

## Literature Review: Intervention on Adolescent Girls in 8000 First Days of Life (HPK) as Stunting Prevention in Future Generations

### *Literatur Review: Intervensi pada Remaja Perempuan 8000 Hari Pertama Kehidupan (HPK) sebagai Upaya Pencegahan Stunting pada Generasi di Masa Depan*

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#### ABSTRACT

**Background:** The complex nutrition problem until now in Indonesia is stunting. Stunting is a failure-to-grow condition due to prolonged malnutrition since the baby was born during pregnancy. Therefore, the nutrition and health of adolescent girls as the future mother have a crucial role in preventing stunting.

**Objectives:** Identified various programs intervention to adolescent girls as stunting prevention to the next generation and identify the successful various programs intervention to adolescent girls as stunting prevention to next generation

**Discussion:** This research method used a literature review of ten journals from 2011 to 2021. The research results were various interventions for adolescent girls as stunting prevention for the next generation. There were nutrition education, stunting education, early marriage education, hygiene and sanitation education, fulfillment of micro nutrient intake and consumption of balanced food, Multi Micro Nutrient (MMN) supplementation, school feeding program, and high calcium milk intake. Intervention for adolescent girls is the main target of 8000 HPK programs as holistic stunting prevention has a vital role, so it needs to be implemented as early as possible.

**Conclusions:** Appropriate Interventions for adolescent girls have the potential to reduce stunting and increase the opportunity for human resources in the future.

#### INTRODUCTION

Indonesia still faces the triple burden of malnutrition in the health and nutrition sector, one of which is stunting. Stunting is a major nutritional problem for toddlers with short stature due to long-term malnutrition. According to Indonesian Basic Health Research (Riskesdas) data for 2007, the prevalence of stunting under five in Indonesia was relatively high at 36.8%, then in 2010, it decreased slightly to 35.6%. The prevalence of stunting under five in Indonesia increased again in 2013 by 37.2% and decreased to 30.8% in 2018, then decreased again in 2019 at 27.67%<sup>1</sup>. Stunting remains a severe nutritional problem in Indonesia because the percentage is above the threshold set by the World Health Organization (WHO) of 20%<sup>2</sup>. As of 2018, WHO revealed that stunting in Indonesia occupies the third position in all of Southeast Asia with a percentage of 36.4%<sup>3</sup>. The economic scale to prevent stunting globally represented by 34 countries in the world spent \$9.559 million<sup>4</sup>. In contrast, the estimated economic losses due to stunting under-fives in 32 Indonesian provinces in 2013

are estimated at IDR 96 billion - IDR 430 billion or around 2%-9% seen in the average Gross Regional Domestic Product (GRDP) of the provinces in Indonesia<sup>5</sup>.

The Indonesian government has launched a specific and sensitive nutrition fulfillment program for children early on through the 1000 First Days of Life Nutrition Improvement Movement (1000 HPK). The first thousand days of life become one of the crucial periods in a person's life, starting from pregnancy until the child is two years old. During this period, the health of pregnant women and the fetus is the main focus that must be considered to fulfill their nutrition through food. The mother's diet during pregnancy significantly affects the child's concentration, memory function, mood, and emotions later in life<sup>6</sup>.

The application of 1000 HPK in preventing stunting has not produced optimal output. This condition has been proven by the fact that the prevalence of stunting in Indonesia is still above 20% from year to year<sup>2</sup>. Therefore, expanding the intervention to The First Eight Thousand Days of Life (8000 HPK) is necessary as a holistic

stunting prevention effort from 1000 HPK plus 7000 days<sup>7</sup>. After the next 7000 days, human life will experience three sensitive phases, namely the age of 5-9 years, where infectious diseases and malnutrition are the primary growth and development problems. At the age of 10-14, the increase in body mass and physiological changes due to puberty and the age of 15-21 is needed. Brain maturation supports interventions<sup>8</sup>. The 8000 HPK program targets teenage girls to prepare for pre-conception adolescent health and nutrition to reduce stunting childbirths in the future.

The 8000 HPK has not received the attention of the Indonesian government, but the intervention of the Continuum of Care (CoC) approach to improve the quality of continuous care for stunting has been implemented in Indonesia<sup>9</sup>. The scope of CoC interventions relate to family, community, outpatient, and clinical care throughout the life cycle, including adolescence<sup>10</sup>. Adolescent nutrition interventions can break the chain of under nutrition problems that positively impact health but still receive little attention<sup>11</sup>, so it is essential to conduct further studies of various intervention programs for young girls as the target of the 8000 HPK program to determine their impact on stunting.

