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Development of sustainable green medicine strategy for adolescent anemia prevention: a mix methods

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ABSTRAK

Latar Belakang: *Anemia pada remaja putri berdampak pada imunitas, remaja yang mengalami anemia imunitasnya cenderung lebih rendah sehingga mudah terserang infeksi. Kebugaran tubuh dapat berkurang dan penurunan prestasi dalam belajar. Defisiensi besi dapat diidentifikasi dengan pemeriksaan kadar ferritin. Green medicine memanfaatkan potensi tanaman herbal dan sumber daya alam yang memiliki aktivitas biologis untuk meningkatkan kadar ferritin dalam tubuh secara alami.*
Tujuan: *Penelitian ini bertujuan untuk mengembangkan strategi berkelanjutan green medicine yang efektif dan dapat diterapkan secara luas untuk meningkatkan kesehatan remaja putri yang menderita anemia defisiensi besi.*
Metode: *Metode penelitian yang digunakan adalah mix method. Metode kuantitatif menggunakan analisis univariat yang tujuan untuk mengetahui kadar ferritin remaja putri serta dilakukan pengukuran asupan nutrisi remaja putri menggunakan kuesioner SQ-FFQ. Metode kualitatif menggunakan analisis tematik dan serta pengembangan produk menggunakan analisis SWOT.*
Hasil: *Hasil kuantitatif menunjukkan sebanyak 5 (15.6%) remaja putri mengalami anemia dengan kadar ferritin dibawah normal (Mean = 9.9 µg/L) sehingga mayoritas kadar ferritin responden normal. Remaja yang anemia 100% asupan iron sebesar 8 ± 4.2 mg dan vitamin C sebesar 70 ± 70.5 µgRE. Hasil kualitatif menunjukkan pengembangan produk green medicine ini mempertimbangan keseluruhan aspek dari kualitas, khasiat, tampilan produk dan distribusi. Hasil analisis SWOT menunjukkan bahwa produk green medicine yang berkelanjutan memerlukan bahan dasar local wisdom dan bekerjasama dengan stakeholder lintas sectoral.*
Kesimpulan: *Pengembangan produk green medicine disesuaikan dengan bahan dasar local wisdom yang mengandung kebutuhan vitamin C dan iron yang seimbang untuk bisa memenuhi asupan nutrisi remaja putri anemia ini dengan mempertimbangkan kualitas, khasiat, tampilan produk dan proses pendistribusiannya sehingga dapat menangani serta mencegah angka anemia di kalangan remaja putri secara berkelanjutan.*

KATA KUNCI*: anemia; feritin; green mecidine; mix method; remaja putri;*

ABSTRACT

Background: *Anemia in adolescent girls has an impact on immunity, adolescents who experience anemia tend to have lower immunity so they are susceptible to infection. Body fitness can be reduced and decreased achievement in learning. Iron deficiency can be identified by checking ferritin levels. Green medicine utilizes the potential of herbal plants and natural resources that have biological activity to increase ferritin levels in the body naturally.*

Objectives: *This study aims to develop a sustainable green medicine strategy that is effective and can be widely applied to improve the health of adolescent girls suffering from iron deficiency anemia.*

Methods: *The research method used was mixed method. The quantitative method uses univariate analysis which aims to determine the ferritin levels of adolescent girls and to measure the nutritional intake of adolescent girls using the SQ-FFQ questionnaire. Qualitative methods use thematic analysis and product development using SWOT analysis.*

Results: *Quantitative results showed that 5 (15.6%) adolescent girls were anemic with ferritin levels below normal (Mean = 9.9 µg/L) so the majority of respondents' ferritin levels were normal. Adolescents who are anemic 100% iron intake of 8 ± 4.2 mg and vitamin C of 70 ± 70.5 µgRE. Qualitative results show that the development of green medicine products considers all aspects of quality, efficacy, product appearance and distribution. The results of the SWOT analysis show that sustainable green medicine products require local wisdom ingredients and collaboration with cross-sectoral stakeholders.*

Conclusions: *The development of green medicine products is adjusted to the basic ingredients of local wisdom which contain balanced vitamin C and iron requirements to be able to meet the nutritional intake of anemic adolescent girls by considering the quality, efficacy, product appearance and distribution process so that it can handle and prevent anemia rates among adolescent girls in a sustainable manner.*

