing agricultural practices through precision farming techniques like soil nutrient management and genetic modification [47]. Technological innovations in food processing and preservation, such as freeze-drying and vacuum packaging, maintain the nutritional integrity of products [48]. Promoting sustainable farming methods and organic production enhances soil health and produces nutrient-rich crops [49]. Research into novel ingredients and functional foods contributes to innovative, nutritionally enhanced products [50]. Educating consumers about nutritional value through labeling regulations and guidelines encourages healthy eating habits [51].

### Food security for sustenance

To improve food security and consumption of nutritious foods, interventions should prioritize diverse crop cultivation and equitable access to nutritious foods [52]. Promoting sustainable food systems supports small-scale farmers and ensures fair prices [53]. Nutrition education empowers communities to make healthier choices and diversify diets [54]. Strengthening social safety nets and food assistance programs provides vulnerable populations access to nutritious foods during crises [55]. Integrating nutrition into broader development policies addresses underlying malnutrition determinants [56]. A multi-sectoral approach enhances nutritional outcomes and community well-being [50].

## Conclusion

The comprehensive review on the understanding adolescent nutritional status that observes the complicated factors manipulating the adolescent health, by emphasizing the critical role of nutrition in their growth. Emphasizing the socio-

economic determinants, demographic characteristics, and the impact of refugee locations, the review highlights the necessity for targeted interventions and policies to discourse the nutritional requirements of adolescents in the refugee camps. Through combining diverse conclusions, it informs future research, policy, and practice to improve adolescent nutrition and well-being highlighting the importance of addressing family food insecurity and other impacts determining adolescent nutritional consequences.

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## Conflict of Interest

None.

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