This literature review aims to identify various intervention programs for young girls to prevent stunting in future generations and identify the success of various intervention programs for young women to prevent stunting in future generations. The benefits of this research are expected to be additional knowledge and insight regarding various interventions for young girls as the focus of the 8000 HPK target to prevent stunting in the future, increase the attention of the Indonesian government towards various interventions for young girls as sustainable stunting prevention,

## METHODS

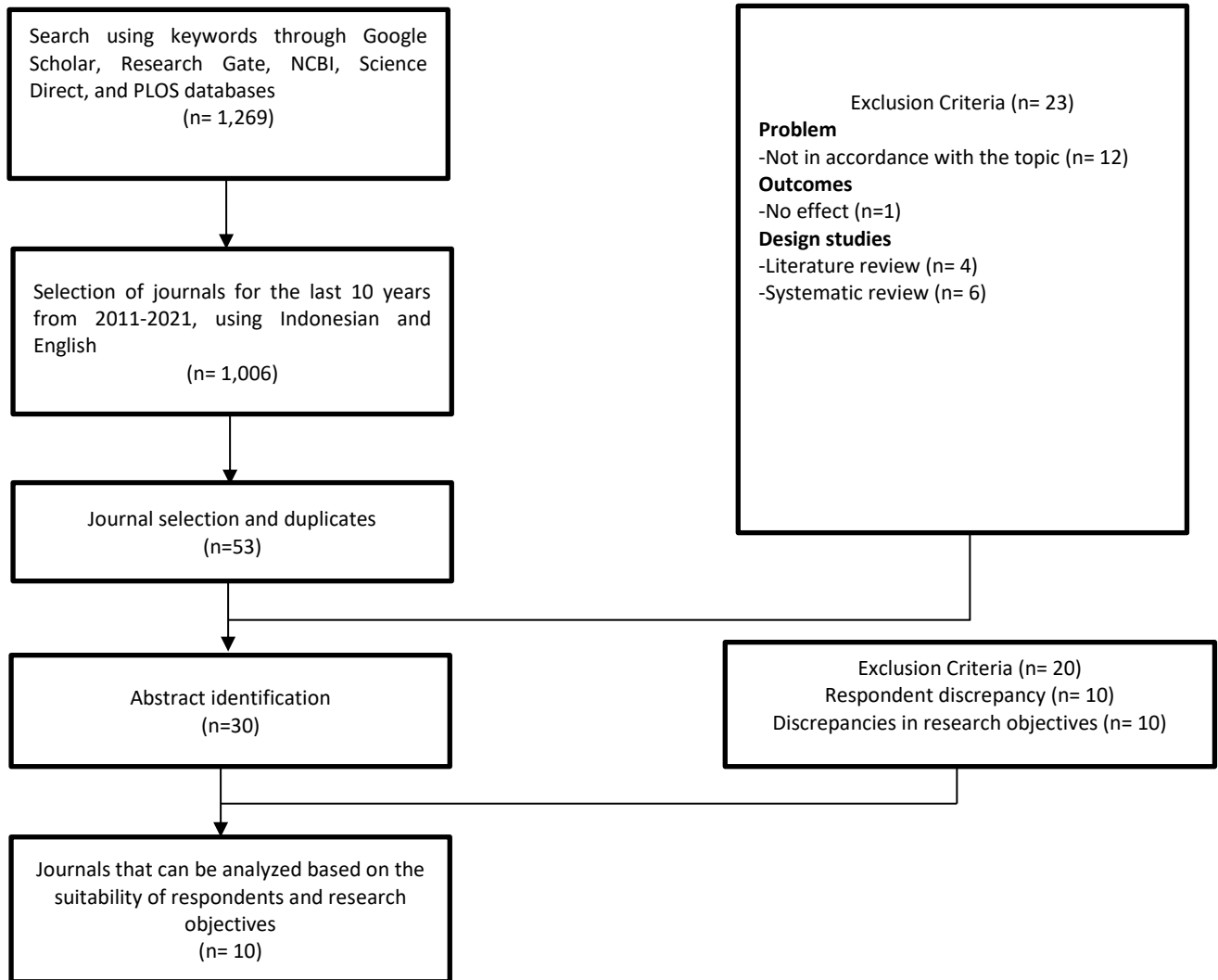
This research method used a literature review. A literature review is a method of searching literature by combining and identifying facts from several scientific sources accurately and validly. Literature searches were carried out nationally and internationally using databases on Google Scholar, Research Gate, NCBI, Science Direct, and PLOS by entering several Indonesian language keywords such as intervention, teenage girls, and stunting. In contrast, English keywords included: intervention, adolescent girls, and stunting.

