

Literature Review: Supplementary Food For Anemia Pregnant Women And Chronic Energy Deficiency Pregnant Women

Irfan Nafis Sjamsuddin, Divia Alfianita, Tuti Surtimanah

Public Health Study Program, Institute of Health Science Dharma Husada Bandung,

Correspondence email: irfansiam.bdg@stikesdhib.ac.id

ABSTRACT

One of the causes of stunting is anemia in pregnant women and Chronic Energy Deficiency (CED) in pregnant women, due to insufficient food intake. Various foods to increase hemoglobin, body weight, and Upper Arm Circumference (UAC) of pregnant women were studied. The aim was to determine the various types of food additives to increase the hemoglobin (Hb) of anemic pregnant women or to increase the UAC and body weight of CED pregnant women. The research method is a literature review by searching online databases through Google Scholar and PubMed obtained 13 food supplement articles for anemia pregnant women and 11 food supplement articles for CED pregnant women. Data processing and analysis by reading, and synthesizing research results using an article summary matrix, then identifying themes and combining the same themes. The results showed the supplementary foods that increase Hb were seaweed juice, Ebi cassava chips, green bean extract, moringa biscuits, otak-otak Tempe Bilis, and green spinach extract. Meanwhile, additional food consumed with iron tablets is dragon fruit juice, guava juice, dates, tempeh milk, green bean pudding, honey, and cavendish. Supplementary food to increase body weight and UAC from CED pregnant women are anchovy biscuits, anchovy biscuits mixed with moringa leaf flour, biscuits mixed with corn flour – soybeans – pumpkin – *katuk* leaves – powdered sugar – chicken eggs, bread/sandwich biscuits made from wheat, vegetable fat without hydrogenation, sugar, milk, eggs, nuts, dried fruit, fortified with vitamins and minerals, biscuits mixed with soy flour – wheat – sugar – skimmed milk – eggs – margarine, anchovy biscuits – moringa flour, dry food from flour soybeans – corn, Tempe flour cookies plus papaya and passion fruit juice, mackerel fish buns, pre-made biscuits. Health workers and health volunteers are expected to disseminate information on types of supplementary food to pregnant women through various methods and media including social media and demonstrate how to make processed food so that they are encouraged to practice it. All types of processed food additives have the potential to become a healthy food home industry.

Keywords: Hemoglobin, body weight, upper arm circumference, additional food

INTRODUCTION

Stunting is a condition in which children experience growth disorders so that the children's height does not match their age, due to chronic nutritional problems, namely lack of nutritional intake for a long time. In 2019 there were 27.67% of stunted children in Indonesia, the intervention started when the child was still in the womb, paying attention to the diet of pregnant women (1). The condition of pregnant women in Indonesia is still concerning, pregnant women with anemia in 2018 were 48.9%. Pregnant women with Chronic Energy Deficiency (CED) in 2018 amounted to 17.3% (2), and fell in 2020 to 9.7% (3).

Pregnant women are prone to nutritional problems, one of which is Chronic Energy Deficiency (CED), Iron Deficiency Anemia, and Lack of Vitamin A (4). Anemia is a condition of the body in which the level of hemoglobin (Hb) in red blood cells is lower than the standard it should be. Pregnant women are said to be anemic if their Hb level is <11 gr/dl (5). Most of these conditions are caused by iron deficiency factors which are characterized by low hemoglobin levels (6). Normal hemoglobin level > 12gr%, mild anemia 10-11 gr%, moderate anemia 8-10 gr%, and severe anemia <8 gr % (7). CED mothers are conditions where the mother experiences a long-term food shortage which can have an impact on the health of the mother and fetus (8), including causing stunting in children (9). Pregnant women with CED are

characterized by a pregnant woman's weight of less than 40 kg, looking thin with an Upper Arm Circumference (UAC) of less than 23.5 cm (10).

Knowledge about the intake of nutritious food for pregnant women and a culture that preserves certain food taboos for pregnant women is still an obstacle. In the culture that prevails in some areas, foods that are prohibited are highly nutritious foods such as fish and eggs. Increasing the use of local food for additional food for anemic pregnant women and CED pregnant women through activities to increase the nutritional knowledge of pregnant women as well as increasing the ability of pregnant women to consume nutritious food according to their needs during pregnancy (3). Anemia pregnant women and CED pregnant women need more energy and protein intake to meet their energy needs so that their nutritional status becomes normal. The utilization of local food as additional food needs to be developed. It is necessary to overcome anemia in pregnant women and CED pregnant women, among others through the provision of supplementary feeding (11), during pregnancy to support the improvement of maternal nutritional status (12) in addition to giving Blood Supplement Tablets (Fe tablets) which has been programmed by the government (5).

The purpose of this research (study) was to find out the various types of supplementary feeding to increase the Hb of anemic pregnant women and increase the body weight and upper arm circumference (UAC) of CED pregnant women. The results of the study are expected to contribute to the prevention of anemia and CED in pregnant women as well as to prevent stunting.

METHODS

The research method is the literature review. A search for research articles was carried out through article databases, namely Google Scholar and PubMed. Article searches were guided by the keywords "*ibu hamil, anemia, makanan*" and "*berat badan, makanan*" ("pregnant women, anemia, food" and "UAC, weight, food"). These keywords are combined to achieve more specific search results. The inclusion criteria for selecting articles were pre-experimental or quasi-experimental intervention research; full-text pdf articles are available and obtained free of charge; Indonesian or English. Exclusion criteria for articles published more than the last 5 years. All literature was re-selected based on inclusion and exclusion criteria as listed in chart 1 of the article selection process.

Data processing and analysis were carried out by reading and synthesizing research articles using the article summary matrix. Furthermore, by using auxiliary tables, the identification of themes is carried out, as well as merging data with the same theme.

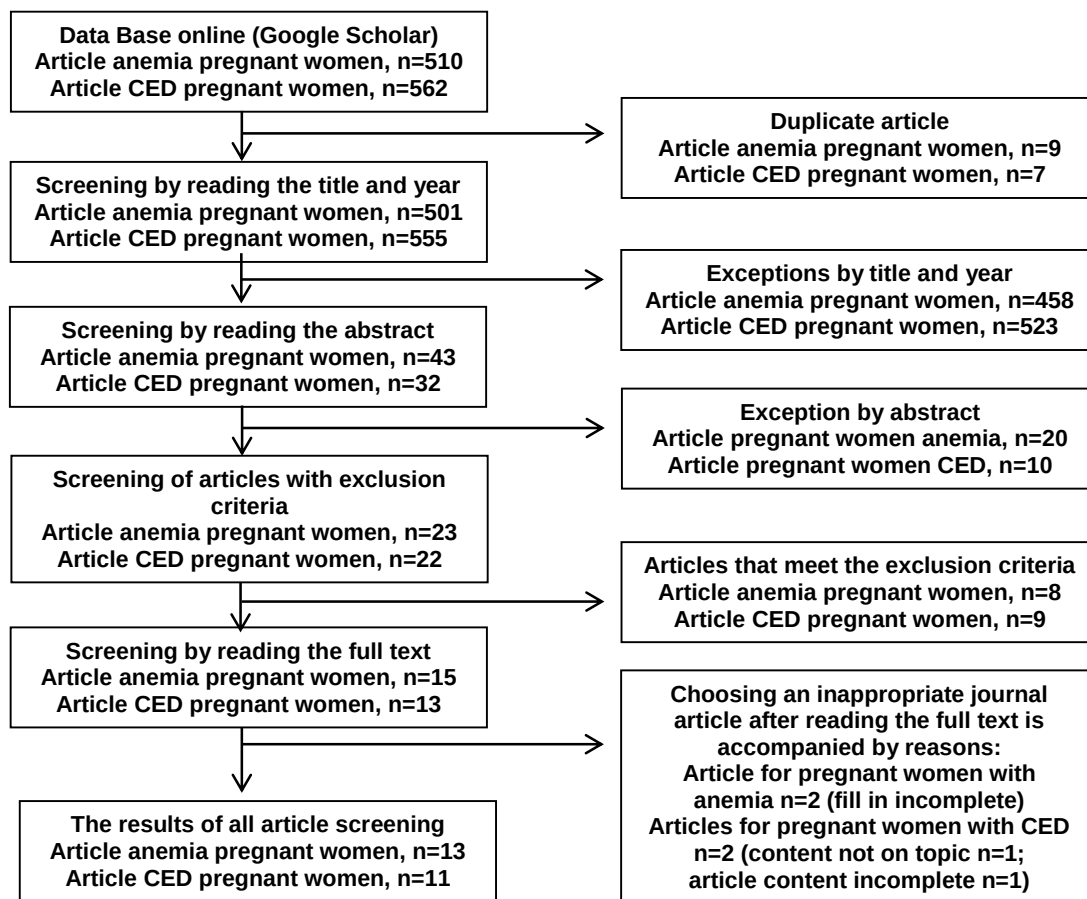


Figure 1. Article Selection Process

RESULTS AND DISCUSSION

The research summary about supplementary food for anemia pregnant women list in table 1, and food for chronic energy deficiency list in table 2.

