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How Adolescents Perceive Stunting and Anemia: A Qualitative Study in Yogyakarta's Stunting Locus Area, Indonesia

Persepsi Remaja tentang Stunting dan Anemia: Studi Kualitatif di Daerah Lokus Stunting di Yogyakarta, Indonesia

Tri Siswati,[1] Heru Subaris Kasdjono,[2] Yustiana Olfah,[3] dan Bunga Astria Paramashanti[4]

[1]tri.siswati@poltekkesjogja.ac.id
Politeknik Kesehatan Kementerian Kesehatan Yogyakarta
Jl Tata Bumi No 3, Banyuraden, Sleman, Yogyakarta, 55293 Indonesia

[2]kherusubaris@gmail.com
Politeknik Kesehatan Kementerian Kesehatan Yogyakarta
Jl Tata Bumi No 3, Banyuraden, Sleman, Yogyakarta, 55293 Indonesia

[3]yustianajogja@gmail.com
Politeknik Kesehatan Kementerian Kesehatan Yogyakarta
Jl Tata Bumi No 3, Banyuraden, Sleman, Yogyakarta, 55293 Indonesia

[4]bunga@almaata.ac.id
Sidney School of Public Health, University of Sidney
New South Wales 2007, Australia

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Abstrak*: Persepsi merupakan interpretasi unik dari suatu situasi sebagai proses kognitif kompleks yang memengaruhi perilaku seseorang. Penelitian ini bertujuan untuk membahas persepsi remaja tentang stunting dan anemia. Penelitian ini dilakukan di wilayah lokus* stunting *yang mencakup Kabupaten Kulon Progo dan Gunung Kidul, Yogyakarta, Indonesia pada tahun 2020. Penelitian ini dilakukan dengan metode* rapid assessment procedures *(RAP) dengan wawancara mendalam. Sebanyak 33 orang terdiri dari 25 siswa SMP baik laki-laki maupun perempuan serta 8 guru, orang tua, dan tokoh masyarakat berpartisipasi dalam penelitian ini. Analisis data dilakukan berdasarkan tema definisi, penyebab, dampak, pencegahan, dan hambatan dalam penanggulangan* stunting *dan anemia. Berdasarkan hasil wawancara mendalam, beberapa remaja menyatakan bahwa anemia sama dengan tekanan darah rendah. Di antara hambatan untuk mengatasi anemia adalah remaja sering memiliki citra tubuh ingin menjadi lebih ramping, lebih kurus, membatasi makanan bergizi, kurang tidur, dan khawatir berlebihan terhadap tubuhnya. Ada beberapa kendala dalam mencegah dan mengendalikan* stunting*, antara lain tabu tentang makanan tertentu, persepsi* stunting *yang keliru, genetik sebagai penyebab utama, dan stigma. Namun, untuk mendorong persepsi ini, diperlukan dukungan serta strategi komunikasi, informasi, dan edukasi sehingga target penurunan* stunting *dapat tercapai. Tenaga kesehatan perlu merancang strategi komunikasi perubahan perilaku yang tepat untuk menanggulangi anemia dan stunting pada remaja.*

Kata kunci: *anemia; kualitatif; persepsi; remaja;* stunting

Abstract: Perception is an individual's unique interpretation of a situation as a result of a complex cognitive process that influences behavior. This study aims to explore adolescents' perceptions of stunting and anemia. This qualitative study was conducted in Kulon Progo and Gunung Kidul Districts, Yogyakarta, Indonesia, in 2020. The study was carried out by rapid assessment procedures (RAP) using in-depth interviews. A total of 33 informants consists of 25 male and female of junior high school students, and 8 persons, including teachers, parents, and the community involved in this research. We thematically coded the data by definitions, causes, impacts, prevention, and obstacles in tackling stunting and anemia. This finding is that some adolescents state that anemia equals to low blood pressure. The barriers to prevent anemia are body image, lack of nutritious food intake, less sleep, and excessive upset. Meanwhile, stunting is a genetic problem, so if the parents are short, their children must be short too. To achieve the goal of reducing stunting, however, it is required to implement methods for communication, education, and information dissemination. So health professionals must develop suitable behavior change communication strategies.

Keywords: adolescent; anemia; perception; qualitative; stunting

Introduction

Indonesia faces the double burden of malnutrition, including overnutrition and undernutrition (Maehara et al., 2019). The popular forms of adolescent malnutrition are anemia and stunting (Juffrie et al., 2020; Tamrat et al., 2020). Stunting is chronic malnutrition experienced in early life since pregnancy and affects all periods of human life (Dewey & Begum, 2011; Connery et al., 2021; Finkelstein et al., 2018). This is the reason several countries agreed to reduce stunting by 40 percent as the second Sustainable Development Goals (SGDs) target (WHO, 2017). Indonesia has set a stunting prevalence of 14 percent by 2024. Furthermore, a national cross-sectional study in 2021 reported that stunting prevalence among children was 24.4 percent and continuously decreased from 30.8 percent in 2018 and 37.2 percent in 2013 (Kementerian Kesehatan Republik Indonesia [Kemenkes RI], 2021; 2018; 2013). Based on this study, the mean of reducing stunting prevalence is 1.6 percent per year. It is estimated that stunting prevalence will be 19.6 percent in 2024 when the velocity of decreased stunting is persistent. Thus, the government need a unique strategy to accelerate stunting reduction.