The flow of writing a literature review starts with a search using the various keywords above through databases from Google Scholar, Research Gate, NCBI, Science Direct, and PLOS, which obtain 1,269 pieces of literature. The literature was then selected for the last ten years, from 2011 to 2021, using Indonesian and English to obtain 1,006 literature. The flow of writing a literature review was continued by selecting journals and duplicates, which obtained 53 pieces of literature. Fifty-three kinds of literature that were obtained identified the exclusion criteria seen from several things such as problems that were not following the topic, the outcome had no effect, and the researchers did not choose the study design literature review or systematic review so that a total of thirty literature were obtained.

Thirty kinds of literature were then re-identified for their abstracts, and 20 pieces of literature were obtained that were not used due to the inappropriateness of respondents, such as male adolescents and toddler age groups, and the purpose of the research that was not used was to identify factors related to stunting so that ten works of literature were obtained that could be analyzed to be used as a reference for writing. The creation of citations and bibliography in this study uses the Mendeley application, which is done by grouping and entering all related journals into the application

**Inclusion and Exclusion Criteria:**

Search using keywords



**Figure 1.** Literature search flow

**Table1.** Literature data search based on the literature search research, the following data can be obtained.

Author, Title	Intervention	Research methods	Research result	Conclusion
Razzak A et al., 2016 <sup>12</sup> <b>Research title:</b> Role of Nutrition Education in Improving the Nutritional Status of Adolescent Girls in North West Areas of Bangladesh	Nutrition education using various media such as charts, leaflets, and posters for young girls aged 10-19 years consisted of 241 people in the intervention group and 236 people in the control group from January 2014 to April 2016.	Randomized control trial study using a questionnaire.	-The increased percentage of balanced food consumption habits in the intervention group (22.8%) compared to the control group (8.5%). -Increased iron supplementation in the intervention group (56.8%) compared to the control group (15.7%). -The increased percentage of normal nutritional status in the group of female adolescents who were given intervention from 44.8% to 52.6% compared to the control group.	-Nutrition education can improve adolescent girls' behavior, attitudes, and health and nutrition practices in rural Bangladesh.
Hasanah and Permadi, 2020 <sup>16</sup> <b>Research title:</b> The Effect of Booklet Media on Young Women's Knowledge of Stunting in Probolinggo	Providing stunting booklet media to 99 high schools (SMA) young girls with an average age of 16 in 12 high schools in Probolinggo.	<i>Pretest-posttest</i> and analysis of non-parametric statistical tests Wilcoxon test.	-The difference in the level of knowledge of young women before and after being given the stunting booklet media through the Wilcoxon Signed Test with a value of $p < 0.001$ .	-Media booklets can increase young women's knowledge about stunting in Probolinggo.
Sondakh et al, 2020 <sup>22</sup> <b>Research title:</b> The Effect of Counseling on Adolescent Knowledge About Early Marriage at SMA Negeri I Suwawa	Providing early marriage counseling to 24 female students aged 16 years at SMA Negeri I Suwawa, Gorontalo. This research lasted two months, from 29 July to 20 August 2020.	<i>Quasi-experimental one group</i> with pretest and posttest. Statistical test using the Wilcoxon test.	-The results of the pretest and posttest knowledge of 24 students aged 16 years at SMA Negeri I Suwawa before counseling got a score of 82.5, while after being given counseling, they got a score of 90.	-Counseling can increase the knowledge of 16-year-old students at SMA Negeri I Suwawa, Gorontalo, shown through the Wilcoxon test with a p-value of $<0.001 < 0.05$ .

