



# Predisposing factors of anemia prevention among students in East Luwu District, South Sulawesi, Indonesia

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## Abstract

The purpose of this study was to explore how predisposing factors influence the prevention of anaemia in adolescents to prevent stunting. One of the efforts to prevent stunting is the provision of blood supplement tablets which is a form of priority intervention to overcome the problem of anemia in adolescent girls. For East Luwu Regency, the coverage of BST among adolescent girls in 2021 was 81.82% and increased from 2020 which was 79.14%. Qualitative with a descriptive analysis design, with focus group discussions and in-depth interviews. Focus group discussions were conducted with 80 third-grade schoolgirls aged 16-19 years, with 10 participants in each group in eight schools. In-depth interviews were conducted with school principals, school health teachers, as well as the secretary and head of the public health sector at the East Luwu District Health Office. Schoolgirls' knowledge about anaemia is quite good because some have experienced it, while stunting is still limited to stunted growth. Most schoolgirls take blood supplement tablets regularly and even every day during menstruation, but some still feel dizzy, sleepy, and nauseous. Positive support from the school was seen from teachers who always reminded them to take supplements. Schoolgirls' understood anaemia quite well and understood stunting as a condition of stunted growth, only one student thought that taking blood supplement tablets was one way to prevent stunting. Some students take blood supplement tablets regularly and every day during menstruation, although some still feel uncomfortable.

**Keywords:** Adolescents, Anaemia prevention, Blood supplement tablets, Stunting, Stunting prevention.

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## 1. Introduction

According to WHO, adolescence is in the age range of 10-19 years, where adolescence is the second sensitive developmental period after childhood which is a window of opportunity for effective health prevention and promotion. In addition, adolescence is a critical period in physical development, psychosocial, cognitive and emotional development, as well as sexual and reproductive maturation that requires good nutritional intake so as not to become a health problem in the future [1]. One of the health problems that plague adolescents today is anaemia. Anaemia is a condition where the number of red blood cells or haemoglobin concentration in the blood is lower than normal and adolescent girls are categorised as anaemic if the Hb level is < 12gr/dl. Anaemia is more at risk in adolescent girls than in adolescent boys. This is because adolescent girls enter puberty so the need for iron increases along with their growth, adolescent girls have the wrong diet with the wrong nutritional intake and diet, and adolescent girls experience

menstruation every month so they need twice as much iron during menstruation [2]. The incidence of anaemia in adolescents tends to increase with age and is associated with the highest growth spurt during adolescence. The highest prevalence is between the ages of 12-15 years when demand is at its peak. More than 50% of girls in this age group are reported to be anaemic [3]. WHO estimates that worldwide, 40% of children aged 6-59 months, 37% of pregnant women, and 30% of women aged 15-49 years are anaemic [4]. Meanwhile, the prevalence of anaemia in Indonesia based on Riskesdas data in 2018, recorded 26.8% of children aged 5-14 years and 32% of those aged 15-24 years [5]. As for South Sulawesi, based on data from the South Sulawesi Provincial Health Office, the number of high school adolescent girls who experienced anaemia in 2018 was 33.7% [6]. Anaemia that occurs during adolescence can lead to impaired physical and mental growth, susceptibility to infection and decreased concentration levels that can affect school performance.

