

## Korespondensi Jurnal aspirasi

The screenshot shows the journal submission page for article #3097. The page is titled "Submission" and displays the following information:

- Authors:** Tri Siswati, Heru Subaris Kasdjono, Yustiana Olfah, Bunga Astria Paramashanti
- Title:** How Adolescents Perceive Stunting And Anemia: A Qualitative Study In Stunting Locus Area In Yogyakarta Indonesia
- Original file:** 3097-7889-2-SM.doc 2022-05-17
- Supp. files:** 3097-7890-1-SPpdf 2022-05-17, 3097-7894-1-SPpdf 2022-05-17
- Submitter:** Tri Siswati
- Date submitted:** May 17, 2022 - 11:56 AM
- Section:** Article
- Editor:** Rahmi Yuningsih
- Author comments:** Dear : Editor in Chief

The page also includes a navigation menu with options like Home, About, User Home, Search, Current, Archives, Announcements, and Submission. A sidebar on the left contains sections for Profile, Template, and Author Notice.

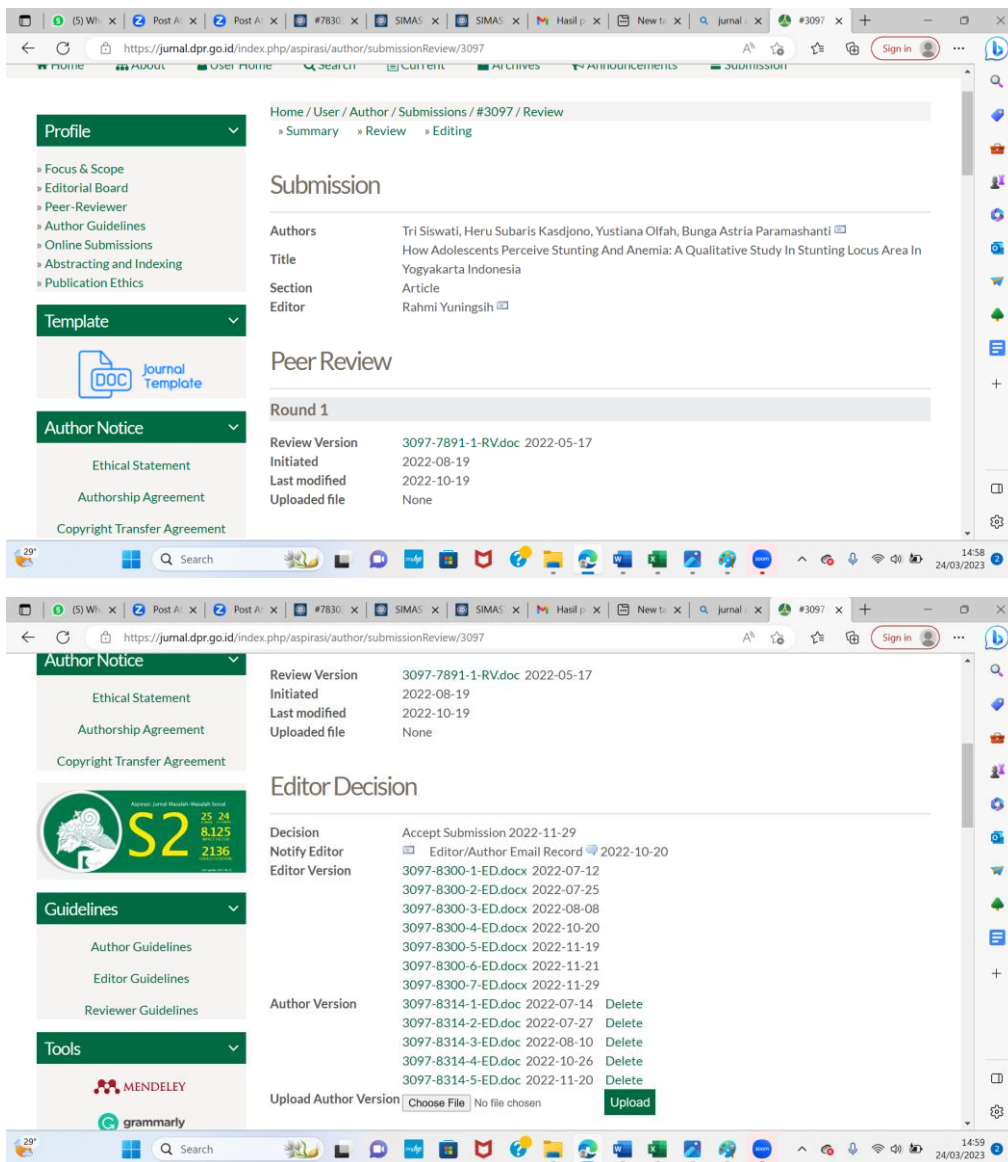
The screenshot shows a Gmail email titled "Revisions Required" from no\_reply@dpr.go.id, dated July 12, 2022. The email content is as follows:

Tri Siswati:

Thank you for submitting your manuscript "How Adolescents Perceive Stunting And Anemia: A Qualitative Study In Stunting Locus Area In Yogyakarta Indonesia" to Aspirasi: Jurnal Masalah-masalah Sosial. The editorial team has assessed your submission and feels that it has potential for publication, and so we would like to invite you to revise the paper before we present it to the reviewer. There are some points that still need to be revised.  
(Please correct according to the comments in table review and each paragraph)

You have a week to respond to this revise and the request ends on July 19, 2022.

Please feel free to contact me at [aspirasijurnal@gmail.com](mailto:aspirasijurnal@gmail.com) with any questions.



Mohon dilengkapi sumber yang belum ada dalam daftar pustaka

1. Tamrat et al., 2020) (Tamrat, Yeshaw and Dadi, 2020)
2. Dewey & Begum, 2011; (Dewey and Begum, 2011)
3. (WHO, 2017)(WHO, 2017)
4. Kemenkes RI, 2018(Kemenkes RI, 2018); Kemenkes RI, 2013(Kemenkes RI, 2013)
5. (Mamen & Fredriksen, 2018)(Mamen, A., & Fredriksen, 2018),
6. (Liang et al., 2019)(Liang *et al.*, 2019)
7. (Beebe, 2001)(Beebe, 2001).

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8. (Solomon et al., 2007)(Solomon *et al.*, 2007)
9. (Rock, 1985)(Rock, 1985)
10. Iorfa et al., 2020(Iorfa *et al.*, 2020)
11. Siswati et al., 2021(Siswati *et al.*, 2021)
12. (Abbas et al., 2022)(Abbas *et al.*, 2020)
13. (Mohamed et al., 2021). (Mohamed *et al.*, 2021)
14. Nivedita, 2016).(Nivedita K, 2016)
15. Bhandari et al., 2001(Nivedita K, 2016)
16. (Ronnenberg et al., 2004),(Nivedita K, 2016)
17. (Spear, 2013)(Spears, Ghosh and Cumming, 2013)
18. Sumbele et al., 2020) (Sumbele *et al.*, 2020)
19. Apriningsih et al., 2020 (Apriningsih, Madanijah, S., Dwiriani, C. M., & Kolopaking, 2020)
20. Scheffler et al., 2021; (Scheffler *et al.*, 2021)
21. Zhang et al., 2021(Zhang *et al.*, 2021)
22. Erdenebileg, et al., 2018; (Tamrat, Yeshaw and Dadi, 2020)
23. Balluck, et al., 2016(Balluck, Toorabally and Hosenally, 2016)
24. (WHO, 2022)(WHO, 2022).
25. (Fardet *et al.*, 2015)→ (Fardet *et al.*, 2015)
26. Konermann,→ (Woldehanna, Behrman and Araya, 2017)

They explained complex causes of anemia and stunting including social, environmental, and economic, social support, and policies, as previous research finding (Siswati et al., 2022; Beal et al., 2018).--> lengkapi Siswati et al., 2022a atau Siswati et al., 2022b