Table 1. Summary Matrix of Supplementary Food for Anemia Pregnant Women

Number	Author and Year	Purpose Research	Research Design	Type of Intervention	Research Results (Increase Hb)
1	Sofia Mawaddah, Rabiatul Adawiyah - 2021 (13)	Knowing the effect of seaweed juice on increasing Hb levels of pregnant women	Pre-experiment 1 group pre-post test, a sample of 30 pregnant women, Samada Health Center Timur Sub District	Give seaweed juice for eight days.	The average Hb before the intervention was 9.38 g/dL, after 11.99 g/dL, Up 2.61 g/dL, p 0.000.
2	Nunung Aryanti Arsyad, Andi Asrina, Andi Nurlinda - 2020 (14)	Analyzing the effect of consumption of Ebi cassava chips on Hb levels in	Quasi-exp, exp group of 15 people (Ebi chips); 15 control people (without Ebi chips)	In the treatment group of eating Ebi cassava chips- for 4	The average Hb in the intervention group before 10.04 g/dL, after 11.94 g/dL. Up 1.9 g/dL, p 0.000. The

Number	Author and Year	Purpose Research	Research Design	Type of Intervention	Research Results (Increase Hb)
		pregnant women	chips) Melai Bau-bau Health Center	weeks, the control group was not given.	average Hb control group before 10.97 g/dL, after 11.3 d/dL. Up 0.3 g/dL p 0.000.
3	Risza Choirunissa, Desima Resnawati Manurung – 2020 (15)	Knowing the effect of green bean extract on Hb levels of pregnant women.	Quasi-exp pre-post test with control. Samples 15 interventions and 15 controls. 1-2 trimesters. Sirnajaya Health Center (HC) Bekasi	The intervention group give green bean extract for 7 days. The control group was not given.	The average Hb in the intervention group before 9.993 g/dL, after 11.287 g/dL. Up 1.294 g/dL, p 0.000. The average Hb control group before 9.78 g/dL, after 9.967 g/dL Up 0.187 g/dL, p 0.036.
4	Emanuela Natalia Nua, Regina Ona Adesta, Rosania E.B.Conterius – 2021 (16)	Analyzing the effectiveness of Bikelor on increasing Hb in pregnant women with anemia.	One Group Pre-Test and Post-Test Design, 20 pregnant women.	Give Moringa biscuits 4-5 pieces per day (100 grams) for 14 days.	The average Hb before intervention was 9.44 g/dL and after 10.62 g/dL. Up 1.18 g/dL, p 0.000
5	Mardiah, Yusuf Kristianto, Nurniati T. Rullyni, Rita R., Rahmadona - 2019 (17)	Knowing the effect of consumption of Tempe Bilis otak-otak on the Hb of anemic pregnant women	Quasi-exp one group pre and posttest, 16 anemic pregnant women in Tanjungpinang	Tempe bilis otak-otak food for 10 days.	The average Hb before the intervention was 9.58 g/dL and after 10.43 g/dL. The average Hb rose 0.85 g/dL p 0.000.
6	Dheny Rohmatika, Tresia Umarianti – 2017 (18)	Proving the effect of green spinach extract on Hb levels of pregnant women.	Quasi-exp pre-posttest with control, 34 pregnant women at Gambirsari HC	Green spinach extract for seven days	The average Hb before the intervention was 10.06 g/dL, and after 10.60 g/dL. Up 0.54 g/dL, p 0.000.
7	Yenny Aulya, Vivi Silawati, Ega Margareta – 2021 (19)	Knowing the effectiveness of dragon fruit juice against anemia in third-trimester pregnant women at Teluk Naga Health Center.	Quasi-exp pre-post test, with the control group. The intervention and control groups were 15 people each.	The 14-day treatment group was given Fe tablets and dragon fruit juice 2 times a day @ 250 ml; the Fe tablets control group.	The average Hb in the intervention group before 9.62 g/dL, after 11.64 g/dL. The average Hb in the control group before 9.54 g/dL, and after 9.72 g/dL. Up 0.18 g/dL, p 0.003.
8	Evi Wahyuntari, Sri Wahtini – 2020 (20)	Assessing the effect of guava juice on Hb levels of anemic pregnant	Quasi-exp, 29 third-trimester anemic pregnant women in each	The two groups give Fe tablets 2x1-2 weeks, the	The average Hb in the group before 9.83 g/dL, after 11.24 g/dL. Up 1.41 g/dL. p 0.02.

Number	Author and Year	Purpose Research	Research Design	Type of Intervention	Research Results (Increase Hb)
		women.	group, without pregnancy complications.	intervention group + drinking guava juice 200 ml/day – 2 mg.	The average Hb in the control before 9.77 g/dL, after 10.33 g/dL. Up 0.57.
9	Nur Fauziah, Novita Maulany 2021 (21)	Alfi – Knowing the effect of giving dates on increasing Hb levels of pregnant women	Quasi exp non-equivalent control group, pregnant women with anemia third-trimester people in treatment and control groups. Tanjung Agung Health Center (HC)	Treatment groups were given Fe tablets and dates as much as 75 g/day for 10 consecutive days; the control group was given only Fe tablets.	The average Hb in the intervention group before intervention was 10.22 g/dL, after 11.55 g/dL, increased by 1.33 g/dL p 0.000. The average Hb in the control group before 10.24 g/dL, after 10.92 g/dL, up 0.68 g/dL p 0.000.
10	Novianti, Asmariyah, Suriyati 2019 (22)	– Knowing the effect of giving Tempe milk on Hb levels of pregnant women.	Pre and post-test quasi exp, treatment group 20 people, control group 19 people pregnant women third-trimester in Bengkulu City.	Treatment groups give Tempe milk at a dose of 100 mg/day and Fe tablets; the control group give only Fe tablets for 20 days.	The average Hb in the treatment group before was 10.15 g/dL, after 11.42 g/dL, up by 1.26 g/dL, p 0.000. The average Hb in the control group before 10.79 g/dL, after 10.91 d/dL, up 0.12 g/dL p 0.000.
11	Dennti Kurniasih, Utari Yunie Atrie, Devy Kurniawati 2017 (23)	– Knowing the effect of giving green bean pudding on increasing Hb levels of pregnant women	Quasi-exp pre posttest with the control group. 34 pregnant women at the Batu IX Health Center	The intervention group gives Fe tablets plus green bean pudding; the control group Fe tablets only.	The average Hb in the treatment group before was 9.65 g/dL, after 10.8 g/dL, up 1.15 g/dL p 0.000. The average Hb in the control before 9.82 g/dL, after 9.94 g/dL, up 0.12 g/dL p 0.07.
12	Ahmady, Zulhaini Sartika A. Pulungan, Edi Purnomo 2021 (24)	– Knowing the differences in Hb levels of anemic pregnant women who received Fe tablet supplementation and honey	Non-randomized quasi-exp pretest and posttest with control group design. A sample of 30 people in Mamuju City.	The intervention group give Fe tablets and honey for 14 days; the control give only Fe tablets	The average Hb in the treatment before was 8.69 g/dL, after 9.75 g/dL, increased by 1.06 g/dL p 0.0005. The average Hb in the control before 9.65 g/dL, after 9.96 g/dL increased by 0.31 g/dL p 0.371.
13	Wisdyana	Knowing the	Quasi-exp , 20	Fe tablets	The average Hb in

Number	Author and Year	Purpose Research	Research Design	Type of Intervention	Research Results (Increase Hb)
	Saridewi, Prianita Oktatiranti, Dini Marlina - 2018 (25)	effect of Cavendish and Fe tablets on increasing Hb levels in pregnant women	third-trimester pregnant women, in Central Cimahi	consumption plus cavendish intervention group; Fe tablets only (control group) for 9 days.	the treatment group before 9.78 g/dL, after 9.97 g/dL, increased by 0.2 g/dL, $p < 0.05$. The average Hb in the control group before 10.0 g/dL, after 10.1 g/dL, increased by 0.1 g/dL, $p < 0.05$.