Author, Title	Intervention	Research methods	Research result	Conclusion
Shapu et al., 2021 <sup>24</sup> <b>Research title:</b> Effectiveness of Health Education Intervention on Water Sanitation and Hygiene Practices among Adolescents Girls in Maiduguri Metropolitan Council, Borno State, Nigeria: A Cluster Randomized Control Trial	Educational intervention on hygiene and sanitation practices for 417 young girls aged 10-19 years in 4 schools in Nigeria. The intervention group was given education about sanitation hygiene related to drinking water sources and basic sanitation hygiene practices, while the control group was given education on malaria health interventions. The intervention took place from October 2019-March 2020.	Randomized cluster control trial.	-Increased sanitation hygiene practices for young girls in the intervention group compared to the control group were shown through the Independent T-Test value, p <0.001.	-Providing interventions in the form of effective health education improves sanitation hygiene practices for young girls in Maiduguri Metropolitan Council.
Khadilkar A et al., 2014 <sup>25</sup> <b>Research title:</b> Effect of Micronutrient Supplementation on Height Velocity of Underprivileged Girls in Comparison with Un-Supplemented Healthy Controls	Provision of micronutrient supplementation (group 1): (zink 15 mg/day + multivitamin, calcium 500 mg/day, and vitamin D 30,000 IU per 3 months), (group 2): (calcium 500 mg/day and vitamin D 30,000 IU per 3 months), (group 3): (multivitamin and vitamin D 30,000 IU per 3 months) to young girls aged 8-12 years with low economic status while healthy young women with high economic status were not given intervention. The intervention was carried out for one year.	Cohort study	-Increase in the Height for Age Z-Score in group 1 female adolescents with intervention (zink 15 mg/day + multivitamin, calcium 500 mg/day, and vitamin D 30,000 IU per 3 months) compared to female adolescents without intervention -A significantly accelerated height in group 1 female adolescents with intervention (zink 15 mg/day + multivitamin, calcium 500 mg/day, and vitamin D 30,000 IU per 3 months).	-Providing calcium, vitamin D, zinc, and multivitamin supplementation effectively increases the height of young women with a low economy in India.

Author, Title	Intervention	Research methods	Research result	Conclusion
<p>Srinivas P et al., 2017<sup>27</sup></p> <p><b>Research title:</b> A Study of Impact on Targeted Height among Adolescents Girls</p>	<p>Nutrition intervention for female adolescents aged 10-18 was divided into a control group and a case group of 64 people. The control group was given a balanced nutritional diet, iron, and deworming medication. The case group was given a balanced nutritional diet, iron, worm medicine, and additional micronutrients (zinc, calcium, vitamins A, B complex, and D). Intervention for 1.5 years and analyzed every month.</p>	<p><i>Prospective interventional study.</i></p>	<p>-Increased height of 6.83 cm/year in the control group and 7.97 cm/year in the case group. The increase in height in the case group was 1.14 cm higher than the control group.</p>	<p>-Adequacy of nutrients and micronutrient supplementation in short adolescent girls can cause height.</p>
<p>Nguyen P et al., 2017<sup>31</sup></p> <p><b>Research title:</b> Pre-conception Micronutrient Supplementation with Iron and Folic Acid Compared with Folic Acid Alone Effects Linear Growth and Fine Motor Development at 2 Years of Age; A Randomized Controlled Trial in Vietnam</p>	<p>Giving weekly supplements to 5,011 pre-conception women was divided into three groups. Group 1: (2,800 µg folic acid). Group 2 (60 mg + 2,800 µg iron folic acid). Group 3 (multiple micronutrients) until conception. Anthropometric measurements for children from women of conception who received weekly supplements were measured starting at 3, 6, 12, 18, and 24 months of age.</p>	<p>Randomized control trial.</p>	<p>-Increase in the value of Length for Age Z score (LAZs) by 0.14 SD in children aged two years from the group of pre-conceptional women with iron and folic acid intervention than the group of pre-conceptional women with folic acid alone. -Increased LAZs by 0.10 SD in children aged two years from the pre-conceptional women with multiple micronutrient interventions compared to the pre-conceptional women who were given folic acid intervention.</p>	<p>-Supplementation of iron and folic acid and administration of multiple micronutrients to pre-conceptional women increases the linear growth of children up to 2 years of age than pre-conceptional women to folic acid alone.</p>