Yogyakarta is a province with the third lowest stunting rank after Bali and Jakarta. A report of a 5-year survey notes that stunting prevalence has decreased there from 27.3 percent in 2013 to 21.4 percent in 2018, and is lower at 17.3 percent in 2021 (Kemenkes RI, 2013; Kemenkes RI, 2018; Kemenkes RI, 2021). In other words, the mean prevalence reduction was 1.25 percent annually. Therefore, while the rate of decline remains constant, the stunting prevalence is estimated to be 13.6 percent in 2024 in Yogyakarta, a critical borderline target.

Anemia and stunting are relatively close-associated. It is estimated that one-third of all reproductive women are anemic. The Ministry of Health in Indonesia observed a rise in the prevalence of nutrition-related anemia among pregnant women from 37 percent in 2013 (Kemenkes RI, 2013, p. 296) increased to 48.9 percent in 2018 (Kemenkes RI, 2018, p. 522). The 2013 Basic Health Research report reveals that 28 percent of children under five and 26 percent of children aged 5 to 14 years are anemic (Kemenkes RI, 2013). A regional survey of 1,503 female adolescents showed that almost 20 percent are anemic (Dinkes DIY, 2019).

Previous studies describe that women recognize anemia's symptoms but not its clinical term: pregnant women are aware of iron supplements but don't know why they're recommended, and one-third of

women reported harmful side effects from iron supplements as well as 10 percent of women quit taking iron supplements due to negative effects in five nations (Galloway et al., 2002, p. 529). In Tangerang, West Java, in a qualitative study with respondents' mothers, it was stated that short toddlers are not associated with health or nutrition problems. Even respondents viewed "kuntring" or stunting as smart children (Liem et al., 2019). In rural Indonesia, only two percent of mothers knew about stunting, two-thirds of individuals blamed genetics for stunting, and stunting causes interrupted growth (33.7 percent), stupidity (13.8 percent), and illness (11.8 percent) (Hall et al., 2018, p. 142). Surprisingly, the "Lieschen Müller effect" study resulted that since the early 20th century, the child's longitudinal growth has no relationship with food and growth (Hermanussen et al., 2018).

Adolescents (aged 10–19 years old) play an important role in providing human resources. They are in a transitional period between childhood and adulthood characterized by rapid physical, emotional, and cognitive growth, as well as crucial for acquiring health-related behaviors (Jaworska & MacQueen, 2015). The adolescent period has been highlighted as a second opportunity for the treatment of dietary deficiencies (Sparrow et al., 2021). They expose growth spurt and consolidation, as shown in Fig 1.

Adolescence is a strategic period to shape lifestyles and determine behavior patterns and health values. During the transition to adulthood, adolescents' nutritional trajectories (e.g., nutritional status and food consumption) are intertwined with their social and economic trajectories, such as schooling, family formation, and labor engagement, distinguishing them from younger children and adults (Fig 2.). It is an ideal period of life marked by shifting behaviors and dietary patterns (Branca et al., 2015; Viner et al., 2012). The multiple trajectories of adolescents are depicted in Fig 2.

Globally including in Indonesia, there have been many healthcare programs for adolescents' well-being, such as intervention blanket anthelmintic (Weatherhead et al., 2017), school feeding (Adelman et al., 2019), behavior change communication of adolescent health (Gupta et al., 2013), Fe supplementation (Finkelstein