Table 2. Summary Matrix of Supplementary Food for Chronic Energy Deficiency Pregnant Women

Number	Author and Year	Purpose Research	Research Design	Type of Intervention	Results (weight gain)	Results (UAC improvement)
1	Arini Arini, lin Octaviana Hutagaol - 2021 (26)	Develop biscuit formula with moringa leaf flour and anchovy flour to increase the Hb and weight of pregnant women third trimester.	Quasi-exp, one group pre-test, and post-test.	Anchovy flour biscuits mixed with Moringa leaf flour, a dose of 2x2 biscuits – 90 days.	Weight before 48 kg, after 59 kgs. Gain 11 kg.	Hb before was 9 g/dl, after 11 g/dl. UAC before intervention was 22 cm, and after 23 cm, up by 1 cm.
2	Rosa Hadiana Putri, AASP Chandradewi, Reni Sofiyatin, Made Darawati – 2019 (27)	Knowing the effect of giving biscuits based on local food ingredients on weight and UAC pregnant women with CED.	Pre experiment	Intervention gives biscuits with local ingredients (composition of corn flour - soybeans - pumpkin - katuk leaves, powdered sugar, chicken eggs) - 90 days per week.	Weight gain 7.03 kg	UAC rise 1.55 cm. $p < 0.05$
3	Ginta Siahaan, Dini Lestrina and Efendi Nainggolan – 2019 (28)	Determine the effectiveness of food supplements for pregnant women in Indonesia.	Cohort; 43 pregnant women aged 20-35 who visited Medan HC Medan	The pastries made from high protein Tempe flour + papaya + passion fruit juice, for 21 days.	The average weight before intervention 60.50 kg; after 61.50 kg. Up 1.0 kg, $p < 0.001$.	The average UAC before intervention 26.3 cm; after 26.70 cm. Up 0.6 cm, $p < 0.001$.
4	Irviani A. Ibrahim,	Knowing the effect of giving	Quasi experiment	Bakpao shredded	The average weight gain	The mean increase in

Number	Author and Year	Purpose Research	Research Design	Type of Intervention	Results (weight gain)	Results (UAC improvement)
	Musyhirah Waris – 2017 (11)	steamed shredded fish buns with seaweed substitution CED pregnant women	t	mackerel substituted for seaweed every day between meals - 30 days	for pregnant women is 0.9 kg for cases and 0.8 kg for controls.	UAC cases was 0.7 cm and 0.2 cm in the control groups.
5	Herdini Widyaning Pertiwi, Tri Martini, Sri Murni Handayani – 2020 (29)	Knowing the results of giving supplementary feeding and changes in UAC CED pregnant women.	Quasi-experiment	Intervention Supp. feeding biscuit factory (Indonesian government) every day for 90 days.	Weight pregnant women before 42.7 kg, after 43.6 kg. Up 0.9 kg	UAC average before 22.1 cm, after 22.6 cm, increased by 0.5 cm
6	AASP. Chandradewi -2015 (30)	Knowing the effect of PMT on CED pregnant women Labuan Lombok Health Center	Quasi-experiment	Supp. feeding biscuits locally (a mixture of soybean – corn - wheat flours, sugar, skim milk, eggs, and margarine) every day - for 90 days	The average increase in body weight for treatment groups 5.80 kg, p <0.05. The Control group up by 3.13 kg with p <0.05	Not measured
7	Rika Andriani, Martha Irene Kartasurya, Sri Achadi Nugraheni – 2018 (31)	Analyzing the effect of sup, feeding on weight gain for CED pregnant women third-trimesters.	Quasi-experiment	Give Supplementary feeding sandwich biscuits 2x24 hours for 90 days.	The average weight gain the treatment group was 5.9 kg, and for control group was 4.8 kg.	Not measured
8	M. C. Gillespie, A. A. et all. (32)	Knowing the anthropometric comparison of mother and child of moderately malnourished pregnant women, after receiving ready-to-eat supplementary feeding, in South Malawi.	RCT, observation - experiment	The intervention group prepared food (soy-corn flour mix) Control group micronutrient supplements of iron and folic acid. Given daily - 4.5 months.	Intervention group weight gain of 3.4 kg Control group weight gain of 3.2 kg.	Not measured
9	Asmirati, Mitra Asriani	Knowing the effect of giving	Quasi-experiment	Group 1 was given	Not measured	The average UAC group 1

Number	Author and Year	Purpose Research	Research Design	Type of Intervention	Results (weight gain)	Results (UAC improvement)
	Amin, Andi Muhammad Haerul, Asnidar – 2021 (33)	additional food biscuits on the increase in nutritional status in the second trimester of CED pregnant women	t 2 groups of 20 people each	supplementary biscuits, and group 2 was given anchovy biscuits.		before 6.33, after 8.06 p <0.05, up 1.73 cm. The average group 2 before 6.39, after 8.73 p <0.05, up 2.34 cm
10	Rosyati Pastuty, 1 Rochmah KM, Teti Herawati - 2018 (8)	Knowing the effectiveness of the supplementary program for CED pregnant women's final trimester in Palembang city.	Mixed Methods - Concurrent	Supplementary -bread biscuits (sandwiches) daily 1 loaf (100 gr) - 90 days.	Not measured	The average UAC before 22.08 cm. After 23.17 cm, up 1.09 cm p 0.001.
11	Nanik Setiyowati, Yuliana Noor Setiawati Ulvie -2019 (34)	Knowing the effect of supplementary sandwich biscuits on the nutritional status of CED pregnant women	Pseudo-experiment at the Bantar Bolang Health Center, Pemalang .	Supplementary feeding sandwich biscuits daily – 90 days.	Not measured	The average UAC before 21.8 cm, after 22.4 cm. up 0.6 cm, p<0.05.

Supplementary Feeding for Anemia Pregnant Women

The types of interventions in the supplementary feeding to anemic pregnant women and the Hb levels changes showed in figure 2.

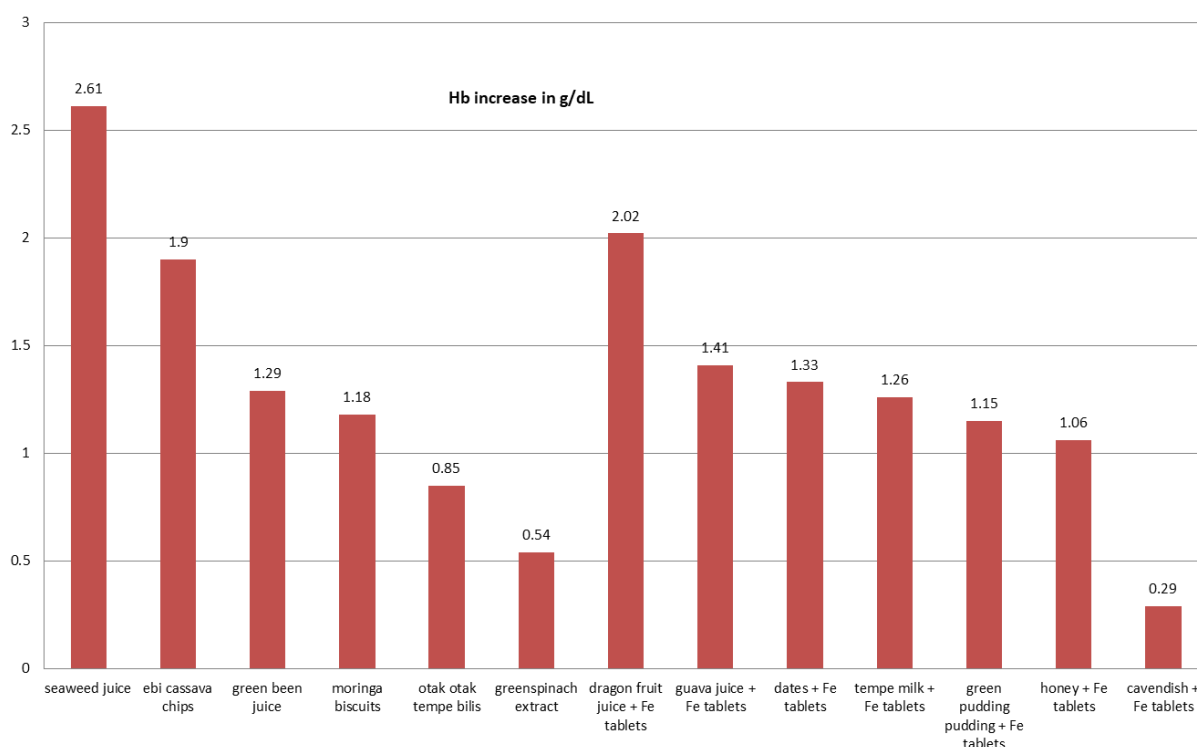


Figure 2. Hemoglobin changes in Anemia Pregnant Women by Type of Intervention

Interventions for anemia are related to risk factors for anemia, namely direct risk factors (nutritional status, eating habits, inadequate intake of certain substances, infections) and indirect risk factors (knowledge, attitudes related to anemia, and sociodemographic factors). There are 3 types of interventions, namely nutrition education to reduce indirect risk factors, the action of supplementing certain substances or giving certain types of food to reduce direct risk factors, and/or a combination of both (35). In this study, two types of interventions were discussed by providing types of food that contain certain food substances and combined with iron supplements (Fe tablets).