Author, Title	Intervention	Research methods	Research result	Conclusion
Sumarmi et al, 2018 <sup>33</sup> <b>Research title:</b> Pre-conception Multimicronutrient Intervention in Bride-to-be to Prevent Neonatal-Stunting in Probolinggo District, East Java	Provision of micronutrients to 156 women aged 16-35 years in 9 Probolinggo Districts. Group I (Placebo-IFA) every other day during the pre-conception period (2-6 months before pregnancy), followed by 60 mg of iron and 250 µg of folic acid with daily doses during pregnancy. Group II (MMN group) was given multi-micronutrients containing 15 vitamins and minerals every other day from pre-conception to pregnancy with daily doses.	Randomized double-blind, community-based trial.	-The average body length of newborns from group II (MMN group) since the pre-conception period was 49.3 cm higher than group I (Placebo-IFA group), receiving iron and folate only during pregnancy which was 47.6 cm.	-Providing micronutrients since pre-conception can prevent stunting of babies from birth compared to giving iron and folic acid supplements since pregnancy.
Gelli A et al., 2019 <sup>35</sup> <b>Research Title:</b> A School Meals Program Implemented at Scale in Ghana Increases Height-for-Age during Mildchildhood in Girls and in Children from Poor Households: A Cluster Randomized Trial	The school feeding program in 10 regions in Ghana for 2,869 school-age children 5-15 years was divided into two groups, namely the control group without intervention and the intervention group.	Longitudinal randomized cluster control trial.	-Increase the Height for Age (HAZ) value for girls aged 5-8 years by 0.12 SD.	-School feeding can be a means to improve nutrition interventions for elementary school children (SD).
Matali V, Wungouw H, Sapulete I, 2017 <sup>37</sup> <b>Research title:</b> Milk Intake on Height and Weight of Elementary School Children	250 mL of low-fat, high-calcium milk was given to 9 girls aged 9-11 years at SD GMIM 34 Manado as a treatment group, while 11 girls at SD GMIM Bethlehem Manado as a control group were not given low-fat high, calcium milk. The research was conducted in September-December 2017.	Experimental research on sample selection by purposive sampling.	-Based on the results of the Independent T-test, it is known that the value of Sig. (2-tailed) <0.05 means there is an increase in height in the treatment group compared to the control group.	-Giving low-fat, high, calcium milk affects the height of elementary school girls.

## DISCUSSION

Stunting has become a severe nutritional problem in Indonesia, illustrated by the incidence of undernutrition, which hinders toddlers' growth and development. The role of young women as future mothers to give birth to a new generation is believed to have great potential in carrying out various stunting prevention efforts. Based on the results of a literature review in ten journals analyzed by researchers, it was found that various factors cause stunting throughout adolescence, such as knowledge factors, hygiene, and sanitation practices, fulfillment of micronutrient intake, and consumption of balanced nutritional food, Multi Micro Nutrient (MMN) supplementation, feeding in schools, as well as the fulfillment of high calcium milk intake. These factors are a problem that is often overlooked, so intervention for young women as future mothers is urgently needed to prevent future generations of stunting. In this literature study, researchers will discuss and identify interventions for young girls as the main target of 8000 HPK related to stunting.

Intervention can use various methods, but the most frequent application of the intervention method in the community is education. As a health promotion approach, education is intended to be the first step in changing perceptions and increasing knowledge and awareness of something that can influence a person's behavior. The research results by Razzak, Hassan, Rahman, Asaduzzaman, Juliana, and Hosain found that nutrition education can increase the consumption of balanced meals in the intervention group with a percentage of 22.8% compared to the control group of 8.5%. Nutrition education also impacts increasing the practice and habit of consuming iron supplements and increasing the percentage of normal nutritional status in the group of female adolescents from 44.8% to 52.6%<sup>12</sup>. The results of this study align with the research of Lathifa and Mahmudiono that nutrition education has an effect on increasing the practice of balanced nutritional food habits for female adolescents with a percentage of 94.4%<sup>13</sup>. Increasing the practice of balanced nutrition eating habits for young girls will grow along with proper nutritional knowledge so that new eating habits are formed for young girls to choose the type and amount of food that affects nutritional status.

Education or counseling as an intervention that aims to increase one's knowledge can use various media, one of which is using booklets. A booklet is a small book that contains information about something<sup>14</sup>. The use of booklets as educational or outreach media is now felt more effective than leaflets because booklets are easy to carry can be stored in pockets, and contain pictures so that readers are more interested in reading<sup>15</sup>. Counseling by Hasanah and Permadi using booklets increased the knowledge of 99 young girls aged 16 about stunting, as evidenced by the average pre-and post-test scores from 1.99 to 2.79. The Wilcoxon test<sup>16</sup> measured these results.