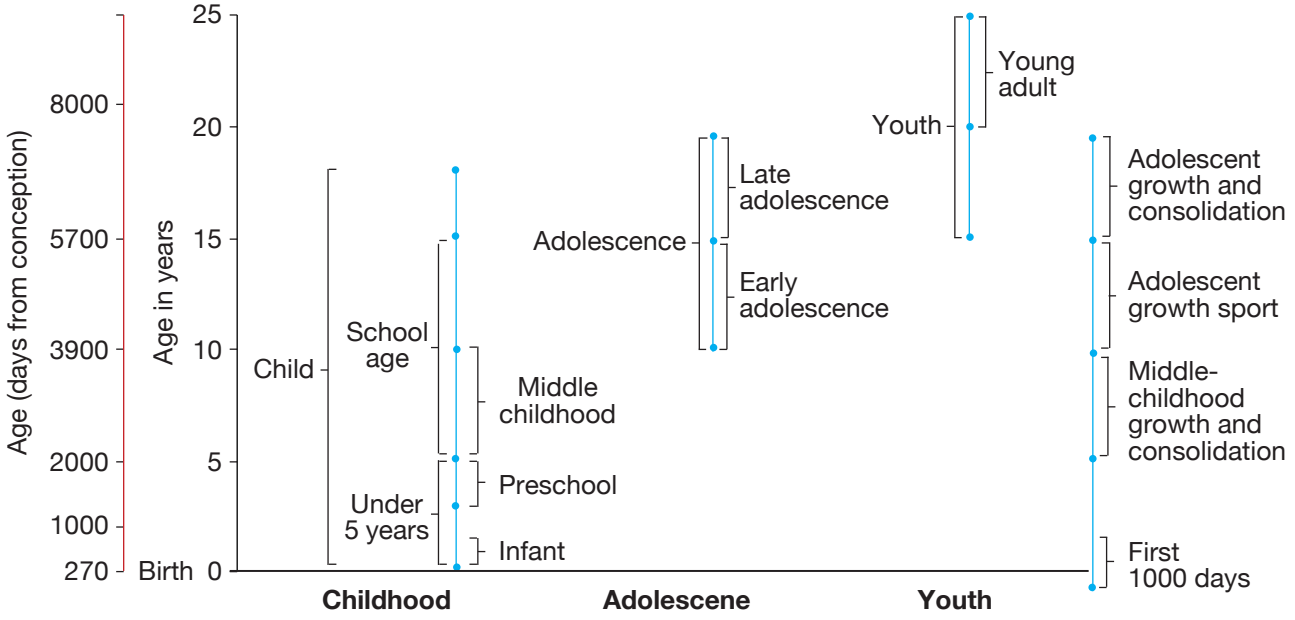

Fig 1. Nomenclature concerning Age and Four Key Phases of Child and Adolescent Development

Source: Bundy et al., 2018

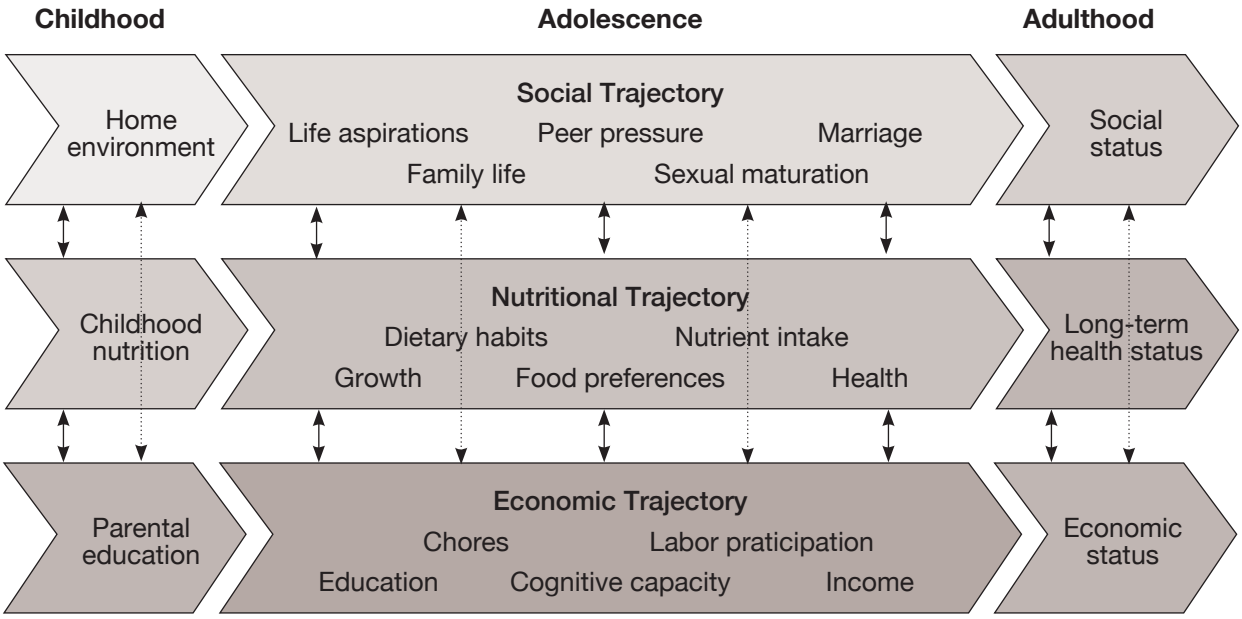

Fig 2. Relationship between Adolescents' Social, Economic, and Nutritional Trajectories from Life Course Perspective

Source: Sparrow et al., 2021

et al., 2018), anthropometric screening (Mamen & Fredriksen, 2018), vaccine (Shiri et al., 2021), reproductive health education (Liang et al., 2019), adolescent peer health groups (Diao et al., 2020), and school health services (Direktorat Pendidikan Dasar dan Menengah Kementerian Pendidikan dan Kebudayaan, 2019).

Considering adolescents' perceptions in a program to eliminate stunting and anemia is crucial. Perception is the capacity of the brain to convert a stimulus or process into the human sense, a cognitive process any individual undergoes to comprehend any information about their environment. It is the process through which an individual interrogates, organizes, and assigns significance to environmental stimuli (Maloney, 2018). In response to this study, we performed qualitative research to explore adolescent perceptions of anemia and stunting. The main theme of the research question is "how do adolescents perceive anemia and stunting?".