Types of additional food are mostly in the form of processed foods, except for dates, Cavendish, and honey. Serving processed foods in the form of juices, juices/milk, snacks, and some are accompanied by additional Fe tablets. Various types of food have been studied, this provides an opportunity to choose according to the availability of ingredients in each region. For example, fish and seaweed are easier in coastal areas than in mountainous areas. Changes in hemoglobin (Hb) in table 1, are the result of giving additional food with various lengths of administration (range of 7-28 days). The following is a sequence of 10 types of food that cause an increase in Hb. above 1 g/dL given within a certain time, namely seaweed juice, dragon fruit juice (+Fe tablets), cassava chips, guava juice (+Fe tablets), dates (+Fe tablets), green bean extract, tempeh milk (+Fe tablets), moringa biscuits, green bean pudding (+Fe tablets), honey (+Fe tablets).

Seaweed juice is given for 8 days, causing an increase in Hb of 2.61 g/dL. Seaweed (*Eucheuma* sp) is a food ingredient containing various compounds needed in the synthesis of hemoglobin such as iron, protein, and vitamin B complex. Iron is a mineral in red blood cells (hemoglobin) that is used to carry oxygen from the lungs throughout the body. If the intake of iron is less, then the blood hemoglobin decreases so that anemia occurs (13). Seaweed contains iron, minerals, B complex vitamins, protein, etc. The bioavailability of substances

contained in seaweed is about 2-10% higher compared to vegetables because the content of phytic acid in seaweed interferes with iron absorption very little (36). Seaweed is quite widely sold in the market and can be made into various snacks, for example, puddings, brownies, salads, stir-fries, seaweed ice, etc. Seaweed juice is made to be given to pregnant women, possibly to make it more appetizing, especially during early pregnancy, which sometimes causes nausea and vomiting. Other snacks made from seaweed require further research in increasing the Hb levels of pregnant women or women of other ages.

Furthermore, dragon fruit juice which was given for 14 days along with the administration of iron tablets caused an increase in Hb of 2.02 g/dL. If only TTD was given in the study, it would only cause a change of 0.18 g/dL (19). Giving iron supplements (Fe tablets) to pregnant women aims to prevent and treat iron deficiency anemia and is one of the specific interventions to accelerate the reduction of stunting. Administration of iron tablets aims to meet the increased need for iron during pregnancy by as much as 25%, this is to support the growth of the fetus, and placenta and prevent bleeding during labor (5). Other studies have shown that regular administration of iron supplements combined with the consumption of dragon fruit can overcome anemia in pregnant women (37). Dragon fruit 100 grams, contains 60.4 mg of iron, effective for controlling iron deficiency and almost all of it can be absorbed as well as 9.4 mg of Vitamin C which plays a role in the absorption of iron through food by forming ferrous ascorbate complexes (38). The content of calcium and iron in dragon fruit is quite high, this is good for bones and blood. In addition, dragon fruit is rich in vitamin C. Iron is needed to carry oxygen throughout the body, while Vit. C helps increase the absorption of iron in the body. Regular consumption can help the optimal growth and health of the fetus (39).

Another type of juice is guava juice given 200 ml (approximately 1 glass of normal size) per day for 14 days along with iron tablets, increasing Hb by 1.41 g/dL. A common cause of anemia is a lack of iron intake, but also a lack of other nutrients (folic acid, vitamin A, vitamin B12). Iron comes from animal protein foods (meat, fish, seafood) and vegetable protein foods (fruits and nuts). The body absorbs iron from animal protein better than it absorbs iron from vegetable protein. Ascorbic acid or vitamin C can increase the absorption of iron (20). Guava (*Psidium Guajava*) is a tropical plant that is easy to grow in Indonesia. Guava is a fruit with a high ascorbic acid content (50-400 mg/100 g), but it decreases to only 50 mg at the peak of ripeness or canned/stored. Guava also contains iron, which is 0.6-1.4 mg/100 grams (40). Guava juice is very easy to make with guava ingredients which are available all year round and easily available in Indonesia.

Other types of food that significantly increase the Hb of pregnant women are cassava chips, Ebi, mung bean extract, and tempeh milk. Cassava Ebi chips are made from cassava, cassava leaves, pumpkin seeds, dried shrimp, and cooking oil which can be a snack for pregnant women. Sweet potatoes and pumpkin seeds contain nutrients Fe, protein, and magnesium. Ebi cassava chips given for 28 days, increased the Hb of pregnant women by 1.9 g/dL (14). Ebi or dried small shrimp is a food that is rich in nutrients. Every 100 grams of shrimp (90% edible amount), contains 259 kilo calories of energy, 62.4 grams of protein, 1.8 grams of carbohydrates, 2.3 grams of fat, 1,209 milligrams of calcium, 1,225 milligrams of phosphorus, and 6 milligrams of iron. In addition, it contains as much as 210 IU of vitamin A, and vitamin B1 - 0.14 milligrams (41). This shows the content of calcium, protein, iron and phosphorus, including high. Ebi cassava chips are easy to make and the ingredients are easy to get.

Dates consumed with iron tablets for 10 days increased the Hb of pregnant women by 1.06 g/dL. Dates are consumed as much as 75 grams together with Fe tablets (60 mg of ferrous sulfate and 0.400 mg of folic acid) every 19.00 WIB. Respondents are advised not to drink tea and coffee because they can inhibit iron absorption. Dates are sweet and special fruit, rich in vitamin A, vitamin C, vitamins B1 and B2, and minerals such as iron, potassium, phosphorus, calcium, magnesium, zinc, and sulfur. In addition, it contains carbohydrates, proteins, nicotinic acid, boron, and dietary fiber. In 100 grams of dates there is vitamin C - 6.1 mg and iron - 1.2

mg, thereby simultaneously promoting the absorption of iron. Dates are given when the mother consumes iron tablets, thereby helping to reduce nausea, and side effects of iron tablets that some pregnant women feel. The sweet taste of dates encourages mothers to drink iron tablets diligently (21).

Next, the green bean extract given for 7 days can increase Hb as much as one way to process green beans. Healthy said green beans contain as much as 2.25 mg of iron in every half cup of green beans. Green beans also contain 2.19% phytate. Phytate can inhibit iron absorption, so it is recommended to soak green beans before processing them. Processing green beans through soaking previously aims to facilitate the absorption of iron which is needed for the maturation of blood cells (15). Mung bean pudding given with TTD caused a relatively high increase in Hb, which was 1.15 g/dL, whereas if only TTD only increased Hb by 0.12 g/dL. One type of legume that contains high iron is green beans. Green beans (*Phaseolus radiates* L.) are a source of vegetable protein, vitamins (A, B1, C, and E) as well as several other substances that are very beneficial to the human body such as starch, iron, sulfur, calcium, fatty oils, manganese, magnesium, and niacin (23). Green beans are easy to get at relatively low prices and are available all the time. Various other snacks made from mung beans include mung bean porridge, gandasturi, dumplings filled with mung beans, mung bean crackers, red sweet potato mung bean rice, mung bean mochi cakes, etc. How much Hb increases when green beans are processed into these snacks requires research.