KEYWORD*: adolescent girls; anemia; ferritin; green mecidine; mix method*

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INTRODUCTION

Indonesia is one of the developing countries that still has anemia problems. The prevalence of anemia in Indonesia based on 2023 Riskesdas data is still high at 16.3%, meaning that 2 out of 10 adolescents in Indonesia experience anemia. While the prevalence of anemia in North Sumatra in 2023 was 13.8% (1). In contrast, the prevalence of adolescent anemia in Medan City is 9.3%. The data is still relatively high. The high incidence of anemia can have an impact on certain things. Anemia is a common health problem among adolescent girls, especially in developing countries. The prevalence of anemia in adolescent girls is very high due to the increased need for iron during puberty, which is often not met by daily food intake. Iron deficiency is the most common cause of anemia. Iron deficiency causes a decrease in hemoglobin and red blood cell production resulting in lower hemoglobin concentration and hematocrit. Anemia in adolescent girls has an impact on their immunity, adolescents who experience anemia, their immunity tends to be lower so that they are susceptible to infection, fitness can be reduced and decreased achievement in learning. Women who experience anemia during adolescence are vulnerable to the risk of anemia when they become when becoming a mother to be. The risk of complications can also increase during conception, which can lead to pregnancy and fetal distress. Anemia can be diagnosed based on hemoglobin levels, other biomarkers and serum ferritin <30 µg/L is a reliable indicator of anemia (2).

One of the most important indicators of anemia is ferritin levels, which is the body's reserve form of iron. Low ferritin levels indicate the presence of iron deficiency, which if left untreated, can adversely affect the growth, development and quality of life of adolescent girls (3). Ferritin is a water-soluble intra-cellular protein, which is an

acute phase protein. So that if anemia occurs, the step taken is the administration of iron tablets. But many people who are given iron tablets do not consume them regularly because the effects of Fe tablets are in the form of constipation, nausea, and darker colored stools.

Traditional treatment of anemia or green medicine often involves iron supplementation, but this method is not always effective and can cause side effects. Therefore, a more holistic and sustainable approach to addressing this issue is needed. One promising approach is the development of green medicine or environmentally friendly natural ingredient-based treatment. Green medicine utilizes the potential of herbal plants and natural resources that have biological activity to increase ferritin levels in the body naturally (4). Green Medicine is the use of herbal products in therapy for various diseases. The use of Green Medicine is not only to cure or prevent the occurrence of certain diseases but is often also consumed to restore pathological damage (5). The use of Green Medicine is thought to improve the quality of life of patients and reduce the need for conventional medicines. There are many plants that are used as traditional medicine with the aim of increasing life expectancy. Advances in technology have increased the capacity of modern science, especially in terms of traditional medicine by utilizing plants (6).

Sustainable strategies in the development of green medicine do not only focus on therapeutic effectiveness, but also consider the quality, efficacy, product appearance and distribution process to the target. In the context of anemia treatment in adolescent girls, the use of local wisdom plants that are easily available and have high nutritional value is one of the keys to creating a sustainable solution to be able to create green medicine products in the prevention of anemia in adolescent girls in Medan City. The mixed methods approach, which combines quantitative and qualitative methods, allows for more comprehensive data collection regarding the development of green medicine in increasing ferritin levels in anemic adolescent girls. This approach also helps in understanding the perceptions, acceptance, and barriers in implementing this sustainable strategy in the community. Thus, this study aims to develop an effective and widely applicable green medicine sustainability strategy to improve the health of adolescent girls suffering from iron deficiency anemia. Previous studies have focused more on social factors that cause anemia in adolescents without conducting laboratory tests to diagnose anemia. While in our study, ferritin levels were examined to diagnose anemia and nutritional factors were also considered, not many studies have done this. Micro and macro nutrient content factors are very important to consider in the food intake of adolescent girls in the factors causing anemia.