We use rapid assessment procedures (RAP), a qualitative inquiry using triangulation, iterative data analysis, and more data to rapidly establish an understanding of a problem from the insider's perspective (Beebe, 2001). RAP offers more efficient data coding and categorization (Renfro et al., 2022). This study uses RAP to track and evaluate previously administered educational interventions (Siswati et al., 2022a). As a strategy for monitoring intervention, the RAP technique has seen significant methods in various contexts, including HIV studies (Solomon et al., 2007), acute public health diseases, and pharmacy (Renfro et al., 2022). As indicated by a previous study (Renfro et al., 2022), the theme was developed by considering inquiries from the research team to determine whether the questions were intuitive and proper. So we categorized information into five themes, including definitions, determinants, impacts, preventions, and obstacles to combating stunting and anemia. We conducted the study in September 2020 in two-locus stunting areas in Gunung Kidul and Kulon Progo, Yogyakarta, Indonesia. The informants were 33, purposively selected by the criteria of 25 students who were part of previous educational interventions in two junior high schools (Siswati et al., 2022a) and were willing to become informants as well as 8 persons, including the headmaster or their representatives,

parents, community leaders to improve the data validity.

Table 1. Informants Characteristic

Characteristic	No. of person
Gender	
- Male	13
- Female	20
Occupation	
- Student	25
- Headmaster/Teacher	3
- Parents	2
- Community leader	3

Data were collected using a recorder by two researchers during school hours class. This research was approved by Institutional Review Board Universitas 'Aisyiyah Yogyakarta No. 1661/KEP-UNISA/VII/2020 on 17 July 2020.

Knowledge and Perception

Knowledge is the prior visual experience that influences perception and behavior (Rock, 1985). Behavior plays an essential function; thus, poor behavior will have negative consequences. However, a person's behavior highly depends on how they perceive something, including health issues. The constructs of the Theory of Planned Behavior are included personal value and behavior change, subjective norms (i.e., perceived behavioral expectations of others), perceived behavioral control (i.e., perceived ability to change behavior within the context of perceived barriers), and intention (i.e., readiness to perform a behavior) provides a framework for the assessment of individual strengths and barriers to behavioral change (Kim & Kim, 2020).

Adolescents' healthy behaviors are also predictors of their health status later in adulthood (Kim & Kim, 2020), which are typically maintained throughout life (Patton et al., 2016) and may lead to nutrition-related non-communicable diseases in adulthood (Viner et al., 2012). Further, health interventions in adolescents will provide long-term benefits. They will develop into adults, get married, and then instill healthy behaviors in their children (Sparrow et al., 2021). However, widespread malnutrition in children and adolescents limits their capacity to develop and perform to their fullest potential, negatively impacting the trajectory of national development (Branca et al., 2015).

There are strong associations between health perceptions and behavior through feelings, beliefs, emotions, enthusiasm, motivation, interest, and curiosity, as well as the encouragement to modify behaviors (Kim & Kim, 2020). Some studies showed that positive knowledge builds positive perceptions, for example, research on the relationship between knowledge and perceptions about Covid-19 (Iorfa et al., 2020; Siswati et al., 2021), dental healthcare (Abbas et al., 2022), and acceptance of the Covid-19 vaccine (Mohamed et al., 2021). Studies also reported that knowledge and perceptions regarding anemia enhanced health behavior as a potentially avoidable risk factor, including linear growth failure and delayed development in adolescents (Agustina et al., 2021). Understanding the role of knowledge and perception in anemia and stunting is essential in capturing important messages to prevent barriers, misunderstanding, and stigma (Agustina et al., 2021; Nivedita, 2016). Further, it is important to provide proper behavior change communication in adolescence and promote healthy living in a lifetime and the next generation to ensure the optimum impact of health interventions (Bundy et al., 2018).

Stunting and Anemia

Stunting is a condition characterized by failure to grow as a result of chronic malnutrition. The linear growth process is disrupted by anemia, which is typically caused by an iron deficiency. This occurs when the body is lacking in Fe, it adapts to dietary deficits, causing meta-

bolic processes to be interrupted and the formation of cells and tissues to be impeded. Inadequate food intake will also result in concealed hunger owing to a lack of micronutrients like iron. Iron deficiency in toddlers can result in cognitive and physical impairments, as well as an increased chance of death. This is due to iron's role in oxygen circulation across all human tissues. If oxygenation to bone tissue is decreased, the bone will not optimally develop potential, hence inhibiting growth (Bhandari et al., 2001).

Anemia was considered by hemoglobin (Hb) level lower than standard. The multifactorial impact on anemia includes improper diet, less iron, folate, cyanocobalamin, prolonged menstrual period, infection (malaria, HIV, tuberculosis, and parasitic infection), hemoglobinopathies, smoking exposure, and others (WHO, n.d.b). Unfortunately, anemia frequently coexists with stunting, wasting, and being underweight. Studies demonstrated a robust relationship between anemia and stunting children (Alzain, 2012; Gaston et al., 2022). Anemia preconception or anemia in adolescents is a determinant of intergenerational malnourished children (Nivedita & Shantini, 2016), represented by low birth weight and early gestational age (Liu et al., 2022). Meanwhile, anemia in adolescence is predicted to become anemia in reproductive age and pregnancy (Spear, 2013), potentially leading to a complicated delivery and poor pregnancy outcome (Figueiredo et al., 2018). Thus, anemia can interfere with cognitive performance, behavioral features, physical growth and development, and school absenteeism, negatively impacting academic performance (WHO, n.d.a).