Giving Tempe milk with iron tablets for 20 days resulted in a change in Hb of 1.26 g/dL (22). Tempe has higher quality and nutritional value than pure soybeans, tempeh's amino acids are 24 times higher than soy milk. The fermentation process increases vitamin B2 (Riboflavin), Vitamin B6 (Pyridoxine), folic acid, pantothenic acid, and nicotinic acid. Vitamin B1 levels decrease for mold growth, but vitamin B12 is formed by bacteria which is not present in other vegetable products. The tempeh fermentation process activates the phytase enzyme to break down phytic acid (which binds several minerals) into phosphorus and isotol. With the breakdown of phytic acid, certain minerals such as iron, calcium, magnesium, and zinc become more available for the body to utilize. This enzyme also plays a role in increasing the absorption of iron minerals in the blood (42). Tempe milk is easy to make, besides that tempeh is also cheap and easy to get. How to make tempeh milk: cut into small cubes the size of medium-sized tempeh (250 grams), boil for 5 minutes to turn off the tempeh mushrooms, drain then boil the tempeh in a blender with a glass of water, strain through a sieve, add enough water, boil the tempeh milk until it boils, may add sugar or food flavoring, ready to be enjoyed.

Another food is moringa biscuits which, when given for 14 days, increase the Hb of pregnant women by 1.18 g/dL. During pregnancy, mothers need an intake of green vegetables to meet iron needs, including Moringa leaves (*Moringa Oleifera* Lam). Moringa contains important micronutrients for pregnant women, namely beta carotene, thiamine (B1), riboflavin (B2), niacin (B3), calcium, iron, phosphorus, magnesium, zinc, vitamins, and iron. Moringa leaves can be processed into various snacks, including Moringa biscuits. How to make it: Take the 3rd to 7th stalk of Moringa leaves to match their age, then wash them and air dry them at room temperature for 3-4 days. After that, the Moringa leaves are in a blender 3 times, so that they become flour ready to be processed into biscuits (16). Moringa biscuits can be a home industry opportunity.

Giving honey and iron supplements for 14 days increased the Hb of pregnant women by 1.06 g/dL. Honey is a natural food produced by honey bees. Honey, in the form of viscous and jelly, is a complex mixture of organic and inorganic compounds such as sugars, proteins, organic acids, pigments, minerals, and many other elements. The content of Fe, protein, vitamins, and minerals in honey can increase the production of iron in the blood. Bone marrow requires precursors such as iron, vitamin C, vitamin B12, cobalt, and hormones for the formation of red blood cells and hemoglobin (24). Honey is sold under various brands and type, the most important thing is to make sure the honey consumed is genuine honey that is kept clean.

Tempe bilis otak-otak food, green spinach extract, and Cavendish (+Fe tablets) can be an option even though it increases Hb levels below 1 g/dL. Anchovies or anchovies contain high levels of iron, which when combined with tempeh in processed otak-otak can increase Hb levels in pregnant women (17). Iron is found in vegetables, including spinach (*Amaranthus* spp.) which is a source of non-heme iron for the formation of hemoglobin. Cooked spinach contains 8.3 mg/100 grams of iron. Green spinach is easily processed into a variety of foods or more varied herbal extracts (18). The 100 grams of bananas contain 0.5 mg of iron, and 72.0 mg of vitamin C, greater than watermelon and oranges. Consumption of Fe tablets with cavendish is expected to optimize the absorption of iron, thereby reducing anemia in pregnant women (25).

Based on the discussion above, judging from the ease of availability of food ingredients and the ease of consuming them, they are guava juice, dragon fruit juice, dates, honey, and Cavendish. Seaweed juice raises Hb quite high, but the availability of seaweed ingredients is rather rare in traditional markets. Types of food that are easy and can be prepared at home are green bean extract, tempeh otak-otak ikan anchovies, and tempeh milk. While those that have the potential to become home industries are Ebi cassava chips, moringa biscuits, and spinach extract because they can last longer for marketing. Health workers together with cadres of health activists can disseminate Hb-boosting foods for pregnant women to the public, especially potential targets, namely pregnant women through various methods and media, including demonstrating how to make them. Lack of information on the potential target segments of counseling has resulted in not yet practicing the provision of nutritious supplementary food and the opportunity to prevent/overcome anemia in pregnant women, which can have an impact on problems for babies born including low baby weight and even stunting (1).

Supplementary Food for Pregnant Women with Chronic Energy Deficiency (CED)

Types of additional food given to CED pregnant women, mostly in the form of biscuits mixed with various other nutritious food ingredients as well as manufactured biscuits which are distributed by the government (Indonesia). Various types of food have been studied, this provides an opportunity to choose according to the availability of ingredients in each region. The types of interventions in the form of the practice of giving types of food to CED pregnant women and the resulting increase in body weight and Upper Arm Circumference (UAC) are listed in figures 3 and 4. Changes in body weight and UAC is the result of supplementary feeding with various length of time (range of 21-135 days).

The type of food that can increase the highest body weight is processed food from anchovy flour biscuits mixed with moringa leaf flour which is given for 3 months, increases body weight by 11 kg and increases UAC by 1 cm. Anchovies that contain high protein are made into flour, mixed with Moringa leaf flour to make biscuits with high nutrition (26). Anchovy biscuits given to pregnant women raised UAC by 2.34 cm, but how long they were given was not stated. Anchovies are rich in nutritional content (33). Anchovies (*Engraulis* spp) have a longer and smaller body shape, taste delicious and are rich in health benefits. Anchovies are usually made with anchovy sauce, capcai vegetables and anchovies, and anchovy bakwan. In 100 grams of raw anchovy, there is nutritional content: protein 10.3 grams, fat 1.4 grams, carbohydrates 4.1 grams, calcium 972 mg, phosphorus 253 mg, iron 3.9 mg, sodium: 554 mg, potassium (k) 126 .1 mg, copper 305.20 mg, zinc 0.2 mg, retinol (vitamin A) 13 mcg, carotene 28 mcg, thiamin (vitamin B1) 0.24 mg, riboflavin (vitamin B2) 0.10 mg, niacin (vitamin B3) 1.9 mg. Consuming salted anchovies should not be too much, because the high salt content risks problems such as hypertension. Salty food is also harmful to the bones, because it triggers loss. Frying salted fish makes the fat and cholesterol content high, so salted fish should be boiled or sautéed with vegetables (43).