Adolescent girls who are anaemic are also very at risk of anaemia during pregnancy which will impact fetal growth and development, potentially experiencing complications of pregnancy and childbirth, giving birth to babies with low birth weight (LBW), babies born prematurely and maternal and child mortality. In addition, their children are also more likely to be stunted [7-8]. Meanwhile, teenage pregnancy with anaemia will harm the nutritional status of the fetus and infant. Children under five born to women who marry in their teens are significantly more likely to be stunted [9]. The high number of stunted children is a result of the high number of factors that influence it, including marriage in early adolescence [10]. One of the effective ways to overcome the problem of anaemia in adolescents is by giving Blood Supplement Tablets (BST), which if consumed regularly will increase haemoglobin levels in the blood. Taking BST can improve concentration in adolescent girls and women of childbearing age and increase the IQ of anaemia patients [11]. In addition, BST to adolescent girls should be given every week so that they have sufficient iron reserves before pregnancy because it will have less impact if it starts to be given during the first trimester of pregnancy [12]. This is in line with the government programme regulated in Permenkes No. 88 Year 2014 on Blood Addition Tablet Standards for Women of Fertile Age and Pregnant Women and Ministry of Health Circular Letter No. HK. 03.03/ V/ 0295/ 2016 on Providing Blood Addition Tablets to Adolescent Girls and Women of Fertile Age. Meanwhile, in East Luwu Regency, it is regulated in East Luwu Regent Circular Letter No. 440/ 0145/ BUP on Adolescent Nutrition and Provision of Blood Supplement Tablets (BST) to Adolescent Girls. Providing BST with the right dose can prevent anaemia and increase iron reserves in the body. BST is given to adolescent girls from 12-18 years old in junior high school and senior high school. The preventive dose is to give one BST every week on the same day for 52 weeks a year, and one BST every day for 10 days during menstruation [13]. From the Indonesian Health Profile, it is known that the coverage of BST among adolescent girls in 2021 was 31.3%, a decrease from 2020 which was 39.1%. Meanwhile, in South Sulawesi Province, the coverage of BST among adolescent girls in 2021 was 44.8%, also a decrease from 2020 which was 58.9% [14-15]. For East Luwu Regency, the coverage of BST among adolescent girls in 2021 was 81.82% and increased from 2020 which was 79.14% [16]. In addition to BST management in adolescent girls, other approaches that can be taken as a form of anaemia prevention include providing nutrition education to adolescents, especially adolescent girls, which aims to provide information about their specific energy and nutritional needs, including iron intake, diet, nutrient intake and a healthier diet [17]. Research at the Binamu Kota Health Centre, Jeneponto Regency found that there is a lack of facilities and infrastructure such as the availability of posters, leaflets and brochures for socialisation about anaemia and BST administration and there is a lack of monitoring or monitoring of the BST administration program, especially for students who bring BST home [18]. Another study at SMA Negeri 1 Talang Padang, Tanggamus Regency concluded that most adolescent girls had insufficient knowledge about anaemia and most experienced anaemia, so there was a relationship between adolescent girls' knowledge about anaemia and the incidence of anaemia [19]. Based on the above, this study will explore how predisposing factors

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influence anaemia prevention as an effort to prevent stunting in East Luwu Regency, South Sulawesi.

## **2. Materials and method**

This study uses a qualitative approach with a descriptive analysis design that aims to explore the influence of predisposing factors for anaemia prevention in stunting prevention efforts in East Luwu Regency. Qualitative research is an approach or search to explore and understand a central symptom by conducting interviews [20]. Data were collected through focus group discussions (FGDs) and in-depth interviews. FGDs were conducted with 80 third-grade adolescent girls aged 16-19 years, divided into 10 groups in eight schools, with 10 FGD participants in each group and one group discussion in each school. In-depth interviews were conducted with school principals, school health teachers, as well as the secretary and head of the public health sector at the East Luwu District Health Office. In addition, to support the completeness of information and data, the data sources used are primary data and secondary data. Primary data was obtained from the results of FGDs and in-depth interviews and secondary data in the form of data reports related to anaemia and stunting in schools and at the health Office. By using research instruments in the form of FGD guidelines and interview guidelines, stationery, voice recorders and cameras. Furthermore, the data used thematic analysis. Theme analysis is a method for identifying, analyzing and organizing the data collection systematically, with the following steps: (1) processing and preparing data for analysis, (2) reading the whole data, analysing in more detail by coding all data, (3) applying the coding process to describe the setting, people, categories and themes to be analysed, (4) describing in the form of a narrative/report, (5) making interpretations or interpreting the data [20]. Before conducting FGDs and in-depth interviews, researchers first explained the purpose of the research to informants and FGD participants, explained and assured that the information provided would be kept confidential and would not be shared with others, and explained about informed consent before FGD participants and informants were asked to sign the informed consent sheet. In addition, the names used in this article are pseudonyms and not real names. This research was conducted after obtaining Ethical Approval Recommendation Number: 10255/UN4.14.1/TP.01.02/2022 from the Research Ethics Commission of Hasanuddin University.