Stunting is short and strongly associated with cognitive functions and other long-term effects (Grillo et al., 2016; Undurraga et al., 2018; Woldehanna et al., 2017). Miller found that there is an association between severely stunted children (<-3SD HAZ) with a negative impact on the early childhood development index (OR = 0.75; 95% CI = 0.67–0.83) in fifteen low-middle-income countries (Miller et al., 2016). Child stunting is related to the male sex, preterm birth (Beal et al., 2018; Siswati et al., 2020), nonexclusive breastfeeding for the first six months, short stature maternal, low maternal education, and inadequate access to health care (Beal et al., 2018).

Adolescent stunting tends to remain in adulthood, with broad impacts covering aesthetic, social, limited higher education opportunities, economics, body performance, employment, and economics. Furthermore, in terms of education, they tend to have low cognitive functions, so the chances of good universities are limited and impact the household economy in the future. The most important thing is that stunting in early life has an impact on stunting intergeneration, where a stunted baby will grow up to remain stunted, become a short adolescent, malnourished pregnant, and give birth to a stunted toddler again (United Nations Administrative Committee on Coordination Sub–Committee on Nutrition & International Food Policy Research Institute, 2000) as described in Fig 3.

Definition

This study found that most adolescents, teachers, parents, and community leaders stated that anemia occurs due to nutritional deficiencies, lack of Fe supplementation during the menstrual period, cigarette exposure, lack of exercise, and infections, as explained by WHO (2022). As detailed below:

> "Anemia is a lack of blood." (A, adolescent)

> "… lack of blood or low blood or malnutrition." (D, parent)

Based on the results, the public perception of anemia is good-met the criterion of anemia definition, and its impact includes low intelligence score, risk of infections, and a negative impact

on future generations. The result is similar to previous studies in India (Moore et al., 2013; Onyeneho et al., 2019) and Nepal (Charlise et al., 2018), while a study in Ontario reported that anemia in adolescents and pregnant women have a higher risk of premature birth (Briggs et al., 2007).

In contrast, adolescents found the opinion that anemia is low blood pressure, as stated below:

> "Anemia causes dizziness due to low blood pressure." (T, adolescent)

> "Lack of blood equals anemia." (D, adolescent)

This demonstrates that people still require specialized education regarding anemia and low blood pressure. About the definition of stunting, all informants stated that stunting is a condition of being short and malnutrition intergenerational, as stated below:

> "Stunting is being short with an intellectual impairment." (A, adolescent)

> "Stunting is short or dwarf." (H, teacher)

> "Stunting is the effect of chronic malnutrition during pregnancy, small birth but appropriate gestational age (AGA)." (F, community leader)

They explain stunting well but do not discuss infectious diseases and psychological stimulation. In complete definition, stunting is poor nutrition, frequent infections, and lack of psychological stimulation that impedes children's growth and development (United Nations, 2015). They generally have a good perception of the terms stunting and anemia. However, these findings remind the government, the ministry of health, and the ministry of secondary education to collaborate to design and develop health education strategies for adolescents regarding anemia