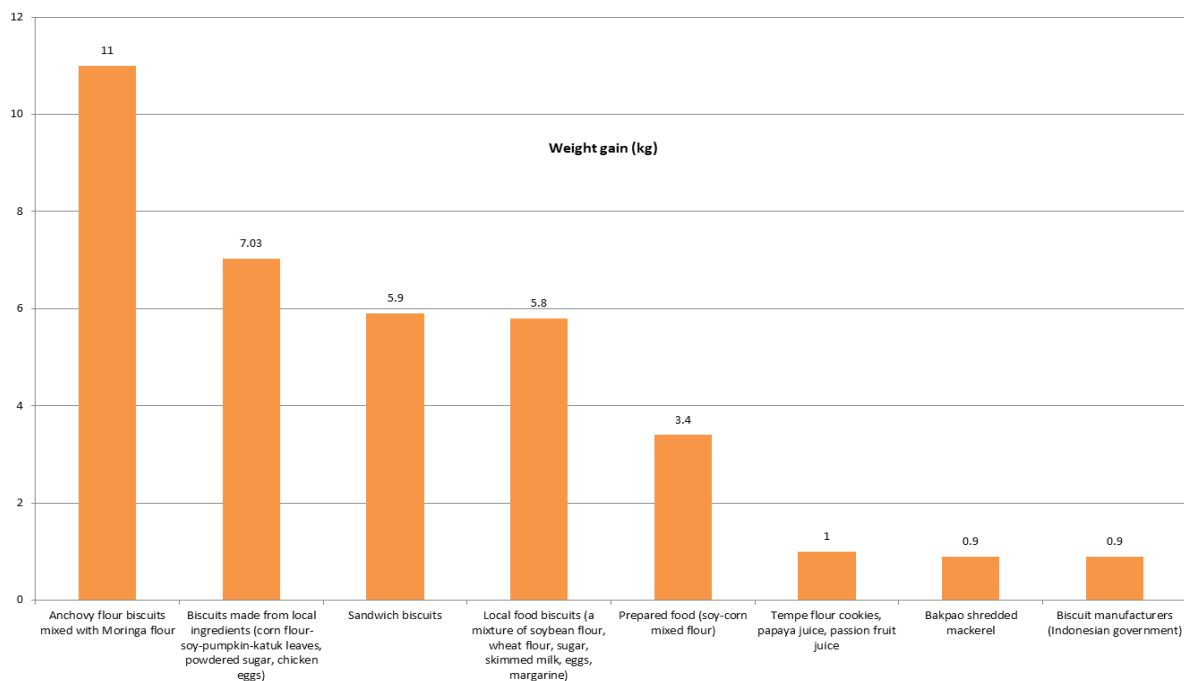


Figure 3. Weight Gain by Type of Supplementary Food

Provision of biscuits made from local ingredients corn soybean *katuk* pumpkin yellow (composition of corn flour - soybean - pumpkin - katuk leaves, powdered sugar, chicken eggs) which was given every week for 90 days, resulted in a weight gain of 7.03 kg and an increase in UAC by 1.55 cm. Weight gain ranges from 4.2 kg - 9.5 kg higher than the weight gain of pregnant women for three months which should be between 3.6 - 8.4 kg. Corn Soybean *Katuk* Pumpkin Yellow biscuits are given to CED pregnant women, so their weight gain must be higher than pregnant women with good nutritional status (27). Biscuits made from other local foods, namely a mixture of soy flour, wheat flour, sugar, skim milk, eggs, margarine which were given for 90 days, increased body weight by 5.80 kg. The given biscuits contain 474.75 kcal of energy and 18.4 grams of protein. In choosing the type of food, you should consider foods / products that are known, have a good taste so that they are liked and accepted by pregnant women widely, have practicality, have a long shelf life and are easy to serve (30). Making anchovy biscuits, anchovy biscuits mixed with Moringa leaves and corn soybean *katuk* pumpkin yellow biscuits, is an opportunity for home industries as micro, small and medium enterprises.

Sandwich biscuits given to CED pregnant women for 90 days, increased their weight by 5.9 kg. The Sandwich Biscuits used are a type of supplementary food for pregnant women made from flour, non-hydrogenated vegetable fat, sugar, milk, eggs, nuts, dried fruit, enriched with vitamins and minerals, with or without supplementary feeding. Sandwich biscuits contain a total energy of 500 kcal, 25 grams of fat, 15 grams of protein, 28 grams of carbohydrates, 240 mg of sodium (31). Another type of sandwich biscuit given for 90 days increased UAC by 1.09 cm. Biscuits (sandwiches) are consumed daily 1 loaf (100 gr). The existence of various variations of additional food for pregnant women is expected to reduce the boredom of mothers in consuming them. The cooperation of health workers and cadres in supervising pregnant women who receive additional food is very helpful so that mothers consume according to the provisions (8). The participation of cadres and families is very helpful so that the provision of supplementary food is successful in increasing the weight and UAC of pregnant women with CED.

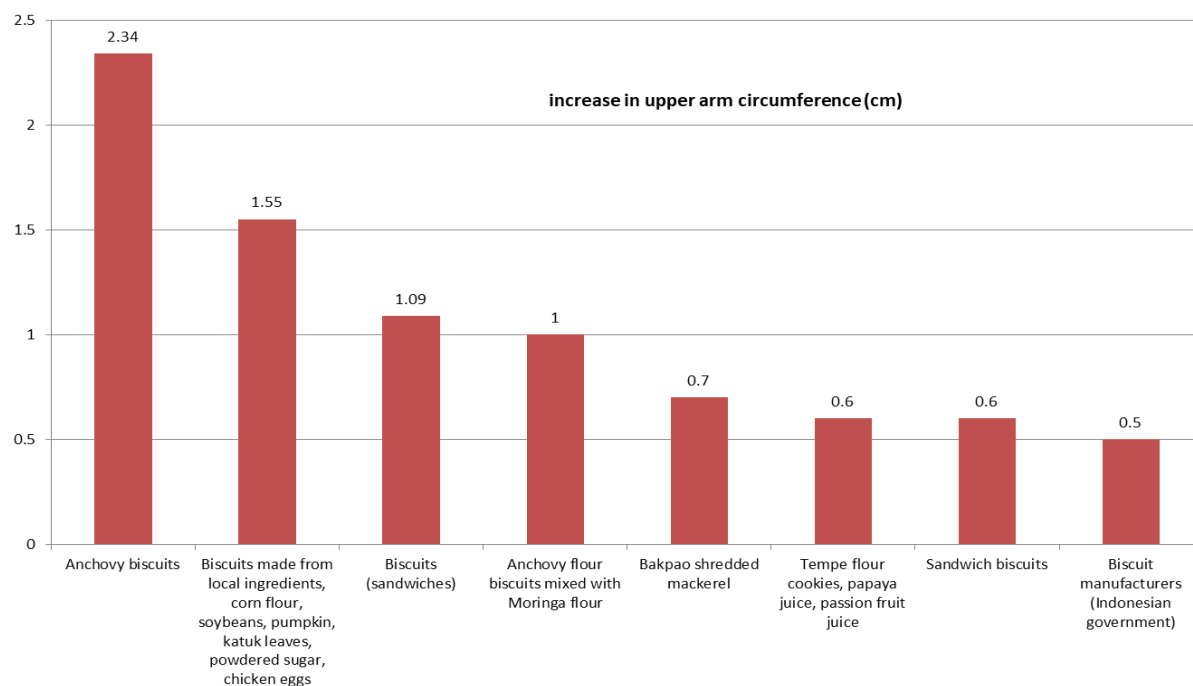


Figure 4. Upper Arm Circumstances Increase by Type Supplementary Food

Another type of supplementary food is prepared food made from a mixture of soy and corn flour, given for 4.5 months to increase the weight of pregnant women by 3.4 kg. This research was conducted in Sub-Saharan Africa. It is stated that the provision of additional food encourages the fetus to grow better and prevents premature birth (32). When compared to Indonesia, maybe this food is in the form of porridge consisting of soy and corn flour, which can be added sugar or flavorings to make it more preferable. Other processed foods are buns filled with mackerel, substituted for seaweed, which are given for 30 days, causing an increase in body weight by 0.9 kg and UAC by 0.7 cm. The increase was smaller than anchovy flour biscuits and moringa leaves, although the protein and energy content of mackerel processed into shredded fish increased the protein content. The composition of buns filled with mackerel mackerel - *Rastrelliger kanagurta*, substituted for seaweed of the *Eucheuma cottoni* type, plus wheat flour and yeast (11).

Other types of food, namely in the form of pastries from tempeh flour accompanied by papaya and passion fruit juice for 21 days, increased body weight by 1 kg and UAC 0.6 cm. Providing additional food in the form of high-protein cookies made from *tempeh* flour and vitamin C-rich juice can improve the nutritional status of pregnant women, as evidenced by increased body weight and hemoglobin levels. This improvement in nutritional status can promote good and profitable pregnancies. *Tempe* flour cookies weighing 10 g/piece, consumed 2 times a day, 3 pieces each. The nutritional value contained in pastries is 394.2 calories, 8.3 g protein, 25.4 g fat, 49.1 g carbohydrates. The juice is made by boiling each 100 g of passion fruit and papaya with 250 mL of water, consuming as much as 250 ml of juice/day. The nutritional value of the juice is 176.3 calories, 2.8 g protein, 2 g fat, 38.2 g carbohydrates, 140 mg vitamin C. Vitamin C can be obtained from direct consumption of fruits or from fruit juices. Juices that combine papaya and passion fruit juices provide adequate amounts of vitamin C and are available at affordable prices. Papaya is high in fiber, thereby reducing constipation that often occurs in pregnant women, papaya contains papain which can speed up protein digestion and facilitate the function of protein transporting iron. Adding passion fruit juice to papaya juice stimulates the

appetite while offsetting the smell of papaya which can cause nausea and vomiting in some people (28). In addition to the processed foods mentioned above, there are types of processed food in the form of manufactured biscuits which are given as additional food. Factory biscuits given for 90 days can increase body weight by 0.9 kg and UAC by 0.5 cm (29). These factory biscuits are produced and distributed at government expense to various regions in Indonesia.

