

THE ROLE OF DIET IN SUPPORTING THE PHYSICAL HEALTH AND PHYSICAL DEVELOPMENT OF ADOLESCENTS IN INDONESIA

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Abstract

This study aims to analyze the role of dietary patterns in supporting the physical health and development of adolescents in Indonesia. The research used a descriptive qualitative approach with literature study and thematic analysis. The results indicate that the nutritional status of Indonesian adolescents still faces a double burden of malnutrition, encompassing both undernutrition and overnutrition. Unbalanced dietary patterns, low intake of energy, protein, and fat, as well as insufficient fiber consumption, are the main contributing factors. Nutritional knowledge, body image, and family influence especially the role of mothers significantly affect dietary quality. It is concluded that holistic nutritional interventions and continuous education are essential to support optimal adolescent growth and development.

Keywords: *Dietary Patterns, Physical Health, Physical Development, Adolescents, Nutritional Status, Indonesia*

INTRODUCTION

The problem of malnutrition is a complicated problem where, according to FAO, 768 million people in 2020 suffered from malnutrition, which this data increased by 18.1 from the previous year of 650.3 million people (Hartanti et al., 2024). Common problems experienced by adolescents in Indonesia are undernutrition and overnutrition (Hartanti, 2024). Malnutrition leads to stunting to anemia while overnutrition leads to obesity. A survey conducted by SKI (Indonesian Health Survey) in 2023 revealed that the nutritional status condition in adolescents was 7.6% (malnutrition) and 12.1% (obesity) (Desfita et al., 2024). The information above provides clues if Indonesia is still experiencing excess and malnutrition. Generally, adolescent age groups are included in a very critical period (Mokoginta et al., 2016). Not without reason, the period of soaring growth and development requires equal nutrition. Poor eating habits will affect the growth and development of adolescents because the nutrients needed by the body are lacking (Ningrum et al., 2022). If not balanced with proper nutritional intake, it can lead to problems such as malnutrition, iron deficiency anemia (in the majority of women due to menstruation), vitamin A deficiency and iodine deficiency (Oktaviasari et al., 2021). This research intends to answer a number of fundamental questions.

First, what is the nature of adolescence as a period of development and what are the characteristics of physical development that occur in it? Second, what is meant by diet and what is the description of eating patterns that are common in Indonesian teenagers? Third, how much nutritional need is actually needed to support this phase of rapid growth? From these basic questions, the problem formulation then focuses on the relationship between variables, namely how diet affects the fulfillment of nutritional needs, as well as how the correlation between diet and the physical development and overall physical health of adolescents. This study seeks to answer fundamental questions about the characteristics of adolescence, diet, and nutritional needs. The main focus is to analyze the relationship between diet and nutritional fulfillment and its impact on the physical development and physical health of adolescents in Indonesia. The purpose of this study was to analyze the relationship between diet and nutritional status of adolescents and identify factors that influence them, such as nutritional knowledge and environmental influences. Thus, this research is expected to provide practical benefits in the form of dietary recommendations that are applicable to adolescents and become educational materials for parents and schools in supporting optimal growth.

LITERATURE REVIEW

Concept of Adolescence:

Adolescence can be described as a crucial transition period from childhood to adulthood with some common changes both physically and psychologically. Under the Child Protection Law, adolescents are classified as individuals between the ages of 10-18, which makes up nearly 20% of Indonesia's total population (Hartanti et al., 2024). In this phase, adolescents experience various striking physical changes, such as height and weight gain, muscle development, and secondary sex organ maturation. Psychologically, they also experience emotional turmoil that is unstable, volatile, and often still labile in decision-making (Izzani et al., 2024: 267). This complex transition demands a comprehensive approach, including meeting their nutritional needs. The specific nutritional needs of adolescents are very crucial considering that this phase is a phase of rapid growth and development after infancy. To support the acceleration of growth and development of their vital organs, adolescents need adequate intake of macronutrients such as carbohydrates, proteins, and fats. In addition, micronutrients in the form of various vitamins and minerals, as well as fiber, are no less important to ensure optimal physiological and metabolic functions of the body (Mokoginta et al., 2016). Nutritional adequacy during this period not only determines his current health status, but also an investment in his quality of life in adulthood.