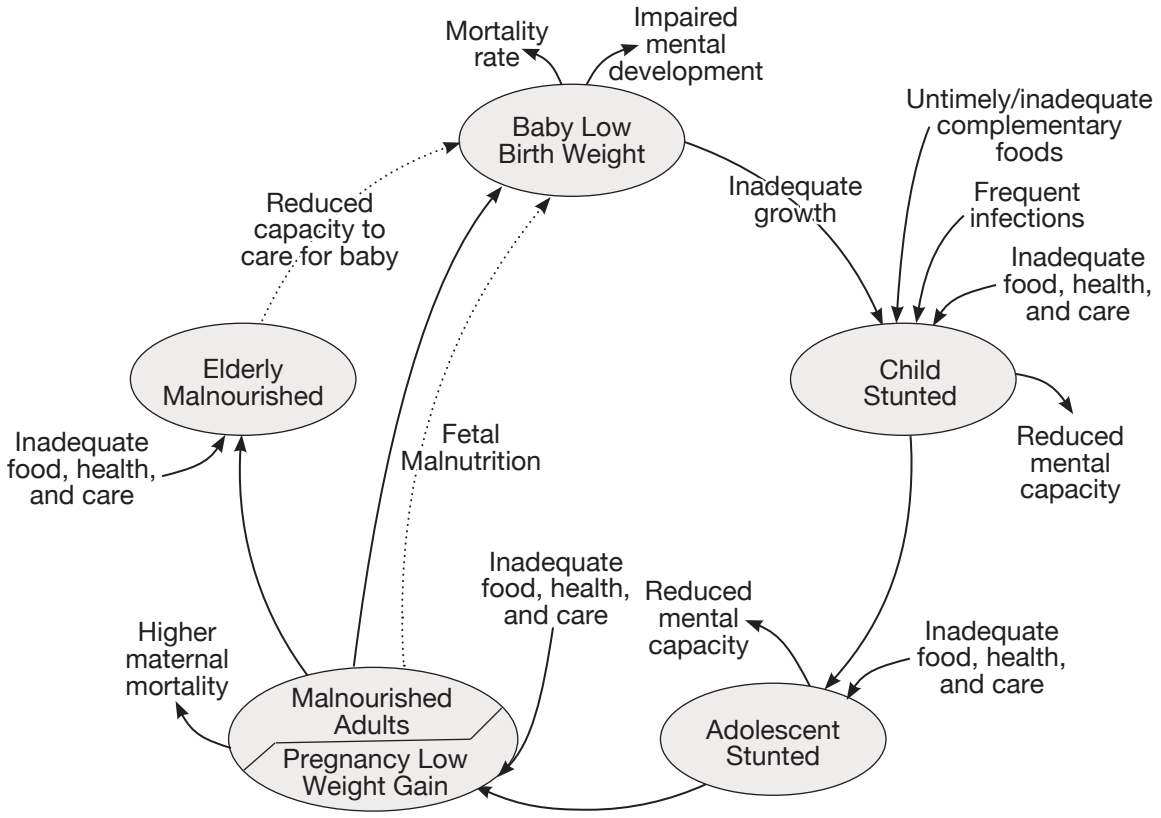

Fig 3. Nutrition Throughout the Life Cycle

Source: United Nations Administrative Committee on Coordination Sub–Committee on Nutrition & International Food Policy Research Institute, 2000, p. 14

and stunting definition. Knowledge regarding definition is the key to prevent anemia and stunting by changing perceptions and practices (Agustina et al., 2021).

Determinants

The informants reported that anemia prevention and control include substituting the consumption of tea and coffee with food sources of Fe, treating infections by drinking Fe-folate, eating nutritiously, adhering to the four pillars of balanced nutrition, avoiding/preventing infections, drinking Vitamins C and B12, eating nuts, spinach and foods contain Fe. Some informants stated the role of food intake:

> "I cook spinach. I recommend taking supplements for my daughter when she is menstruating, getting enough sleep, sunbathing in the morning, and exercising even though there are no sports lessons because it is an online school." (H, parent)

> "We are trying to prevent anemia with food, balanced nutrition, physical activity, clean and healthy living, iron supplementation, and reproductive health education." (S, teacher)

> "… the intervention program for iron supplementation, especially during the menstrual period, is very good. We support it." (S, teacher)

Regarding the causes of anemia, the informant argued that anemia is caused by malnutrition, cigarette smoke, including secondhand smoke, poor diet, and low intake of Fe supplements during menstruation. This finding is similar to a cross-study in eight developing countries where poor diet and iron tablets cause anemia (Galloway et al., 2002). While their opinion of smoke-related anemia is similar to other findings in Thailand that smoking affects family members' health through direct effects on smokers and direct effects on both smokers and family members (Tungtrongvisolkit & Seaharattanapatum, 2021).

In the term of stunting determinants, some participants said that the primary determinant of stunting is short stature parents and grant parents, as below:

> "My neighbor's parents and grandparents are short, so I think stunted children are due to heredity. I am not sure adequate intake can support re-catch up growth." (K, adolescent)

They argued that the impact of stunting is wide, covering the short, medium, and long-term impacts, as stated by the teacher below:

> "Stunting is dangerous because of the impaired brain development, intelligence, impaired physical growth, and metabolic disorders." (H, teacher)

Some informants stated that the causes of stunting are complex and multifaceted, including low birth weight, anemia, chronic malnutrition, adverse maternal outcomes, premature birth, early marriage, economic status, education attainment, consumption, poor health, as below:

> "I think anemia, early marriage, and the family economy are the causes of stunting. Unhealthy pregnancy will deliver stunted children." (H, teacher)

> "I see my classmate in elementary school who delivered a short baby, so I argue that early marriage is the cause of stunted babies." (K, adolescent)

> "Stunting is not a monopoly of poor families, but poor families tend to have malnourished children, including short children." (H, community leader)

The informants stated that stunting is caused by malnutrition during pregnancy, anemic mothers, babies at birth weighing less than 2,500 grams, and exposure to cigarettes during pregnancy. The public perception of stunting impacts includes short, medium, and long-term as previously reported by other studies (de Onis & Branca, 2016). In addition, cigarette exposure during pregnancy and childhood can

cause growth retardation because oxygen in the brain is bound by nicotine, and nutrients are blocked and fail to be transferred to target cells (Islam et al., 2021). One of the participants reported that less visit to antenatal care is a cause of stunting children, as below:

> "Mother should routinely do antenatal care for knowing fetus growth. Poor maternal health can be detected early by visiting primary health care." (D, cadre)

On the issues of anemia and stunting, they tend to have a positive perception. They explained the complex causes of anemia and stunting, including social, environmental, economic, social support, and policies, as per previous research finding (Siswati et al., 2022b; Beal et al., 2018).