Increasing young women's knowledge will build the correct perception to increase their awareness of various stunting prevention efforts later, including preventing early marriage. Bugis's research reveals that knowledge of young women can influence attitudes,

decision-making, and actions of young women to plan the ideal age of marriage and not to marry early<sup>17</sup>. The researcher's analysis of the study indicated that some information was not conveyed in the journal, such as not mentioning the number of pretest and posttest questions and not explaining educational material related to stunting. Researchers suggest that this information is conveyed in a journal so readers or researchers get comprehensive information.

Early marriage is still a problem of a social phenomenon among adolescents in Indonesia. The World Health Organization (WHO) states that early marriage is a marriage that occurs before someone is 18 years old<sup>18</sup>. Early marriage is considered one of the causes of stunting because it is related to the age of the mother getting married. The age of mothers who are married for less than 18 years is considered insufficient parenting knowledge for children, so food needs are not fulfilled optimally<sup>19</sup>. The high rate of early marriage among adolescents can trigger reproductive health problems, bearing in mind that adolescence will experience puberty marked by changes in hormones that cause physical changes, including the reproductive organs that are not fully ready for reproduction. Adolescent girls who have not experienced reproductive organ maturity and have not experienced physical maturity will increase morbidity and mortality during childbirth later. One of the measures to control the incidence of morbidity and mortality during teenage childbirth is by conducting early marriage education to young women as future mothers to increase knowledge and awareness of the risks posed by early marriage.

The incidence of early marriage is still often found in Indonesia, especially in Sleman Regency, Yogyakarta Special Province (DIY), as the first rank for early marriage, namely 159 couples<sup>20</sup>. This case has received the Indonesian government's attention to form one of the Indonesian government's programs through the BKKBN to prevent teenage pregnancies by holding the Youth Family Development Program (BKR). Establishing the BKR program aims to improve parents' attitudes, knowledge, and skills in monitoring and fostering their adolescent children's growth and development by involving effective communication between the two<sup>21</sup>. Research by Sondakh, Aisyah, and Pakana through providing early marriage counseling to 24 young women aged 16 years who measured their level of knowledge through the pretest and posttest obtained an increase in knowledge of 90 compared to before being given counseling, namely 82.5<sup>22</sup>. The increased knowledge possessed by young girls will later influence their attitudes and awareness of early marriage as a cause of stunting.

Stunting is a complex nutritional problem requiring an approach from various aspects, so in addition to providing interventions, it is also necessary to look at the factors that cause stunting, including sanitation and hygiene. Poor hygiene and sanitation practices can lead to health problems such as diarrhea and respiratory infections (ARI)<sup>23</sup>. When the body is infected with a disease in the long term, it will cause malnutrition, interfering with the growth and development of teenage girls. Research by Shapu, Ismail,



Lim, Ahmad, and Njodi found that education on sanitation hygiene practices to 417 young girls aged 10-19 years in four schools in Nigeria was proven to improve sanitary hygiene practices<sup>24</sup>. According to the researcher's analysis, providing education on sanitation hygiene practices to adolescent girls aged 10-19 years is felt too late, considering that infectious diseases most often occur in the age group 5-9 years<sup>8</sup>, so the research above is not correct on target.

Adolescence will be a developmental transition from childhood to adulthood, illustrated by an increase in height. The intake of micronutrients such as vitamins and minerals influences the increase in the height of female adolescents. Research by Khadilkar, Kadam, and Chiplonkar found that female adolescents aged 8-12 years who were given complete micronutrient supplements such as calcium, vitamin D, zinc, and multivitamins experienced a significant increase in height compared to female adolescents who were only given calcium and vitamins or multivitamins and vitamins D only<sup>25</sup>. Consuming food sources of calcium, especially during the adolescent growth period, will help increase height, reflected through bone density and size, but if calcium needs are not appropriately met, it will reduce the formation of bone mass and hardness, which affect height. A deficiency of vitamin D can inhibit the efficiency of absorption of calcium needed during growth, while zinc deficiency can interfere with the activity of protein synthesis, which plays an essential role in forming new tissue during growth<sup>26</sup>. The researcher's analysis, according to the provision of interventions in the study, can be said to have been right on target because adolescent girls aged 10-14 years experienced an increase in body mass and physiological changes due to puberty<sup>8</sup>, so it requires supplementation of vitamins and minerals to support the growth and development of teenage girls.