Diet Concept:

Diet is defined as an individual's habit of consuming a variety of foods and drinks with the intention of meeting the nutrients needed to achieve optimal body condition (Putri & Rachman, 2023: 59). A good diet can be assessed from its three main components, namely the type (diversity of food), frequency (how often eaten in a day), and the amount (portions consumed) of the food consumed (Ar et al., 2024). The types of diets themselves are very diverse, ranging from a balanced, vegetarian diet, to an irregular diet (skipping breakfast or consuming junk food) excessively. The formation of an adolescent's diet is influenced by the complex relationship between internal and external factors. The most dominant internal factors come from parents, which include the level of parental nutritional knowledge, employment status, and parenting style applied in the family. Meanwhile, the main external factor is the influence of the friendship environment and the social norms that apply around it (Surijadi et al, 2021). These two factors interact with each other to shape adolescents' perceptions, preferences, and eating behaviors.

Adolescent Physical Development:

Adolescent physical development does not occur simultaneously, but through stages that can be categorized. According to Hurlock, the stages of adolescent physical development are divided into three main phases (Hikmadani et al, 2023). The early adolescence phase occurs at the age of 11-13 years, marked by the onset of signs of puberty. Intermediate adolescents are at the age of 14-16 years, where physical growth takes place very rapidly. Meanwhile, the late adolescence phase is experienced at the age of 17-20 years, where physical growth begins to slow down and approaches the shape of an adult body. Optimal physical development at each stage cannot be separated from the influence of several factors (Batubara, 2010). Genetic or hereditary factors play a role in determining potential height and basic body shape. However, this genetic potential can only be expressed optimally if it is supported by adequate nutritional factors, because nutrition is the raw material for growth. In addition, environmental factors such as sanitation conditions, climate, and physical activity also affect the pace and quality of physical development of an adolescent.

Nutritional Needs of Adolescents:

Adolescents' nutritional needs are specific and have increased drastically due to growth spurts and high activity. These needs include macronutrients as a source of energy and body builders, as well as micronutrients to regulate various metabolic processes (Mokoginta et al., 2016). Carbohydrate sources such as rice and tubers are necessary for energy, while proteins (animal and plant) are essential for the formation of cells, hormones, and muscle tissue. Healthy fats from fish and nuts are important for cell and hormone health, as well as fiber from vegetables and fruits for optimal digestion. Quantitatively, adolescents need between 2200-3200 kcal of energy for males and 1800-2400 kcal for females per day. Carbohydrates should account for 45-65% of total energy, with a protein requirement of about 0.8-1 gram per kilogram of body weight. Fat intake should ideally be around 25-35% of total energy, and fiber is about 10%. For micronutrients, adolescents need a complete spectrum of vitamins (A, B, C, D, E, K) and essential minerals such as calcium for bones, iron to prevent anemia, zinc, magnesium, omega-3, and antioxidants (Nurhasanah et al., 2023). The balanced fulfillment of all these nutrients is the foundation for optimal physical health and physical development.

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The Relationship of Diet and Physical Development:

Several previous studies have attempted to look at the relationship between the influence of diet on adolescent health and physical growth. Research by Mellenia Dwiari Andya et al. based on 16 journals studied, found that 13 journals mentioned that there was a significant relationship between physical activity and diet that showed good condition (Andya et al., 2022). Research by Andrini et al found that the diet of teenagers at SMAN 8 Jambi City was in the poor category where 51.9% were overweight (Andrini et al, 2023: 26). Research by Aprillia Kurniawai found that there is a relationship between the influence of diet and the physical growth of adolescents where they like to eat junk food tend to be impaired in their physical growth and become obese (Kurniawati, 2023).