**Comment [3]:** lengkapi 2022a atau 2022b

**Comment [4]:** lengkapi 2022a atau 2022b

**Comment [5]:** lengkapi 2022a atau 2022b

sesuaikan daftar pustaka

Cek kembali sumber yang digunakan

Konermann, S. (2019). The effect of early childhood stunting on children's cognitive achievements: Evidence from young lives Ethiopia. *Physiology & Behavior*, 173(3), 665–676.

judul tersebut merupakan artikel penulis lain → <https://pubmed.ncbi.nlm.nih.gov/29249889/>

tidak ada artikel berjudul "The effect of early childhood stunting on children's cognitive achievements: Evidence from young lives Ethiopia" pada jurnal *Physiology & Behavior* volume 173 issue 3 → <https://www.sciencedirect.com/journal/physiology-and-behavior/vol/173/suppl/C>

jurnal edisi itu pun tidak terbit pada tahun 2019 melainkan 2017

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**Comment [9]:** tidak ada artikel yang dimaksud pada volume 173 issue 3 <https://www.sciencedirect.com/journal/physiology-and-behavior/vol/173/suppl/C>

**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.**

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**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 study was qualitative research was conducted in Kulon Progo and Gunung Kidul districts, Yogyakarta, Indonesia in 2020. This was carried out by rapid assessment procedures (RAP) using in-depth interviews. A total of 33 informants consists of 25 male and female Yuniior high school students, and 8 persons including teachers, parents, and 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 some adolescents state that anemia equals to low blood pressure. Among the barriers to preventing anemia are body image; lack of nutritious foods intake, less sleep, and excessive upset. Meanwhile stunting is a genetic problem so that 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 that health professionals must develop suitable behavior change communication strategies.*

**Keyword:** adolescent; anemia; perception; qualitative; stunting

## 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 dengan tubuhnya berlebihan. 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*.

## Introduction

Indonesia faces the double burden of malnutrition including overnutrition and undernutrition (Maehara et al., 2019). The popular form 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 (Finkelstein et al., 2018; Dewey & Begum, 2011; Connery et al., 2021). This is the reason several worldwide countries agreed to reduce

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stunting by 40% as the second Sustainable Development Goals (SDGs) target (WHO, 2017). Indonesia has set a stunting prevalence of 14% by 2024. Furthermore, a national cross-sectional study in 2021 reported that stunting prevalence among children was 24,4%, and continuously decreased from 30,8% in 2018 and 37,2% in 2013 (Kemenkes RI, 2021; Kemenkes RI, 2018; Kemenkes RI, 2013). Based on this study, the mean of reducing stunting prevalence is 1,6% a year. It is estimated that stunting prevalence is 19,6% in 2024 when the velocity of decreased stunting is persistent. Thus, we need a unique strategy to accelerate stunting reduction.

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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% in 2013 to 21,4% in 2018, and is lower at 17,3% in 2021 (Kemenkes RI, 2013; Kemenkes RI, 2019; Kemenkes RI, 2021). In other words, the mean prevalence reduction was 1,25% annually. Therefore, while the rate of decline remains constant, the stunting prevalence is estimated to be 13,6% in 2024 in Yogyakarta, a critical borderline target.

Anemia and stunting are relatively closed associations. 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% in 2013 increased to 48.9% in 2018 (Kemenkes RI, 2018). The 2013 Basic Health Research report reveals that 28% of children under five and 26% of children aged 5 to 14 years are anemic (Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI, 2013). A regional survey of 1.503 female adolescents showed that almost 20% are anemic (Dinkes DIY, 2019).

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Previous studies describe that women recognize anemia's symptoms but not its clinical term: pregnant women are aware with 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% of women quit taking iron supplements due to negative effects in five nations (Galloway *et al.*, 2002). 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 2% of mothers knew about stunting, two-thirds of individuals blamed genetics for stunting, and stunting causes interrupted growth (33,7%), stupidity (13,8%), and illness (11,8%) (Hall *et al.*, 2018). Surprisingly, the "Lieschen Müller effect" study resulted that since the early 20th century, the child's longitudinal growth has been no relationship between 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 the acquisition of 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 2.