This study shows that there are many additional foods in the form of processed foods that can be made by the community, especially families, so that pregnant women increase their weight and UAC. Hopefully this will be material in educating the community, especially pregnant women. Staple food for pregnant women must provide energy and nutrients in sufficient quantities and according to the needs of pregnant women and the fetus, such as protein, fat, vitamins and minerals to facilitate metabolic processes. The nutritional needs of the mother during pregnancy are higher than the nutritional needs of the mother before pregnancy, as well as when the gestational age increases, the amount of nutrients needed is also higher. Optimal nutritional intake adjusted for gestational age is needed to achieve a healthy pregnancy. During pregnancy, the mother's weight is expected to increase by 9-12 kg, because it is necessary to provide additional food besides daily food so that nutritional needs are met (44). A diet that is in accordance with the quantity and quality with the proportion according to the concept of the contents of my plate remains the main thing (45), while additional food is an additive because pregnant women need more and nutritious food. There are differences in the duration of giving each type of food, has not been discussed in depth in this study. It is assumed that the longer the supplementary food is given regularly every day according to the recommended dose, the changes in weight and UAC will increase in CED pregnant women. This needs further in-depth study with further research.

Nutritional adequacy during pregnancy can be monitored by weight gain according to gestational age. In addition, the nutritional status of pregnant women and 6 months postpartum was measured using UAC parameters. Based on the UAC measurement, there are 4 (four) classifications of the nutritional status of pregnant women, namely severe malnutrition if <19 cm, moderate malnutrition if 19-21.9 cm, mild malnutrition (22-22.9 cm), and normal nutritional status if ≥ 23 cm (44). The use of UAC as a way of determining nutritional status and detection and screening of pregnant women with CED is the most practical method in the field compared to measuring other anthropometric indicators. UAC measurement is easy to do using only the UAC tape tool, the cost of funds is not expensive and does not require intensive training in the skills to carry it out. UAC measurements are only for screening purposes, not for monitoring. Another way to determine the nutritional status of pregnant women is to calculate the Body Mass Index (BMI), which requires 2 tools, namely a scale and a height meter with calibration requirements for the scales and a hard, flat floor for measuring height. BMI cannot be used as an indicator of CED in pregnant women because of changes in body weight that occur during pregnancy, therefore, measuring UAC is useful for detecting the risk of CED in pregnant women because UAC is relatively stable (46). Taking into account the advantages and disadvantages of calculating BMI and measuring UAC in detecting nutritional status, pregnant women should be weighed and measured UAC during their pregnancy.

Based on the discussion above, almost all of them are processed supplementary feeding. Choices according to the ease of availability of food ingredients and their effect on weight gain and UAC for pregnant women. Biscuits with anchovies (can be mixed with *moringa* leaf flour) in it are the first suggestions to choose from, followed by biscuits made from a mixture of corn flour – soybeans – pumpkin – *katuk* leaves – powdered sugar – chicken eggs, then sandwich biscuits made from flour, fat non-hydrogenated vegetable, sugar, milk, eggs, nuts, dried fruit, fortified with vitamins and minerals, with or without supplementary feeding. Furthermore, biscuits are made from a mixture of soy flour – wheat – sugar – skim milk – eggs – margarine, followed by tempeh flour cookies plus papaya and passion fruit juice, buns filled with shredded mackerel, factory biscuits. All types of processed food additives have the potential to become home

industries. Health workers, along with cadres and health activist groups, can disseminate Hb-boosting foods and complementary foods for pregnant women simultaneously to the public, especially potential targets, namely pregnant women through various methods and media, including demonstrating how to make them. The increasing use of internet-based social media among the public, especially currently pregnant women who are estimated to be born in the range of 1990 to 2000 (millennials), allows the use of social media (WhatsApp – Instagram – YouTube – Tik Tok, etc.) in disseminating information as well as monitoring eating habits during pregnancy.

This research (study) has limitations, namely it has not discussed differences in the length of intervention. Further research is needed about the effective timing of each type of supplementary food to be able to weight gain and UAC to the fullest.

CONCLUSION

The practice of giving supplementary feeding to increase hemoglobin (Hb) in the form of processed and prepared food is used as a snack. Additional food according to the increase in Hb caused, sequentially are seaweed juice, cassava chips, green bean extract, kelor biscuits, *otak-otak Tempe Bilis*, and green spinach extract. Meanwhile, additional food consumed with Fe tablets is dragon fruit juice, guava juice, dates, *tempeh* milk, green bean pudding, honey, and cavendish. Additional food according to the increase in body weight and UAC for pregnant women are anchovy biscuits, anchovy biscuits mixed with *moringa* leaf flour, biscuits mixed with corn flour - soybeans - pumpkin - *katuk* leaves - powdered sugar - chicken eggs, bread/sandwich biscuits made from wheat, vegetable fat without hydrogenation, sugar, milk, eggs, nuts, dried fruit, fortified with vitamins and minerals, biscuits mixed with soy flour – wheat – sugar – skimmed milk – eggs – margarine, anchovy biscuits – *moringa* flour, dry food from flour soybeans – corn, Tempe flour cookies plus papaya and passion fruit juice, mackerel fish buns, pre-made biscuits. Health workers together with cadres/health activist groups, can disseminate types of supplementary food to the public, especially pregnant women through various methods and media including internet-based social media, as well as demonstrating how to make processed food to encourage its practice during pregnancy. All processed supplementary feeding has the potential to become home industries (micro, small and medium enterprises).

REFERENCES

1. Kementrian Kesehatan. Situasi Stunting di Indonesia. Jendela data dan Informasi Kesehatan. 2018;208(5):1–34.
2. Badan Pusat Statistik Indonesia. Catalog : 1101001. Statistik Indonesia 2020 [Internet]. 2020;1101001:790. Available from: <https://www.bps.go.id/publication/2020/04/29/e9011b3155d45d70823c141f/statistik-indonesia-2020.html>
3. Kementerian Kesehatan Republik Indonesia. Laporan Kinerja Kementerian Kesehatan Tahun 2020. 2021;1–224.
4. Utami R, Gunawan IMA, Aritonang I. Pengaruh Pemberian Makanan Tambahan (PMT) Pemulihan terhadap Status Gizi pada Ibu Hamil di Kabupaten Sleman. *Journal Nutrition*. 2018;20(1):19–26.
5. Kementerian Kesehatan Republik Indonesia. Pedoman Pemberian Tablet Tambah Darah (TTD) Bagi Ibu Hamil. 2020;24.
6. Rusdi PHN, Oenzil F, Chundrayetti E. Pengaruh Pemberian Jus Jambu Biji Merah (*Psidium Guajava*.L) Terhadap Kadar Hemoglobin dan Ferritin Serum Penderita Anemia Remaja Putri. *Jurnal Kesehat Andalas*. 2018;7(1):74.
7. Mariyona K. Pengaruh Pemberian Jus Kacang Hijau (*Phaseolus Radiatus* L) Terhadap Peningkatan Kadar Hemoglobin Serum Pada Penderita Anemia Remaja Putri. *Jurnal Menara Medika*. 2019;2(1):22–6.