RESEARCH METHODS

This study uses a descriptive qualitative approach with a literature study method (Nasution, 2023). This study was used to analyze the role of diet on the physical health and physical development of adolescents in Indonesia. This type of research was chosen to understand the phenomenon in depth through secondary data synthesis (Kalalinggi, 2024). The research population includes all scientific publications related to the topic, such as journals, books, and research reports. The sample was selected *purposively* with the criteria of literature published in 2010-2025 which discusses the diet, nutrition, or physical development of Indonesian adolescents. The research instrument is in the form of researchers themselves. The data collection technique was carried out through a systematic literature search on academic databases such as Google Scholar using keywords relevant to diet, health and adolescents. Data were analyzed using thematic analysis techniques that involved identifying, coding, and drawing key themes emerging from a variety of literature to investigate the relationship between diet, nutritional fulfillment, and adolescent physical development, resulting in a comprehensive knowledge synthesis.

RESULTS AND DISCUSSION:

A. Key Findings

Based on the analysis of various literature, several findings can be synthesized regarding nutritional status, diet, and factors that affect it in Indonesian adolescents.

Aspects	Key findings	Source
Nutritional Status	51.5% thin, 39.4% normal, 9.1% obese at SMP N 3 Boyolali	Hartanti et al. (2024)
	40% good nutrition, 23% undernutrition, 16% malnutrition at SMPN 48 Pekanbaru	Desfita et al. (2024)
Diet	97.5% of adolescents have very little energy sufficiency	Mokoginta et al. (2016)
	52.9% good diet, 47.1% bad diet	Ningrum et al. (2022)
Determining Factors	Significant relationship between nutritional knowledge and nutritional status ($p=0.044$)	Hartanti et al. (2024)
	Significant relationship between body image and diet ($p=0.01$)	Ningrum et al. (2022)
	The maternal factor greatly affects children's consumption patterns	Surijati et al. (2021)

B. Interpretation of Research Results

1. Nutritional Status

Optimal nutrition is a crucial foundation that must be fulfilled during adolescence, considering that this period is the second period of rapid growth after infants. Nutritional adequacy not only determines current physical development, but also affects long-term health quality. Hartanti et al. (2024) in their research at SMP N 3 Boyolali revealed a worrying condition where more than half of adolescent girls (51.5%) experience a lean nutritional status, while almost 10% are obese. These findings indicate an extreme polarization of nutritional problems in the same population. In more detail, Desfita et al. (2024) reported the complexity of deeper nutritional problems at SMPN 48 Pekanbaru. As many as 39% of students experienced a combination of undernutrition and malnutrition, while 21% experienced overnutrition and obesity. This data not only reflects the inequality of nutritional intake, but also indicates the failure of the system to provide access to optimal nutrition for all adolescents. The phenomenon of *double burden of malnutrition* is a serious public health challenge, where interventions must be able to address both problems simultaneously.

2. Consumption Patterns

A balanced food consumption pattern is an absolute prerequisite for achieving optimal nutritional status. However, the reality revealed by Mokoginta et al. (2016) shows a very wide gap between needs and actual intake. The high prevalence of "severely under-sufficient" energy sufficiency (97.5%) indicates that most adolescents do not get enough energy to support daily activities and optimal growth. Even more concerning, this deficiency is not only in energy, but also in essential macronutrients such as carbohydrates (95% <70% AKG), protein (77.5% <70% AKG), and fat (77.5% <70% AKG). The dominance of rice (90%) and fresh fish (77.5%) consumption indicates a high dependence on local food sources, which is actually a positive potential. However, the low variation in vegetable and fruit consumption, as well as the high consumption of carbonated drinks (30%) indicate the need for education on the importance of food diversification and the dangers of excessive sugar consumption. The findings of Ningrum et al. (2022) showing that almost half of adolescents (47.1%) have poor diets reinforce the evidence that the problem of suboptimal consumption patterns is a common phenomenon among Indonesian adolescents.