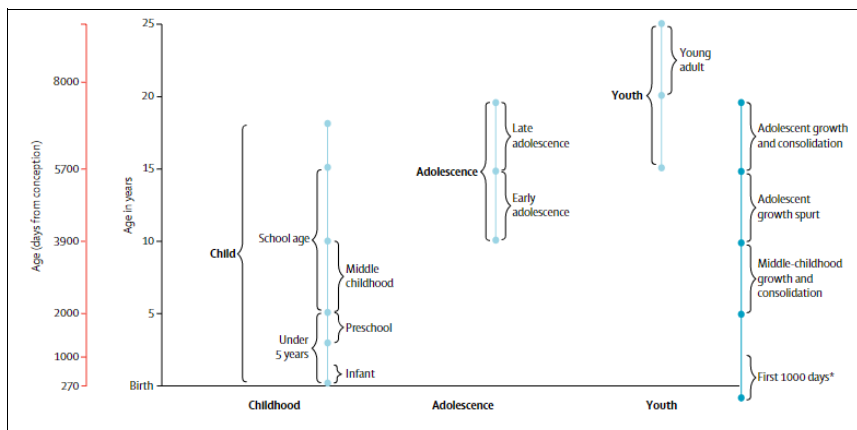


Fig 2. Nomenclature concerning age and four key phases of child and adolescent development (Bundy et al., 2018)

Adolescence is a strategic period to shape lifestyles and determine patterns of behavior 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, which distinguishes them from younger children and adults (Fig 3.). 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 depicted in Fig 3.

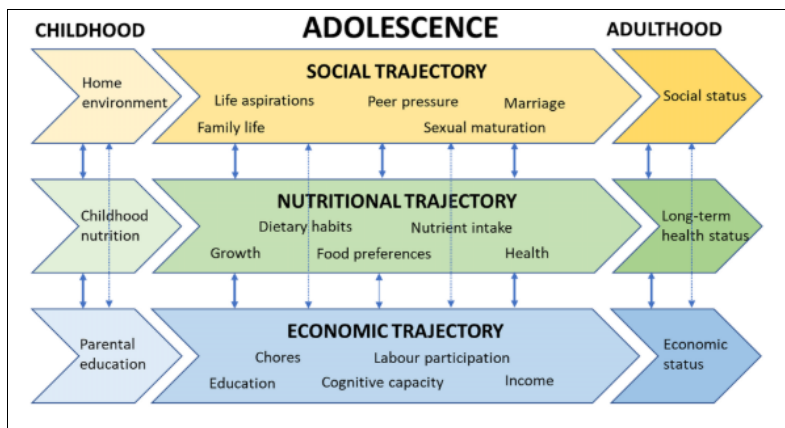


Fig 3. A relationship between the social, economic, and nutritional trajectories of adolescents in a life course perspective (Sparrow et al., 2021).

Globally including in Indonesia, there have been many health care 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 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 (Kemenkes RI, 2020).

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In a program to eliminate stunting and anemia, it is crucial to consider the perception of adolescents. Perception is the capacity of the brain to convert a stimulus or process into the human sense, a cognitive process any individual undergoes in order 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 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 also offers more efficient data coding and categorization (Renfro et al., 2022). In this study, RAP is utilized 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 a variety of contexts, including HIV study (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 of the research team to determine whether the questions are intuitive and proper. So that 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., 2022b), and were willing to become informants as well as 8 persons including head-school or their representative, parents, community leaders to improve the data validity.

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Table 1. Characteristic informants

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



Data were collected using a recorder by two researchers during school hours at 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 of visual experience that influences perception and behavior (Rock 1985). Behavior plays an essential function, thus poor behavior will have negative consequences. But a person's behavior is highly dependent 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) provide a framework for the assessment of individual strengths and barriers to behavioral change (Kim & Kim, 2020).