MATERIALS AND METHODS

The research method used in this study is to use a mix method to get a product development strategy to increase ferritin levels in anemic adolescent girls who are broader and more comprehensive. The first study was a study conducted quantitatively to determine the ferritin levels of female adolescents and to determine the root causes of anemia in adolescents. Then, after the ferritin levels were known and the causes of anemia were known through SQ-FFQ interviews, the second qualitative study was continued, namely conducting FGDs with experts for findings obtained through the quantitative research process. The following is the research process in the first stage used quantitative methods with univariate analysis with the aim of knowing the ferritin levels of adolescent girls so that they could diagnose anemia. In addition, the quantitative method measured the nutritional intake of adolescent girls with the SQ-FFQ questionnaire to find out the intake of minerals, iron, vitamins, protein, carbohydrates to energy adequacy in detail. The SQ-FFQ questionnaire has been validated with good reliability. The population and sample in this study were adolescent girls aged 13-15 years in Medan City which has the highest anemia ratio. This study was conducted from May to July 2024. The sample was done by purposive sampling. A sample of 32 adolescent girls were examined for ferritin levels and also interviewed with the SQ-FFQ questionnaire. Inclusion criteria in this study were adolescent girls aged 13-15 years, at risk of anemia, not deaf and dumb and approved by their parents to contribute to the study. Exclusion criteria are adolescent girls who

are not allowed by their parents to become respondents in this study.

In the second stage, qualitative focus group discussion (FGD) research was conducted with nutritionists, general practitioners and green medicine pharmaceutical experts as data triangulation. The nutritionist facilitator is 35 years old with experience in the field of dietetics and nutrition for approximately 8 years and handles anemia nutrition problems at Harapan Jakarta Hospital, for a 64-year-old general practitioner who is also an expert in the field of pharmacy and medicine has more than 10 years of experience, opening a doctor's practice and as a teacher at UIN North Sumatra. While the green medicine pharmaceutical expert is a retired professor of herbal plants from the University of North Sumatra and actively produces herbal medicines as needed until the time the researchers conducted this research, the experience of green medicine experts in the world of herbal plants for more than 20 years. The sampling technique used was purposive sampling. The instrument used in data collection at the qualitative stage was a list of structured interview questions as a guide when conducting FGDs.

Focus Group Discussion (FGD) indicators were carried out, among others, to find green medicine development strategies such as the quality of the basic ingredients of green medicine for anemia patients with low ferritin levels, the efficacy of green medicine that has been recommended, the appearance of green medicine products as well as the process and distribution strategy of the green medicine itself. FGD data was transcribed, then analyzed using a matrix to find themes from each FGD result that had been carried out. Then the qualitative data were processed and analyzed according to the themes, and the findings were interpreted to find the best strategy in increasing the ferritin levels of adolescent girls in Medan City. Qualitative data were processed and analyzed according to the theme, and the findings were interpreted to find the best strategy in increasing ferritin levels of adolescent girls in Medan City. In the last step, SWOT analysis was conducted for further green medicine product development to be carried out. This research has received ethical approval from the ethics committee of Satya Terra Bhinneka University with ethical clearance number 001/SK/KE-STB/V/2024.

RESULTS AND DISCUSSIONS

Qualitative results found the average of the characteristics, examination in 32 samples of adolescent girls in the aspects of vitamin C, iron and ferritin levels. And 5 anemic adolescent girls were analyzed for the average content of vitamin C and iron levels in their bodies and ferritin levels.

Table 1. Characteristics of adolescent girls

Characteristic	f	Mean ± SD
Age	32	14.2 ± 0.8
Weight	32	46.0 ± 8.0
Height	32	150 ± 10
Body Mass Index (BMI)	32	20.5 ± 3.3

Based on **Table 1** shows that the average age of respondents is 14.2 years. while the average BMI is 20.5. **Table 2** shows that the average vitamin C intake measurement of 32 female students examined in Medan City was 96.0 µgRE. In contrast, iron levels had an average of 13.0 mg and an average ferritin level of 65.3 µg/L**. Table 3** shows that out of 32 adolescent girls who experienced anemia, 5 people (15.6%).

Of the 5 adolescent girls who experienced anemia, the results showed an average measurement of vitamin C intake of 70 µgRE, in contrast to iron levels which showed an average of 8 mg. Adolescent girls who are anemic have an average ferritin level of 9.9 µg/L. Qualitative results show that the development of green medicine products considers all aspects ranging from product quality, efficacy and effectiveness, product appearance or availability and distribution process strategies to the targets and targets of this study. For good quality in the utilization of green medicine, it is necessary to make extracts, so as not to change the content of the herbal plant itself, besides that the reason in extras with the same content only needs to consume a small dose,

without overdoing it, you will get the benefits. This is also evident from Inf.3's quote.

…..”*the main nutrient component before it becomes ferritin. From food sources, but indeed for the levels it varies between food ingredients such as protein from animals, plants or vegetables such as spinach so if we really want to focus it should be extracted because we can add intact substances without consuming too much because if we consume too much like 100 gr spinach it is very much*.” (Inf.3, 19/08/2024).