Impact

Informants stated that the impact of anemia on adolescents is vast, disrupting the cognitive, productivity, immunity, and quality of future generations, as reported by participants below:

> "The effects of anemia during adolescence are low education achievement, dizziness, a risk of infections and loss of future generations." (R, community leader)

> "Anemia increases the risk of infection, developmental disorders in childhood and also causes death." (CH, adolescent)

> "Anemia is clearly harmful. It determines low human resources, impaired intelligence, increased risk of sickness, disturbed menstruation, and unhealthy children." (K, parent)

According to the informants, the impact of stunting includes both short and long-term effects. Some effects include poverty and intergenerational stunting, impaired intelligence, poor metabolism, metabolic syndrome, and un-optimal growth and development of children. Participants reported the impact of stunting as below:

> "Dangerous … inhibits a baby's growth and development and affects the baby's intelligence in the future." (D, community leader)

> "Stunting is very dangerous for short-term effects, including brain development disorder, less intelligence score, impaired physical growth, and increased risk of metabolic syndrome." (IU, adolescent)

They generally have a strong understanding of the effects of anemia and stunting. Students who suffer from anemia tend to be fatigue, weakness, dizziness, and shortness of breath, which impact learning achievement, growth, and student well-being. So does stunting. It impaired intelligence scores and human capacity. The previous study proves the association between anemia and adolescent females' HAZ-a indicator of stunting (Agustina et al., 2021), thus stunting concurrent anemia prevalent in low-middle-income countries (Tran et al., 2019; Sumbele et al., 2020). In addition, stunting is associated with human resources, and anemia is associated with the academic performance of students (de Onis & Branca, 2016; Wells, 2018).

Prevention

One adolescent knows well how to combat anemia. She stated below:

> "Female adolescents must eat some nutritious food, eat high iron intake, meet the requirement of iron, iodine, folic acid, avoid exposure to cigarette smoke, and increase their intake of vitamin C, B-12, legumes, spinach, and dark green leafy vegetables. All of them were associated with anemia and stunting prevention." (AM, adolescent)

Furthermore, the parent mentioned several obstacles to overcome anemia, as reported below:

> "Sometimes it is hard for females to take Fe supplementation due to Fe consuming such as nausea and blacky feces." (A, parent)

Therefore, iron supplementation and avoiding smoke exposure are acceptable strategies for combating adolescent anemia. This finding is consistent with another study in Delhi that stated the school-based Fe intervention is a multisector collaboration platform that has the potential to provide leverage for stunting prevention in adolescents (Singh et al., 2020).

The informants state that stunting prevention is important, as described below:

> "According to my view, stunting tends to occur in poor households, so stunting can be prevented through creative, building household economics." (H, teacher)

> "Government provides a social safety net, giving "Bantuan Langsung Tunai" for targeted people (B, cadre)

Adolescent sight is less different with previous statements, but still in the frame of stunting prevention. The state:

> "We must eat a balanced, good diet, implementing the four pillars of balanced nutrition." (L, student)

> "Adolescents must be on the right track, just do much more to learn, reach a good learning outcome, focus on their study and avoid early marriage." (K, student)

This study identifies important strategies for preventing stunting and anemia, such as applying four pillars of balanced nutrition, including dietary diversity, clean living behaviors, physical activity, and body weight monitoring. Moreover, the informants' perceptions about stunting prevention are relevant to existing concepts, including improving maternal nutrition, preventing anemia in adolescents and pregnant women, preventing exposure to cigarettes, a good environment, and policies to reduce stunting acceleration (Johnson & Moore, 2016). In addition, the Indonesian government has implemented stunting prevention with sensitive and specific interventions. The interventions include global health initiatives such as iron supplementation, immunization, vitamin A supplementation, breastfeeding, complementary feeding, and health insurance. At the same time, sensitive interventions include improving sanitation, access to clean water, housing, education, and recreation facilities (Abdullahi et al., 2021; Torlesse et al., 2016).

In Yogyakarta, the school, in collaboration with the provincial health office, implemented the health program "mob screen penjarkes," an application for students to screen health status, including body anthropometry, blood tension, anemia status, and dental health. In addition, some policies support broader health efforts, including a regional action plan for stunting-reducing acceleration, a regional plan for nutrition and food, a regional action plan for a healthy living movement, and a regional action plan for SGDs. These rules included preventing and mitigating public health problems, including anemia and adolescent stunting.

Obstacles

However, online schools during Covid-19 caused Fe distribution to be delayed. Adolescents' adherence to Fe intake is significant in resolving anemia (Apriningsih et al., 2020). As the teacher stated below:

> "… it is just that the students have not received Fe tablets yet, maybe because of the Covid-19 pandemic, and they study online, so the Fe supplementation program was postponed." (S, teacher)

We found that some adolescents experiment with smoking, likely because their parents are also smokers. Hence, they become both active and passive smokers. As the teachers said:

"… sometimes they try to smoke, even though smoking becomes an obstacle to red blood cells carrying oxygen, so they will be malnutrition"

Meanwhile, several obstacles in preventing and tackling stunting were food taboo, picky eaters, low dietary diversity, and genetics. As stated below:

"High protein foods are sometimes avoided, such as fish, because they are fishy." (A, parent)

"Some people still believe in Moringa leaves with mystical things, teaching its high protein, but people do not consume it." (F, parent)

"Short body because he was born to short parents, the community considered stunting a hereditary factor." (I, teacher).