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Adolescents' healthy behaviors are also predictors of their health status later in adulthood (Kim & Kim, 2020), that typically maintained throughout life (Patton et al., 2016) and may lead to nutrition-related non-communicable diseases in adulthood (Viner RM, Ozer EM, Denny S, Marmot M, Resnick M, Fatusi A, 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 their fullest potential, which in turn has a negative impact on 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 of knowledge and perceptions about COVID-19 (Iorfa et al., 2020; Siswati et al., 2021), dental healthcare (Abbas et al., 2022), and acceptance of 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 delay development in adolescents (Agustina et al., 2021). Understanding the role of knowledge and perception in the context of 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, promote healthy living in a lifetime and next generation to ensure optimum impact of health interventions (Bundy et al., 2018).

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### 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 metabolic 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).

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Anemia was considered by hemoglobin (Hb) level lower than standard. The multifactorial impact on the occurrence of anemia such as improper diet, less iron, folate, cyanocobalamin, and prolong menstrual period, infection (malaria, HIV, tuberculosis, and parasitic infection), hemoglobinopathies, smoking exposure, and others (WHO, 2022). Unfortunately, anemia frequently coexists with stunting, wasting, and 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 (Ronnenberg et al., 2004), represented by low birth weight and small-for-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, absenteeism at school, and negative impact on academic performance (WHO, 2022).

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Stunting is not only short but it is also strongly associated with cognitive functions and other long-term effects (Grillo et al., 2016; Undurraga et al., 2018; Koneremann, 2019). Miller found that there is 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 with 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).

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Adolescent stunting tends to remain stunting in adulthood, with very 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 have an impact on the household economy in the future. The most important thing is that stunting in early life has an impact on stunting intergeneration, where stunted in the baby will grow up to remain stunted, being short adolescents, malnourished pregnant, and giving birth to stunted toddler again (United Nations Administrative Committee on Coordination Sub-Committee on Nutrition & International Food Policy Research Institute, 2000) as describe Fig 1.

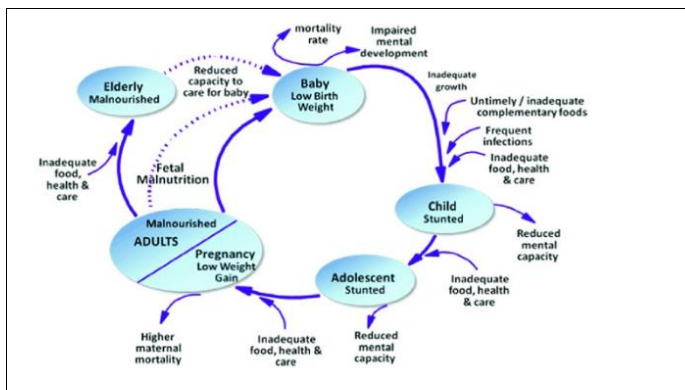


Fig 1. Nutrition throughout the life cycle.

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

### Definition

This study found that the majority of 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 (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 the distinction between anemia and low blood pressure. About 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)*

We found that they explain stunting well, but do not discuss infection diseases and psychological stimulation. In complete definition, stunting is poor nutrition, frequent infections, and lack psychological stimulation impede children's growth and development (United Nations, 2015). In general, they have good perception about the terms of stunting and anemia, but these findings remind the government, the ministry of health and the ministry of secondary education collaboration to design and develop health education strategies for adolescents regarding anemia and stunting definition. Knowledge regarding definition is key to preventing 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 as below:

*"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 at school 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 smoker, poor diet, and low intake of Fe supplements during menstruation. This finding is similar to a cross study in eight developing countries that poor diet and iron tablet is cause of anemia (Galloway *et al.*, 2002). While they opinion smoke related to anemia similar with others finding in Thailand, that smoking's effects on family members' health through direct effects on smokers, and direct effects on both smokers and family members (Tungtrongvisolkrit & Seaharattanapatum, 2021).