The findings show that the use of basic ingredients is local wisdom, in addition to this to purify safety and toxicity tests, plants commonly consumed from three generations (grandfather, father and son) are an overview of food consumption as basic ingredients that are safe for consumption.

…”*Traditional medicine, first look for references, what is the literature and sources because this is going to be made into medicine, secondly try the students in their respective regions or whoever, to find local wisdom, for example, how they use it is recorded, how many sheets of material, what is the processing, this is recorded later, Mr. Ajri, there use fresh material 20 lmebar how many grams of weight, if it's dry, the simplisia will be 20% times 50 grams, right?”….* (Inf.3, 19/08/2024).

The results of qualitative research show that the consumption of iron or iron in the form of green medicine cannot run smoothly and in accordance with its benefits unless it is balanced with a healthy diet. This is evidenced by the following quote from Inf.2.

…”*blood supplement tablets yes, but it is not yet effective because supplementation must be accompanied by proper consumption patterns and also continuous education for target adolescent girls because in some provinces information related to viral diets, foods and so on is very widespread and even foods that need to be considered food ingredients that inhibit Fe absorption.”…* (Inf.2, 19/08/2024).

The results of the qualitative research show that the product packaging of this green medicine is in the form of oral.

…”*The difference is in the packaging so this green medicine, yes, usually the packaging is not like conventional packaging, where conventionally there is an injection, if this green medicine to my knowledge is still in oral form, then if the oral form of green medicine is still limited, it is not like conventional”…* (Inf.2, 19/08/2024).

In the results of Focus Group Discussion (FGD) Inf.3 explained that the appearance of the product in terms of preparations that can be made is to extract the plants that will be used as green medicine.

...” Green medicine is related to plants or plants, yes, here I also make it, here try to see this there is a leaf I made this pugun tano and the process is also in a small lab here. All these plants, extracted and have benefits.”…. (Inf.3, 19/08/2024).

In addition, the capsule dosage form in this strategy is highly recommended by herbal medicine experts.

….” The preparation of these herbal plants is also different, yes, according to the needs here, there are gels, toothpastes, skin ppds baisanya creams, mouthwashes, okay, that means depending on what the preparation is for. And capsules.”…. (Inf.3, 19/08/2024).

…..” According to this, if it's actually the same as you, a capsule can be made. You can make this. Just adjust this to his needs.”….. (Inf.3, 19/08/2024).

The results of qualitative research show that the distribution or marketing of green medicine products is not just a product available and disseminated for consumption. There needs to be a mature and sustainable strategy to be able to maintain the distribution of green medicine products longer and continuously. One of them is education, socialization and behavior change. This is evident from the excerpt from Inf.3's Focus Group Discussion (FGD).

……” In this case eee we don't forget that for the concept we have to educate parents of teenage girls too because they leave the house with a diet.”… (Inf.1, 19/08/2024).

Based on the results of the SWOT analysis (**Table 4**), it shows that the use of green medicine in the treatment of diseases has been widely practiced, for anemia itself can utilize the basic ingredients of green plants with local wisdom that has been consumed by three generations and red natural resources. Green medicine products are made by extracting with the manufacture of

appropriate procedures to maintain the effectiveness of efficacy and product quality. It is recommended that this product innovation needs to work with cross-sectors such as parents, school teachers, health centers and the community to understand the consumption dose and be balanced with a good diet for adolescent girls.

Adolescent girls aged 13-15 years are prone to anemia. Research shows that the age of adolescent girls significantly affects the incidence of iron deficiency anemia (7). Adolescence is a period when nutritional intake becomes very important to support growth and development, this will be related to menstruation in this phase (8). The incidence of anemia in adolescent girls is also influenced by body mass index. Low BMI is associated with a lack of nutritional intake, resulting in low iron in the body. Fulfillment of good adolescent nutritional intake is very important to ensure optimal nutritional status as an effort to prevent anemia. Anemia in adolescents affects activity patterns and learning concentration, which in turn can reduce achievement (9). Vitamin C in the body of adolescent girls plays a role in the absorption of non-heme iron by reducing ferric to ferrous in the small intestine so that it is easily absorbed. It also increases the absorption of iron from plant foods (non-heme) (10).