## **3. Result**

### **3.1. Characteristics of FGD Informants**

FGDs were conducted in eight schools located in eight sub-districts in East Luwu District. The total number of participants was 80 third-grade adolescent girls, with 10 people in each discussion group in each school, with an age range of 16-19 years. Table 1 shows the characteristics of FGD participants.

### **3.2. Characteristics of In-depth Interview Informants**

In-depth interviews were conducted at the same school as the FGD location and at the health Office. A total of eight school informants consisting of five school principals and three school health teachers as well as two people from the health Office, for a total of 10 in-depth interview informants.

Table 2 shows the characteristics of the in-depth interview informants.

### **3.3. Predisposing Factor**

Predisposing factors are factors that facilitate or underlie the realization of a behavior. In this case, the factors that facilitate the occurrence of anaemia prevention behavior as one of the efforts to prevent stunting, which includes knowledge, attitudes, complaints, and reasons for giving BST. The results showed that the schoolgirls had good knowledge about anaemia and its characteristics. Most FGD participants knew that anaemia was a lack of blood or lack of blood. Meanwhile, there are still a few schoolgirls who complete the statement more specifically, namely lack of red blood cells as said by Mia, a 17-year-old YPS high school student and Mahe, a 16-year-old SMA Negeri 5 student, who know this because they often experience anaemia. For the characteristics of people who experience anaemia, all female students already know it by saying that they are pale, often have dizziness and headaches, and often faint, such as Tien's opinion in the quote below:

Anaemia is like our body lacks fluids, lack of blood fluid so we are often sluggish, lethargic and easily sick (Tien, 17 years old, SMA Negeri 6 East Luwu, FGD, 20/09/22).

Furthermore, as one of the efforts to prevent stunting, researchers also explored schoolgirls' knowledge about stunting. The results of the FGDs show that the knowledge of female students about stunting is still lacking, this can be seen from the statements of several female students who have just heard the word stunting such as Rina, a 17-year-old Madrasah student, as well as Nuna, a 17-year-old SMA Negeri 1 student, Nura, a 17-year-old SMA Negeri 7 student and Pina, a 17-year-old SMA Negeri 10 student. However, some students understand stunting quite well, as said by Isda, an 18-year-old student of YPS Sorowako High School, that not all shortness is stunting, and this was added by Wilo, a student of SMA Negeri 5 as in the quote below:

Stunting is like the stunted growth of a child, so what's his name, even though he is an adult, his body size is still small, besides inhibiting growth, stunting also inhibits a child's thinking power, in my opinion (Wilo, 18 years old, SMA Negeri 5 East Luwu, FGD, 21/9/2022).

Meanwhile, not all teachers are familiar with stunting. Some of them also just knew and heard the term. As stated by one of the school health teachers in the quote below:

Which one is it? I just heard that one. Oooo.... that's when women give birth to small babies. I heard about it during socialisation, but maybe we didn't focus on it at the time (Mrs Caya, SMA Negeri 4 Luwu Timur, Interview, 3/10/2022).

Complementing all these opinions, the Head of Public Health at the East Luwu District Health Office said stunting is stunted child growth and development accompanied by chronic nutritional diseases, and those classified as stunted have a height below minus two standard deviations. Furthermore, what are the attitudes and behaviors of female students towards the provision of BST at school? The FGD results show that the attitudes and behavior of female students

towards the provision of BST vary. There is Runi, a 17-year-old SMA Negeri 6 student who only consumes it during junior high school because of the discomfort caused after drinking, there is Sumi, a 16-year-old SMA Negeri 7 student who does not drink because it is forbidden by her grandmother who sees the shape of BST as different from general medicine, there is also Lulu, a 17-year-old Madrasah student who also does not drink but still receives BST from officers and even gives it to friends who ask. In contrast to Fafa's statement who diligently consumed even during menstruation. Here, I drink it regularly every Friday, I also drink it every day when I am menstruating (Fafa, 17 years old, SMA Negeri 1 East Luwu, FGD, 30/9/2022). Next, we explored the complaints experienced or felt by the students after consuming BST. The FGD results found that the complaints experienced by the students after consuming BST were dizziness, headache, drowsiness, nausea and vomiting. In addition, some students feel nothing or mediocre after taking BST. Such as Cesi, a 16-year-old student of SMA Negeri 6 who immediately had dizziness and headache, Sami, a 17-year-old student of SMA Negeri 4 who said her friend immediately vomited, and Ila, a 17-year-old student of SMA Negeri 10 who saw her friends sleepy after drinking BST together in the field. Meanwhile, Diva did not feel any effect, as quoted below:

I don't think it has any effect, it's normal (Diva, 17 years old, MA Darunnajah, FGD, 28/9/2022).