When someone enters adolescence, they will experience a rapid growth spurt, also known as a growth spurt, characterized by an increase in height. Various interventions to increase the height of teenage girls are continuously carried out, including research conducted by Srinivas, Aisyah, and Prakana. The results of research by Srinivas, Aisyah, and Pakana found that adolescent girls aged 10-18 years with the intervention of providing balanced nutritional food, iron administration, deworming, and the addition of micronutrients were monitored for a year there was an increase in the height of 7.97 cm. In contrast, female adolescents who were not given additional micronutrients experienced an increase in height of 6.83 in a year<sup>27</sup>.

The researcher's analysis related to the results of this study showed that the increase in height was more significant in the group of female adolescents with the addition of zinc, calcium, vitamin D, vitamin A, and vitamin B complex compared to female adolescents without additional micronutrients due to the fulfillment of balanced nutritional intake. Fulfilled the consumption of iron and deworming, also supported by the addition of micronutrients so that it encourages faster height gain than female adolescents without additional micronutrients, bearing in mind that during adolescence, the need for micronutrients which are contained in lots

of vegetables and fruit is needed more to achieve optimal growth<sup>8</sup>. The researcher's suggestion for this research is that the provision of interventions can also be connected with its impact on the process of brain maturity of female adolescents.

Nutrition and health of adolescent girls as pre-conception women require early preparation to prevent the birth of stunted children. One of the things to prevent the birth of stunted children is to fulfill various micronutrients for teenage girls. Micronutrients play an essential role in preventing anemia in female adolescents because of their relation to LBW births as triggers for the birth of stunted children in the future<sup>28</sup>. Prevention of anemia is considered adequate by giving MMN compared to giving Blood Supplement Tablets (TTD), but it seems that there has been no step from the Indonesian government to switch to MMN supplements<sup>29</sup>. Multi Micro Nutrient contains 15 types of vitamins and minerals such as vitamin A, vitamin E, vitamin D, vitamin B1, vitamin B2, niacin, vitamin B6, vitamin B12, vitamin C, iron, folic acid, zinc, copper, selenium and iodine<sup>30</sup>. Research by Nguyen, Gonzales, Young, Truong, and Hoang obtained the result that pre-conceptional women with iron and folic acid gave birth to children with a Length for Age Z score of 0.14 SD compared to children born to pre-conceptional women with only folic acid and giving MMN supplementation to pre-conception women can increase the value of Length for Age Z score by 0.10 SD in children aged two years compared to the group of pre-conception women with folic acid intervention alone<sup>31</sup>. According to the researchers' analysis of the results of the study, the pre-conceptional group of women with iron and folic acid interventions had an average length of newborns 0.14 SD higher than those with folic acid alone because the combination of iron and folic acid was effective in increasing the length of the baby. nascent than folic acid alone. The group of pre-conception women who were given MMN showed an increase in the Length for Age Z score, which was 0.10 SD higher than the group of women who received folic acid alone, which was possible for two reasons. The first thing is that since the pre-conception period, they have been given MMN intake, which contains 15 types of vitamins and minerals so that the intake of micronutrients is more completely fulfilled compared to pre-conception women who only intake folic acid<sup>32</sup>. The second thing is that the children involved in the study above were two years old, most likely still being breastfed at that age. Therefore, an increase in the Length for Age Z score in children of pre-conception women with MMN supplementation is indeed felt to get higher results than in pre-conception women with folic acid intervention alone. In the above study, the researcher found information that was not conveyed with certainty, namely the vulnerable age of pre-conception female respondents to interventions because the journal only mentioned the number of respondents.

The mother's nutritional status determines the birth of a stunted child before and during pregnancy. As pre-marital women enter the pre-conception period, adolescent girls require various interventions to achieve normal nutritional status through the Body Mass Index (BMI) value. Adolescent girls with normal nutritional

status have a slight chance of experiencing anemia, thereby reducing the risk of future low birth weight births as a cause of stunting. Efforts to prevent anemia in teenage girls can be prevented through MMN because it contains folic acid, iron, and vitamin B12 as a form of hemoglobin<sup>30</sup>. MMN supplementation would be better given during pre-conception to achieve optimal health status before pregnancy<sup>29</sup>. The results of the research by Sumarmi, Wirjatmadi, Kuntoro, Taha, and Soekirman proved that the group of pre-conceptional women aged 16-35 years who were given MMN supplementation during childbirth had an average length of newborns that was 49.3 cm longer than the group of pre-conception women who were given a placebo and Iron Folic Acid (IFA) which gave birth to a baby with a body length of 47.6 cm<sup>33</sup>. Other studies that are in line with MMN supplementation, conducted by Prihati and Kostania, show that MMN supplementation during pregnancy does not significantly affect newborn weight gain<sup>30</sup>. The results of several studies state that MMN is more effective in increasing newborn length than newborn weight because MMN contains complete micronutrients which are positively related to height increase, in contrast to the case with newborn weight, which will increase as the baby grows postnatal and the mother has an excellent nutritional status<sup>34</sup>.