Table 2. Product development with SWOT analysis for green medicine development strategy in the prevention of anemia in adolescent girls

	Strength (S)	**Weakness (W)**
Opportunity (O)	a. Utilizing natural resources of local wisdom that exist in the community for the basic ingredients of green medicine. b. Distribution strategy with education, socialization and cross-sector cooperation with stakeholders	a. Usage doses are adjusted to the local wisdom food consumed by 3 generations of people b. Basic materials used that are one of a kind and red in color
Threat (T)	a. Community willingness and diet for adolescent girls need to be established by involving cooperation with stakeholders b. Making green medicine extracts takes a long time but the efficacy and quality are good	a. Consumption of green medicine capsules requires the trust and willingness of the public to consume them b. Parental cooperation is needed in regulating the diet of adolescent girls to avoid inhibitory foods.

Adolescent girls with vitamin C deficiency will inhibit the absorption of iron in the body. Vitamin C is an essential element that is needed by the body for the formation of red blood cells (11). Iron has a direct influence on red blood cells and hemoglobin formation (12). Hemoglobin is formed and influenced by adequate intake of iron-containing foods. The main causes of iron deficiency are malnutrition, menstrual bleeding, chronic and untreated malnutrition. In addition, several health risks, especially all aspects of adolescent girls' physical and emotional well-being, are attributed to the lack of iron in their bodies (13).

Diagnosis and screening of iron deficiency and risk of anemia among adolescent girls remains under-diagnosed and undertreated (14). Serum ferritin levels reflect the total amount of iron stores in the body and serve as an indicator of iron reserves that can be measured through laboratory examinations (15). Ferritin is a protein in the body that functions to bind and store iron. Ferritin is found in the liver, spleen, skeletal muscle and bone marrow, while its amount in the blood is usually small. Ferritin levels in the blood can reflect how much iron is stored in the body (16). Low ferritin levels in adolescent girls are the main indication of anemia.

Product quality

In the quality of green medicine products, it is necessary to ensure the basic ingredients and the dosage given. The selection of a good base material for making green medicine requires attention to several factors, including the source of the raw material, sustainability, safety, and effectiveness of the material. The selected base material should come from a renewable source, have minimal environmental impact, and have consistent active ingredients to ensure the effectiveness of the medicine (17). Extraction also allows for dosage standardization, which is important to ensure consistency and effectiveness of treatment. By turning herbs into a more concentrated form, extraction helps to remove inactive substances or ingredients that may cause side effects (18). It also makes the product more stable and durable, and easier to consume and distribute (19).

The use of basic ingredients with local wisdom gives an indication of good product quality. Local plants are products derived from plants that have been consumed by humans for centuries (20). Local plants that have long been used by the community usually have a long history of use. This means that their side effects and benefits have often been tested and understood through generations of experience, providing a guarantee of safety and efficacy (21).

Product efficacy

The efficacy of green medicine products can be well absorbed if balanced with awareness and behavioral changes in good consumption patterns. Consumption of foods that inhibit Fe absorption such as caffeine and calcium will affect the level of iron intake in the body of anemic adolescent girls. Caffeine and calcium have been shown to inhibit iron absorption in several recent studies. Other studies have shown that caffeine, especially that found in coffee and tea, can reduce the absorption of non-heme iron, which comes from plants, by up to 39%. This is especially the case when caffeine is consumed alongside iron-containing foods (22). This is in accordance with the researcher's quantitative data, anemic adolescent girls with low ferritin levels on average consume milk with calcium content of at least 100 ml every week. Based on this, there is a need for direction and education to teachers, parents and adolescent girls to avoid excessive consumption of Fe inhibitors.

Product display

Packaging plays an important role to differentiate products and attract consumer interest, especially in an era of increasingly fierce competition (23). The packaging and dosage forms of green medicine have evolved significantly over the years to improve stability, efficacy and acceptance in the community. From traditional forms such as powders and decoctions, modern green medicine is now available in various formulations such as capsules as well as tablets which means in oral dosage forms (24). In addition, this dosage form is protected from the taste and smell of the sealed arena, this capsule is easier to swallow than in powder or brew preparations and capsules can help reduce the risk of interactions between herbal ingredients with food or other drugs (25).