This is then reinforced by the results of the interview with the principal that the effect or impact felt by the students after drinking BST is only brief as quoted below:

Once I asked a student how the impact was, and some said that they were a little dizzy sir but only for a short time, some said that there was nothing I was used to, I think sir (Mr Musa, SMA Neg. 1 East Luwu, Interview, 30/9/2022).

Then, adding to the obstacles faced by the school, the Secretary of the Health Office also pointed out the difficulty in optimizing cross-sector coordination because stereotypically other sectors always assume that the problem of stunting is only a health sector problem. When people talk about stunting, it is synonymous with health issues, although the problem of stunting is not only a health problem because there are issues of economic factors, there are knowledge factors, now a problem. But the reality in the field when people talk about stunting is a little bit oh that's the health issue. This is sometimes difficult for us to maximize or optimize coordination because stereotypically SKPD friends when talking about stunting, it is synonymous with health only (Mr Didi, HO, Interview, 15/11/2022). Finally, from the predisposing factor, namely digging up information on the extent to which the students know the reason for giving BST, the results showed that most participants said the reason for giving BST was because adolescent girls experience menstruation every month, as said by Tina, a 17-year-old student of SMA Negeri 1. After all, women experience menstruation so they have to drink BST so that the blood that comes out during menstruation can be quickly replaced. Added to the results of the interview with the principal who just found out that the provision of BST is closely related to the prevention of stunting, as quoted below.

I just found out that BST is related to stunting. All this time, I thought it was because women menstruate every month, so to quickly replace the blood that comes out, that's why I was given the medicine. After this, I will remind them to take the medicine every ceremony (Mr. Kama, SMA Neg. 7 East Luwu, Interview, 19/9/2022).

Mela, the only Madrasah student aged 18 years old, had a better understanding of why BST was given and this understanding was obtained after attending socialization conducted by health workers as quoted below:

So, that the offspring will not be stunted (Mela, MA Darunnajah, FGD, 28/9/2022).

Furthermore, in addition to the above, researchers also sought information on the school's support, in this case, the principal's support and teachers' support for the BST programme implemented at school. The FGD results showed that in all research locations, all teachers, especially school health teachers were very supportive of the BST programme. One of them was stated by Zani, a 17-year-old student of SMA Negeri 5, that the teacher always reminded her by asking whether she had drunk or not and drank regularly either during teaching or when meeting outside the classroom. Similarly, the results of the interview with the Principal of SMA YPS stated that this programme was good enough to help the health of the students, as in the quote below:

My understanding is that it is for women because every month they have their period. In layman's terms, I see that this programme is quite good and can help the health of female students (Mr Koko, YPS Sorowako High School, Interview, 27/9/2022).

#### 4. Discussion

Based on the results of FGDs on the knowledge of schoolgirls about anaemia and stunting, the results of another study found that the high incidence of anaemia in Tanggamus Regency was influenced by the lack of knowledge of adolescent girls about anaemia [19]. In line with this study, the better the knowledge of respondents about anaemia, the greater the hope of avoiding anaemia, so those with less knowledge will have a risk of developing anaemia [21]. The results of other studies also reveal that training and coaching of 10 adolescent cadres can improve knowledge and attitudes about family planning, delaying the age of marriage, reproductive health and prevention of anaemia as an effort to prevent stunting [22]. Furthermore, knowledge about stunting and the results of other studies show that the term stunting itself is not widely known by the general public, let alone adolescents [23]. Another study found that one way to increase the compliance of adolescent girls in consuming BST is by increasing their knowledge about anaemia and stunting [24]. Another study shows that providing education through online media can increase the knowledge of adolescent girls about stunting [25]. Regarding the attitudes and behaviors of adolescent girls towards BST administration, other studies have found that, if the knowledge of adolescent girls increases, positive attitudes about anaemia prevention will be embedded, resulting in the formation of preventive behaviors such as believing that eating vegetables will increase iron levels in the blood and believing that iron absorption will be impaired if they consume excessive caffeine-containing beverages [26]. Meanwhile, in addition to discomfort, another obstacle was laziness and some felt no need to take BST. In addition, parental support, which was only a reminder, did not guarantee that adolescent girls would adhere to taking BST [27].