8. Pastuty R, KM R, Herawati T. Efektifitas Program Pemberian Makanan Tambahan-Pemulihan Pada Ibu Hamil Kurang Energi Kronik Di Kota Palembang. *Jurnal Ilmu Kesehatan Masyarakat*. 2018;9(3):179–88.
9. Hapsari DI, Dewi RRR, Selviana. Determinan Kejadian Stunting Pada Balita Di Wilayah 3T (Tertinggal, Terdepan, dan Terluar). *Jurnal Publikasi Kesehatan Masyarakat Indonesia*. 2019;6(2):72–8.
10. Pertiwi, Martini, Handayani. Hubungan Pemberian Makanan Tambahan. *Jurnal Kebidanan*. 2020. <http://www.ejurnal.stikeseub.ac.id>.
11. Ibrahim IA, Waris M. Pengaruh Pemberian Bakpao Abon Ikan Kembung Substitusi Rumput Laut Terhadap Status Gizi Ibu Hamil KEK Di Wilayah Kerja Puskesmas Kassi Kassi Kota Makassar Tahun 2015. *Public Health Science*. 2017;9:63–71.
12. Prameswari FSP, Marliyati SA, Dewi MD. A Supplementary Protein Food for Pregnant Women with Chronic Energy Deficiency to Improve Fetal Growth. *Jurnal Gizi dan Pangan*. 2020;15(28):1–10.
13. Mawaddah S, Adawiyah R. Pengaruh Jus Rumput Laut (*Eucheuma Sp*) terhadap Peningkatan Kadar Hb Ibu Hamil Trimester I dengan Anemia Effect of Seaweed Juice (*Eucheuma Sp*) on Increased Hb Levels in First Trimester Pregnant Women with Anemia. 2021;12:352–8.
14. Arsyad nunung aryanti, Asrina A, Nurlinda A. Konsumsi Kripik Singkong Ebi Terhadap Kadar Hemoglobin Pada. *Journal Muslim Community*. [Internet]. 2020;1. Available from: <http://pasca-umi.ac.id/index.php/jmch/article/view/259>
15. Choirunissa R, Manurung DR. Pengaruh Pemberian Sari Kacang Hijau Terhadap Kadar Hemoglobin Pada Ibu Hamil Di Puskesmas Sirnajaya Kecamatan Serang Baru Bekasi Tahun 2019. *Journal Quality Women's Health*. 2020;3(2):171–6.
16. Nua EN, Adesta RO, Conterius RE. Efektifitas Pemberian Biskuit Kelor (Bi-Kelor) Terhadap Peningkatan Kadar Hemoglobin pada Ibu Hamil dengan Anemia. *Jnc*. 2020;4(2):154–65.
17. Diah D, Kristianto Y, Rullyni NT, Ridayani R, Rahmadona R. Pengaruh Otak-Otak Tempe Bilis terhadap Kadar Haemoglobin (Hb) Ibu Hamil dengan Anemia. *Jurnal Quality Kesehatan*. 2019;13(2):54–61.
18. Rohmatika D, Umarianti T. Efektifitas Pemberian Ekstrak Bayam Terhadap Peningkatan Kadar Hemoglobin Pada Ibu Hamil Dengan Anemia Ringan. *Jurnal Kebidanan*. 2018;9(02):165.
19. Aulya Y, Silawati V, Margareta E. Efektifitas Jus Buah Naga Terhadap Peningkatan Kadar Hemoglobin pada Ibu Hamil Trimester III. *Jurnal SMART Kebidanan*. 2021;8(1):54.
20. Wahyuntari E, Wahtini S. The effect of guava juice toward haemoglobin levels in pregnant women. *International Journal Research in Medical Science*. 2020;8(2):508.
21. Fauziah NA, Maulany N. Konsumsi Buah Kurma untuk Meningkatkan Kadar Hemoglobin Ibu Hamil Trimester III Dengan Gangguan Anemia. *Maj Kesehat Indones*. 2021;2(2):49–54.
22. Novianti, Asmariyah S. Pengaruh Pemberian Susu Tempe Terhadap Kadar Haemoglobin Pada Ibu Hamil Tm III Di Kota Bengkulu. *Journal Midwifery*. 2019;7(1):23–9.
23. Kurniasih D, Atrie UY, Kurniawati D. Pengaruh Puding Kacang Hijau Terhadap Kadar Hemoglobin Ibu Hamil Dengan Anemia. *Jurnal Keperawatan*. 2018;8(2):857–65.
24. Ahmady A, Pulungan ZSA, Purnomo E. Peningkatan Kadar Hemoglobin Ibu Hamil Anemia dengan Kombinasi Pemberian Tablet Fe dan Madu. *Jurnal Kesehat*. 2021;12(2):242.
25. Saridewi, Wisdyana; Oktatiranti, Prianita; Marlina D. Cavendish (Pisang Ambon) dalam meningkatkan kadar hemoglobin pada ibu hamil. 2018;3(2):71–5. Available from: <https://journal.polita.ac.id/index.php/jakiyah/article/view/26>
26. Arini A, Hutagaol IO. Biskuit Tepung Ikan Teri dan Daun Kelor terhadap peningkatan kadar HB dan berat badan ibu hamil. *JKSH: Jurnal Ilmiah Kesehatan Sandi Husada*. 2021;10:112–7.
27. Rosa Hadiana Putri , AASP Chandradewi, Reni Sofiyatin MD. Giving Biscuit Based On

Local Food To Increase Weight And Upper Arm. *Jurnal Kesehatan Prima*. 2019;13(1):32–40.

28. Siahaan G, Lestrina D, Nainggolan E. Effect of Supplemental Feeding on the Nutritional Status of Pregnant Women Treated at the Mandala Community Health Centre (Puskesmas) of Medan. *Pakistan Journal Nutrition*. 2019;18(2):159–64.
29. Pertiwi HW, Martini T, Handayani SM. Relationship Of Supplement Of Supplementary Food (PMT) With A Chan. *Jurnal Kebidanan* [http : // www . ejurnal . stikeseub . ac . id](http://www.ejurnal.stikeseub.ac.id) 2020; XII(01):111–20.
30. AASP.Chandradewi. Pengaruh Pemberian Makanan Tambahan Terhadap Peningkatan Berat Badan Ibu Hamil Kek (Kurang Energi Kronis) Di Wilayah Kerja Puskesmas Labuan Lombok. *Jurnal Kesehatan Prima*. 2015;9, No.1,(1):1391–402.
31. Andriani R, Kartasurya MI, Nugraheni SA. Pemberian Biskuit Sandwich Meningkatkan Berat Badan Ibu Hamil Berisiko Kurang Energi Kronis. *Jurnal Manajemen Kesehatan Indonesia*. 2018;6(2):132–7.
32. Callaghan-Gillespie M, Schaffner AA, Garcia P, Fry J, Eckert R, Malek S, et al. Trial of ready-to-use supplemental food and corn-soy blend in pregnant Malawian women with moderate malnutrition: A randomized controlled clinical trial. *American Journal Clinical Nutrition*. 2017;106(4):1062–9.
33. Asmirati, Mitra Asriani Amin, Andi muhammad Haerul A. Pengaruh Pemberian Pendamping Makanan Tambahan (PMT) Kepada Ibu Hamil Terhadap Kejadian Kekurangan Energi Kronik. *Jurnal Kesehatan Panrita Husada*. 2021;Vol, 6 No,(2):171–9.
34. Setiyowati N, Ulvie YNS. Pengaruh PMT Biskuit Sandwich Terhadap Ibu Hamil Kurang Energi Kronis di Puskesmas Bantarbolang Kabupaten Pemalang. *Jurnal Gizi*. 2019;8(1):1–9.
35. Surtimanah T, Sjamsuddin IN. Risk factors and interventions for anemia among Adolescent Girl. *Annal Tropical Medical and Public Health*. 2021;24(01).
36. Rahmi R. Efektifitas Konsumsi Rumput Laut Untuk Meningkatkan Kadar Haemoglobin Pada Ibu Hamil Anemia. *Jurnal Endurance*. 2018;3(1):195.
37. Santy EJ. Pemberian Buah Naga Untuk Meningkatkan Kadar Hemoglobin Dengan Metode Eksperiment (Experiment Method of Dragon Fruit Intervention in Increasing Hemoglobin Level). *Jurnal Gizi KH*, Desember. 2019;2019(1):2460–6855.
38. Ramayulis. *Green Smoothie 100 Resep 20 Khasiat*. PT Gramedia Pustaka Utama : Jakarta; 2015.
39. Dayat Suryana. *Manfaat buah*. Independent Jakarta; 2018.
40. Pátkai G. Fruit and Fruit Products as Ingredients. *Handbook of Fruits and Fruit Processing: Second Edition*. 2012. 263–275 p.
41. Maghribi AM. Kandungan Gizi Pada Udang Ebi Kering [Internet]. Bersosial.com. 2017. Available from: <https://www.bersosial.com/threads/kandungan-gizi-pada-udang-ebi-kering.42683/>
42. Astuti M, Meliala A, Dalais FS, Wahlqvist ML. Tempe, a nutritious and healthy food from Indonesia. *Asia Pacific Journal Clinical Nutrition*. 2000;9(4):322–5.
43. Puji A. 5 Manfaat Makan Ikan Teri yang Menakjubkan Bagi Kesehatan [Internet]. HelloSehat. 2021. Available from: <https://hellosehat.com/nutrisi/fakta-gizi/manfaat-ikan-teri/>
44. Fitriah AH, Supariasa IDN, Riyadi D, Bakri B. *Buku Praktis Gizi Ibu Hamil*. Media Nusa Creat. 2018;53(9):287.
45. Marbun RM. Kesehatanku Berawal dari “Isi Piringku.” Webinar Kolaborasi Prodi Gizi UPN Veteran Jakarta. 2020;1–29.
46. Putri AR, Al Muqsih AM. Hubungan Lingkar Lengan Atas Ibu Hamil dengan Berat Badan Lahir Bayi Di Rumah Sakit Umum Cut Meutia Kabupaten Aceh Utara dan Rumah Sakit Tk IV IM.07.01 Lhoksemawe Tahun 2015. *AVERROUS Jurnal Kedokteran dan Kesehatan Malikussaleh*. 2018;2(1):1.