C. Discussion of research results based on literature review

1. Nutritional Knowledge

Adequate nutritional knowledge should be the basis for making decisions about food selection. Hartanti et al. (2024) succeeded in proving statistically the existence of a significant relationship between knowledge about nutrition and the nutritional status of adolescents ($p=0.044$). However, what needs to be concerned is the uneven distribution of knowledge, where only 25.3% have good knowledge, while 74.7% have sufficient to lack knowledge. This condition indicates that nutrition education efforts have not been successful so far to reach the majority of the adolescent population. Deeper, Ningrum et al. (2022) reveal the psychological dimension that affects eating behavior. A significant relationship between body image and diet ($p=0.01$) suggests that emotional factors and self-perception have a strong influence, perhaps even stronger than rational knowledge of nutrition. Adolescents with negative body image tend to develop dysfunctional eating behaviors, both in the form of excessive restriction and emotional eating. These findings are consistent with the cognitive-dissonance theory which states that when there is a mismatch between self-perception and ideal standards, individuals will develop adaptation mechanisms that are often maladaptive, including in diet.

2. Family in Eating Behavior

The family, especially the role of the mother, is the most fundamental environment in the formation of an adolescent's eating behavior. Suriyati et al. (2021) through multiple linear regression analysis succeeded in identifying factors that affect children's consumption patterns. Results showing a significant influence of maternal nutrition knowledge ($\beta=0.980$; $p=0.034$), parenting ($\beta=0.377$; $p=0.034$), and maternal education ($\beta=-0.025$; $p=0.037$) confirm Bronfenbrenner's ecological systems theory which places the family as the microsystem that has the most influence on individual development. Higher maternal education not only provides access to better information, but also develops critical thinking in choosing and processing food. Meanwhile, responsive parenting which includes the ability to recognize children's hunger and satiety, create a positive eating environment, and become a desired mother figure has proven to be a strong predictor of the quality of children's consumption patterns. These findings reinforce the importance of the family approach in adolescent nutrition interventions.

D. Implications for Physical Health and Physical Development

Adolescence is a critical period that determines the quality of health throughout the life cycle. The inoptimal nutritional status and diet in this period has long-term and often irreversible implications. Stunted linear growth due to chronic malnutrition can lead to suboptimal adult stature, which is associated with decreased working capacity and an increased risk of metabolic disease. On the other hand, the high consumption pattern of sugar and saturated fat indicated by the high consumption of carbonated beverages and processed foods can program the body's metabolism towards metabolic syndrome. The mechanism of epigenetic programming allows unhealthy diets during adolescence to lead to alterations in gene expression that increase susceptibility to obesity, type 2 diabetes, and cardiovascular disease in adulthood. Therefore, adolescent nutrition improvement interventions should not be seen as isolated efforts, but should be seen as a strategic long-term health investment. The life-course perspective approach emphasizes that interventions in the adolescent period have a cumulative impact that will determine the health trajectory throughout life.

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COVER:

Diet plays a very important role in supporting the physical health and physical development of adolescents in Indonesia. The nutritional status of adolescents still faces serious challenges in the form of a double burden of malnutrition between malnutrition (underage, anemia) and overnutrition (obesity). An unbalanced diet, characterized by low intake of energy, protein, fat, and lack of variety in vegetable and fruit consumption, also aggravates this condition. Factors such as low nutritional knowledge, body image, and family influence (especially the role of mothers) significantly affect the quality of adolescent diets. The impact of non-optimal nutrition in adolescence is long-term and can be irreversible, such as disrupted linear growth, increased risk of metabolic diseases, and decreased quality of life in adulthood. Therefore, comprehensive and targeted nutritional interventions are needed to ensure that Indonesian adolescents grow well in terms of physical and health. Based on the findings of the study, it is recommended that the government, educational institutions, and families collaborate in educating adolescents about the importance of balanced nutrition through counseling programs, integration of nutrition materials in the curriculum, and the involvement of parents—especially mothers—in forming healthy eating habits. In addition, there is a need for policies that support the availability of nutritious food in schools and communities, as well as health campaigns that target positive body image issues in adolescents.

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