Product distribution

Some indicators of success in marketing medicinal plants are sales, sales growth, market share, brand awareness, customer engagement, social media analysis and customer loyalty (26). This green medicine program or innovation strategy can run if all aspects support the target to be addressed. In other studies also show the same thing, community involvement and contribution will provide sustainability that continues to grow, the integration of sustainability in medicine, especially green medicine through community involvement is the same as emphasizing the importance of aligning this program with relevant local issues in the real world, which encourages long-term sustainability in good health practices (27).

Based on the results of qualitative research in finding green medicine development strategies in preventing iron deficiency anemia in adolescent girls, it is necessary to consider quality, efficacy, product appearance and distribution processes in order to be sustainable. In terms of product quality, it is necessary to consider the basic ingredients of local wisdom that are safe with the source of the content needed to prevent anemia in adolescent girls, besides that the processing methods and

procedures in accordance with the standards need to be done correctly.

Based on the efficacy of the product, it is necessary to determine the dosage to ensure its effectiveness by carrying out several procedures, namely safety and toxicity tests, preliminary trials, pre-clinical trials, clinical trials to preliminary trials and their application. While in terms of product display, which is recommended by experts in oral preparations, especially extract capsules because they have several advantages compared to powder or brew preparations. In terms of distribution, what needs to be done is education, socialization and cooperation with cross-sectoral to expand the range and commitment of products to be sustainable (28).

Green medicine product development for anemia prevention in adolescent girls with SWOT analysis

Examination of low ferritin levels is associated with adolescents showing symptomatic signs of anemia. Ferritin is an iron storage protein and its concentration in plasma or serum reflects iron stores, low ferritin indicates iron deficiency, while high ferritin reflects the risk of iron overload. Checking ferritin levels as a diagnostic test for iron deficiency and iron overload is a common clinical practice (29). Data on adolescents with low ferritin levels show low nutritional levels such as vitamin C, vitamin B6, iron, carbohydrates and BMI below normal levels (30). This proves that adolescents with anemia are proportional to the lack of nutritional intake in their bodies so that they show symptoms of anemia that are at risk if not followed up.

Based on the findings of quantitative data, so proceed with qualitative data to find strategies in the development of green medicine in accordance with the nutritional intake needs of adolescents according to the results of the SQ-FFQ questionnaire analysis in adolescents with anemia, with this the products produced are right on target and the right content of nutritional intake with the ultimate goal of preventing anemia to treat anemia. The development of this strategy starts from the basis, where the fulfillment of proper nutrition by consuming green medicine is an alternative and has minimal side effects so that anemia in adolescents can be overcome (31).

The next stage of the FGD was a SWOT analysis conducted to assess the green medicine products to be produced. In order for the product development strategy to prevent anemia in adolescent girls to be sustainable, it is necessary to elaborate on product findings both from strengths, weaknesses, opportunities and threats. Green medicine products in this study focus on basic ingredients from nature and are local wisdom that has been consumed for a long time by the community for three generations by considering the right dose, besides that the ingredients used are one ethnic plant and are red in color, for example beets which are scientifically proven to be able to overcome iron deficiency anemia. This beet also contains several vitamins such as Vitamin C, Vitamin B6, iron and folic acid which are in accordance with the results of the SQ-FFQ questionnaire measurements that anemic adolescent girls lack these contents. The planned dosage form is a capsule extract that is consumed orally as an effort to prevent anemia in adolescent girls (32).

This strategy needs to be developed with contributions from various parties and across sectors. The thing that needs to be done after the product exists is education and socialization to gruu, parents, as well as stakeholders and the community to maintain a healthy eating pattern without consumption of iron-absorbing foods, The sustainability of this collaboration will reduce the iron deficiency anemia rate of adolescent girls in Medan City which has an impact on a better future and women's health that gives birth to a golden and quality generation. Our research focuses on the factors of micro and macro nutrient intake in adolescent girls from the causes of anemia but has not discussed the factors of providing nurturing, loving and caring patterns of parents to adolescent girls. This is important to do further research.

CONCLUSIONS AND RECOMMENDATIONS

Low ferritin levels in adolescent girls indicate cases of anemia and signs of anemia symptoms. Adolescent girls with anemia showed less than normal nutrient intake. Consumption of iron, vitamin C, vitamin B which is less than the normal limit is found in all adolescent girls with low ferritin levels or anemia. Based on this, the development

of green medicine products is adjusted to the conditions found to be able to meet the nutritional intake of anemic adolescent girls by considering the quality, efficacy, product appearance and distribution process so that it can handle and prevent anemia rates among adolescent girls in a sustainable manner.

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