According to community leaders, people perceived stunting as a stigma, so they were reluctant to take their children to Posyandu (integrated service post) or health providers. Some cadre reported that maternal perceive stunting as below:

"… my child is not stunted. He is energetic and never dizzy." (H, cadre)

Adding another community leader stated other households below:

"They do not want their children to be called stunted. They do not accept it, even though they are short." (H, community leader).

According to the informants, strategies to prevent and control stunting include providing economic incentives, social safety networking, avoiding malnutrition during a critical period, ensuring household food security, family planning, focusing on completing formal education, and getting unmarried earlier. A century ago, pediatricians underlined the relationship between economic prosperity, social strata, education, food security, and nutrition played an important role in building human capacity (Scheffler et al., 2021; Zhang et al., 2021). Improvements in macroeconomics have an impact on improving microeconomics and providing opportunities for every household to have a decent life, including in terms of educational facilities, employment, recreation, access to food, access to health services, and information, to name but a few. (WHO, 2013a).

There is substantial evidence connecting child marriage to an increased risk of children suffering from stunting and being underweight (Paul et al., 2019). Several obstacles to prevent and control stunting include taboos about certain foods, perceptions of intergenerational stunting, and stigma. Studies showed that perceptions, including food taboos, stigma, and body image, could restrict nutrition intake and malnutrition (Erdenebileg et al., 2018; Balluck et al., 2016). The causes of adolescent pregnancy are well documented, as are the significant negative effects on health, society, and the economy (WHO, n.d.). In this context, intergenerational stunting is defined as the impact of genetics or short parents. Although the genetic influence is only 5%, the rest are environmental factors that can be modified. The notion of genetics as a cause of stunting can interfere with the efforts to overcome stunting because parents will resign themselves to accepting the condition of their short children (Hall et al., 2018). The informants reported:

"I got married very young, so my child is not tall enough...However, I will focus on caring for my child, providing breastfeeding, adequate intake, a good environment, inviting her to swim and other physical activity, and preventing anemia." (K, parents).

"Stunting is important. It can be prevented by increasing their understanding of sexual reproductive health, iron supplementation, meeting the requirement of iron, iodine, and folic acid, avoiding exposure to cigarette smoke, and increasing consumption of vitamin C and B12 protein. Unfortunately,

all these foods are associated with anemia and stunting." (S, teacher)

Adolescents also agreed on a diet rich in iron, as below:

"The way to prevent stunting is to eat a lot of iron, iodine, and folic acid. Foods containing iron have an impact on avoiding stunting and anemia." (E, adolescent)

Physical activity is one strategy for combating stunting, as below:

"Stunting can be prevented by physical activity such as swimming, walking, skipping, jumping, and running." (A, adolescent)

As stated below, sanitation and tobacco determined both stunting and anemia:

"We should implement healthy, clean pillars. Anemia and stunting can be prevented by hygiene and sanitation. Poor sanitation causes recurrent infection, diarrhea, and acute respiratory infection (ARI) and increases morbidity risk. The adolescent should avoid tobacco and drinking alcohol." (F, adolescent)

Overall, adolescent perceptions regarding anemia and stunting are correct, although it is not comprehensive. Yogyakarta is labeled a student city, but many social phenomena, such as teenage pregnancy, teenage pregnancy, smoking, and others, are irrelevant to the title. All of these things have an impact on adolescent health, such as anemia and stunting. Furthermore, as the locus of stunting, it provides opportunities for its people to be well-educated about stunting. This research showed that adolescents' perceptions regarding anemia and stunting are correct, although it is not comprehensive.

Conclusion

Overall, adolescent perceptions of anemia and stunting are good but not comprehensively correct. There are still some misperceptions, so it is important to tailor and implement the strategy for maximizing adolescents' horizons. Education and various communication strategies should be the basic tool to fix the misunderstanding about stunting.

The existing policies (Presidential Regulation No 71 of 2021) are enough to accommodate efforts to optimize adolescent health. It is just that their implementation needs to be collaborated and emphasized with other aspects consisting of adolescent health and their active role. Commission IX needs to monitor and support the implementation of the policy. The Ministry of Health must intensify Posyandu Balita to prevent adolescent health problems. This study provides reasoning to tailor the program strategies and interventions to reduce adolescents' anemia and malnutrition. Health providers need to improve behavior change communication to increase adolescent engagement in health care, considering specific characteristics of adolescents in terms of integrated nutrition education including balanced nutrition, the long-term consequences of stunting and concurrent and its intergenerational impact, perception of heredity, and behavior.

Conflict of Interest

We have no conflict of interest.

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Author Contributions

TS designed the study, with the contribution of YO. HS and YO conducted field data collection with the supervision of TS. TS and BAP performed analyses. TS drafted the initial draft of the manuscript. BAP and TS critically reviewed the manuscript, drafted the final version, and proofread it. BAP improved the reference list. All authors approved the final version of the manuscript.

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