The rapid growth spurt during adolescence requires intervention from the family environment and the school. The school feeding program can contribute as an initiative to fulfill a variety of nutrients to support the growth and increase in adolescents' physical activity. The results of research by Gelli, Aurino, Folsom, Arhinful, Adamba, and Osei showed that the school feeding program could increase the height/age score by 0.12 SD in the group of girls aged 5-8 years, while the group of girls in their early teens aged 9-15 years there was no increase in the value of TB / U<sup>35</sup>. This study's measuring height/age results were based on calculations using the WHO AnthroPlus software for ages 5-19 years. WHO AnthroPlus Software is a global application from WHO for monitoring the growth of school-age children and adolescents aged 5-19 years<sup>35</sup>. The school feeding program is intended to reduce the habit of snacking outside the school environment, which harms health. Snacks outside the school environment tend to contain high energy, high sugar, and high fat and are not guaranteed cleanliness and safety, affecting nutritional status. This condition was stated by the research of Nasriyah, Kulsum, and Trisanti that 8 Elementary School (SD) children aged 8-14 years who consumed poor snacks had more nutrition<sup>36</sup>. In this case, school feeding programs can fulfill the balanced nutritional food needed by school-age children to support physical growth, brain maturity, and increased productivity. According to the researcher's analysis, the school feeding intervention was right on target according to the age of the research respondents, namely the ages of 5-15 years. When entering the age of 5-9 years, an increase in nutritional status significantly reduces the risk of infectious disease. At the age of 10-14 years, there is relatively fast growth and development that adolescents will experience due to puberty, and at the age of 15-21 years, there is a process

of brain maturity that correlates with increased work productivity<sup>8</sup>.

Milk is a recommended food source for adolescents to reach peak bone density. Milk has the main content in the form of calcium, which is needed for bone density, so it affects the increase in height. Research by Matali, Wungouw, and Sapulete found that giving 250 mL of low-fat high, calcium milk intervention given daily to 9 teenage girls aged 9-11 years at SD GMIM 34 Manado can increase their height compared to 11 teenage girls aged 9- 11 years old at SD GMIM Bethlehem who were not given low-fat high calcium milk<sup>37</sup>. The results of the study indicated that according to the results of the Independent T-test, it was known that the value of Sig. (2-tailed) <0.05 means giving low-fat, high, calcium milk can increase the height of female adolescents with low-fat, high calcium milk intervention. Other research that supports this research was put forward by Kim SH, Kim WK, and Kang that as many as 664 young women aged 15-17 years in Korea who consumed high-potassium milk could increase bone density, thereby affecting height increase<sup>38</sup>. The author's analysis regarding the results of research by Matali, Wungouw, and Sapulete through the administration of low-fat high, calcium milk as an intervention has been right on target because, at the age of 9-14 years, adolescents will experience growth and development, increase in body mass, and physical changes due to puberty<sup>8</sup>. The research was right on target but had a high chance of being biased because the research respondents were not in the same school environment, so the heterogeneity was very high. The researcher's suggestion for this study is to provide low-fat, high-calcium milk interventions to respondents in the same school environment to minimize bias.

## CONCLUSIONS

In conclusion, young women, as the forerunners of future mothers, need to prepare for nutrition and health early to reduce stunted children's birth through a specific intervention program. Providing interventions to young women in the form of education, be it nutrition education, stunting education, early marriage education, as well as hygiene and sanitation education, can increase the knowledge of young women so that they can raise awareness and the correct perception that stunting prevention needs to be carried out since adolescence. Fulfillment of micronutrient intake, balanced nutritional food habits, fulfillment of high calcium milk intake, and school feeding programs can support optimal growth and development during adolescence. Intervention through MMN supplementation for female adolescents is considered more effective in tackling the incidence of anemia as a trigger for LBW events which has a high chance of triggering the birth of stunted children. Various efforts to prevent stunting since adolescence, especially for young women, can potentially reduce the population of stunted children born in the future.

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