In the term of stunting determinant, some participants said that the primary determinant of stunting is short stature parent and grand parent, 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)

Concerning the determinants of stunting, some informants stated that the causes of stunting are very complex, including low birth weight, anemia and chronic malnutrition, adverse maternal outcomes, premature birth, early marriage, economic status, education attainment, consumption, and 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 2500 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, nutrients are blocked and failed 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)

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

**Comment [32]:** lengkapi 2022a atau 2022b

**Comment [TS33R32]:** siswati 2002b, trimakasih koreksinya

## 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 the short and long term effect. Some of the 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)*

In general, they have a strong understanding of the effects that anemia and stunting.

Students who suffer from anemia tend to be fatigued, weakness, dizziness and shortness of breath, among others, impact on learning achievement, growth, and student well-being. So does stunting, it impaired intelligence score and human capacity. Previous study prove the association between anemia and adolescent females' HAZ-a indicator of stunting (Agustina *et al.*, 2021), thus stunting concurrent anemia prevalent occur 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).

**Comment [TS34]:** trimakasih, sudah ditambahkan

## Prevention

One adolescent known well how to combat anemia, she stated as 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's 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 is an acceptable strategy for combating adolescent anemia. This finding is consistent with another study in Delhi that stated the school-based Fe intervention is a multi-sector 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 provide 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 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 specific 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 "mobscreen penjaskes", 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 regional action plan of stunting reducing acceleration, regional plan of nutrition and food, regional action plan of healthy living movement, and regional action plan of SGD's. All of these rules contained the prevention and mitigation of public health problems, including anemia and adolescent stunting.

### Obstacles

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

*"... it's just that the students have not received Fe tablets yet, maybe because of the Covid-19 pandemic, and they are online school, 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:

**Comment [TS35]:** trimakasih, sudah ditambahkan

*“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 don’t 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 about stunting as below:

*“.....my child is not stunted. He is energetic and never dizzy.” (H, cadre)*

Adding another community leader stated other households as below:

*“They do not want their children to be called stunted. They do not accept it, even though they are actually 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, unmarried earlier. *Already a century ago, pediatricians underlined the relationship between economic prosperity, social strata, education, food security, and nutrition played an important role in the process to build human capacity (Scheffler et al., 2021; Zhang et al., 2021).* Improvements in the field of 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, information and so on (WHO, 2013).

**Comment [TS36]:** trimakasih, sudah ditambahkan

**Comment [TS37]:** trimakasih, sudah ditambahkan

There is substantial evidence connecting child marriage to an increased risk of children suffering from stunting and underweight (Paul, et al., 2019). Several obstacles to preventing and controlling stunting, including taboos about certain foods, perceptions of intergenerational stunting, and stigma. Studies showed that perception including food taboo and stigma as well as body image can 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, 2022). In this context, stunting intergenerational is defined as stunting 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 the efforts to overcome stunting, because parents will resign themselves to accept the condition of their short children (Hall et al., 2018). The informants reported that:

**Comment [TS38]:** trimakasih, sudah ditambahkan

**Comment [TS39]:** trimakasih, sudah ditambahkan

*“I got married very young, so my child is not tall enough....but 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 activities 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)

Sanitation and tobacco determined both stunting and anemia, stated below:

*“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 as a student city, but there are many social phenomenons that are actually irrelevant to the title, such as teenage pregnancy, teenage pregnancy, smoking, and others. 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. Overall, 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, although not yet comprehensively correct. There are still some misperceptions, so it is important to tailor and implement the strategy for maximizing teenagers' horison. 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's just that their implementation needs to be collaborated and emphasized with other aspects consisting of adolescent health and their active role. The implementation of policy needs to be increased intensively as Posyandu Balita, so that the adolescent health problem can be prevented. This study provides reasoning to tailor the program strategies and interventions to reduce adolescent anemia and malnutrition. Otherwise 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 con-current and its intergenerational impact, perception of heredity, and behavior.

### Conflict of Interest

We have no conflict of interest.

### Acknowledgement

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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 final version, and proofread. BAP improved the reference list. All authors approved the final version of the manuscript.

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