**Table 1:** Characteristics of FGD Participants of Class XII Adolescent Girls of East Luwu Regency.

No.	Age (Years)	School Origin	District	FGD Time
1	16 - 18	SMA Negeri 1 East Luwu	Malili	30/ 9/ 2022
2	16 - 19	SMA Negeri 4 East Luwu	Mangkutana	3/ 10/ 2022
3	16 - 17	SMA Negeri 5 East Luwu	Wasuponda	21/9/2022
4	16 - 17	SMA Negeri 6 East Luwu	Angkona	20/ 9/ 2022
5	16 - 18	SMA Negeri 7 East Luwu	Burau	19/ 9/ 2022
6	17 - 18	SMA Negeri 10 East Luwu	TomoniTimur	3/ 10/ 2022
7	17 - 18	YPS Sorowako High School	Nuha	27/ 9/ 2022
8	17 - 18	MA Darunnajah	Towuti	28/ 9/ 2022

Source: Primary Data 2023.

**Table 2:** Characteristics of In-depth Interview Informants.

No.	Name	Agency Origin	Position	Interview Time
1	Mr. Musa	SMA Negeri 1 East Luwu	Principal	30/9/2022
2	Mrs. Caya	SMA Negeri 4 East Luwu	School Health Teacher	3/ 10/ 2022
3	Mr. Rudi	SMA Negeri 5 East Luwu	Principal	21/9/2022
4	Mrs. Nana	SMA Negeri 6 East Luwu	School Health Teacher	20/ 9/ 2022
5	Mr. Kama	SMA Negeri 7 East Luwu	Principal	19/ 9/ 2022
6	Mr. Agus	SMA Negeri 10 East Luwu	School Health Teacher	3/ 10/ 2022
7	Mr. Koko	YPS Sorowako High School	Principal	27/ 9/ 2022
8	Mr. Muh	MA Darunnajah	Principal	28/ 9/ 2022
9	Mr. Didi	Health Office	Secretary of the Department	30/9/2022
10	Mrs. Mili	Health Office	Head of Public Health	30/9/2022

Source: Primary Data 2023.

Complementing the results of this study, the guideline book for the prevention of anaemia in adolescent girl states that BST consumption sometimes causes side effects such as pain/stinging in the solar plexus, nausea and vomiting, and black stools. These symptoms are not dangerous and to reduce the symptoms, it is recommended to take BST after meals or at night before going to bed [2]. As for school support or teacher support, the results of other studies show that the role of teachers, family and BST drinking control cards can help in adherence to taking BST in adolescent girls [28]. Then, another study found that well-provided teacher support is the most influential factor in the level of consumption compliance because adolescent girls spend more time at school every day than at home [29]. Adolescents are still in the process of finding themselves and are still easily influenced by the outside which has an impact on many things in their lives. In addition, there are not many health nutrition interventions that can be done for adolescents other than BST supplementation. Therefore, family and school play a very important role, especially in the function of support and supervision [30].

#### 4. Conclusions

Based on the results of the study, it can be concluded that schoolgirls understand anaemia and its characteristics quite well because some often experience it. Meanwhile, schoolgirls understand stunting as a condition of stunted child growth, only one student thinks that taking BST is a way to prevent stunting. Most schoolgirls still complain about the effects that arise after consuming BST, they feel dizzy, headache, drowsiness, nausea to vomiting. In addition, some schoolgirls have started taking BST regularly, even every day during menstruation. As for school support, the principal and teachers are very supportive of this BST activity by often reminding the students to consume BST regularly.

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#### Conflict of interest

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#### Ethical permissions

This research has been approved by the Ethics Committee of the Faculty of Public Health, Hasanuddin University with number 10255/ UN4.14.1/ TP.01.02/ 2022.

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