

The Effect Of Avocado Fruit On The Nutritional Needs Of Pregnant Women Trimeter I At Pmb Tati Hidayat Jati Rahayu Bekasi In 2022

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Abstract.

Pregnant women most commonly experience anemia during the first trimester of pregnancy as a result of poor diet, which causes nausea and a lack of appetite. Chronic energy deficiency (CED) in pregnant women is caused by a long-lasting lack of energy intake in the mother, causing health problems. Pregnant women's nutritional intake has a significant impact on fetal growth during pregnancy, the incidence of low birth weight during delivery, and the baby's growth and development. Avocado (*Persea americana*) is a fruit that is very well known and popular with the public. Apart from having a delicious taste and soft texture, avocados also have several health benefits. The main components of avocados are carotenoids, fatty acids, minerals, phenolics, phytosterols, proteins, and many vitamins. Avocado is a fruit that is rich in vitamin A. Vitamin A has a role in erythropoiesis related to its function of synthesizing protein so that it will affect the growth of bone cells. Bone marrow is the site of the formation of erythrocytes. Vitamin A is needed in several essential processes in the body, such as metabolism, hematopoiesis, and erythropoiesis; it also regulates cell differentiation and plays a role in the immune system. The approach used in this research is experimental research. Experimental research is research that is carried out by manipulating, and it aims to determine the effect of manipulation on the observed individual's behavior. Manipulation carried out can be in the form of certain situations or actions given to individuals or groups, and after that, the effect can be seen. This experiment was conducted to determine the effects of a treatment given intentionally by the researcher. Giving this treatment is a peculiarity of experimental research compared to other studies. The results showed that there was a significant relationship between giving avocado fruit and improving the nutrition of first-trimester pregnant women, as indicated by the p value of 0.000. This is supported by research data showing that giving avocado fruit increases nutrition more, namely by as much as 70%, while not regularly consuming a lot of avocado fruit does not increase nutrition by 30%.

Keywords: Avocado fruit, Nutrition and pregnant women.

I. INTRODUCTION

The adequacy of nutrient intake for pregnant women has an effect on the growth and development of the fetus they contain, some mothers do not know the content of good nutrients to be consumed during pregnancy, not many mothers consume poor food or foods that only mothers like which results in growth disorders and stunted development for mothers and fetuses which include chronic energy deficiency (SEZ), anemia and low birth weight (BBLR) (Azizah & Adriani, 2017). WHO reports that half of pregnant women have anemia which globally has reported as much as 55%, where it can be said that pregnant women in the first trimester are most at high risk of developing anemia. This is the lack of iron deficiency with the deficiency of other substances (Muchtar & Anggraeni, 2021). Meanwhile, based on data from the Ministry of Health of the Republic of Indonesia in 2013, around 146,000 babies aged 0-1 years and 86,000 newborns (0-28 days) die every year in Indonesia. The infant mortality rate is 32 per 1000 Live Births. 54% of the background causes of infant mortality are nutrition (Ministry of Health RI, 2013). Pregnant women with anemia will experience disorders such as dizziness, weakness, fatigue, lethargy, and can even lead to death. This will increase if pregnant women have to take Fe tablets every day because there are side effects from giving Fe tablets such as nausea and vomiting, stomach cramps, heartburn and constipation. In addition, many factors influence the incidence of anemia such as the age of pregnant women, parity, nutritional status, education, employment, and economic status. It also causes the incidence of pregnancy anemia to be still high (Bawazir, 2019). Avocado (*Persea americana*) is a fruit that is well known and loved by the public. In addition to having a good taste and soft texture, Avocado also has several health benefits.

The main content in the fruits of avocado is carotenoids, fatty acids, minerals, phenolic, phytosterols, proteins and many vitamins. Avocado is a fruit rich in vitamin A. Vitamin A has a role in erythropoiesis related to its function of synthesizing proteins so that it will affect the growth of bone cells. The bone marrow is the place of formation of erythrocytes (Bawazir, 2019). Vitamin A is needed in several essential processes in

the body such as metabolism, hematopoiesis, erythropoiesis, cell differentiation regulation, and plays a role in the immune system (Aldi Patria, 2013). One of the other functions of vitamin A is to play a role in the formation of red blood cells through their interaction with the mineral Fe so as to prevent anemia. 6 Another vitamin contained in the avocado fruit is vitamin C. The role of vitamin C in the formation of erythrocytes is related to the function of vitamin C which accelerates the absorption of the mineral Fe from the mucosa of the small intestine and transfers it into the bloodstream towards the bone marrow which is further used to form hemoglobin. Vitamin C plays a role in reducing ferric ions to ferrous ions in the small intestine (duodenum) so that they can be more easily absorbed. Absorption mainly occurs in the upper part of the small intestine with the help of special protein transporters, namely transferrin and ferritin. The mineral Fe in ferritin form will settle at pH 7 inside the small intestine, except in the form of ferric ions such as ferric ions. (Ulfiana et al, 2019). In the Jati Rahayu Bekasi area, there are still many trimester I pregnant women who suffer from anemia in PMB Tati Hidayati, almost 30% of their patients suffer from anemia in 2019 and increase to 45% in 2021.

II. METHODS

The approach used in this study is experimental research. Experimental research is a study carried out by conducting manipulations that aim to determine the consequences of manipulation on the behavior of the observed individual. The manipulations carried out can be certain situations or actions that are given to individuals or groups and after that can be seen their influence. This experiment was carried out to determine the effect caused by a treatment given intentionally by the researcher. The provision of this treatment is a peculiarity of experimental research compared to other studies (Litupun, 2004). The reason why researchers choose experimental methods is because this method is considered the most suitable for researching problems from this study. The population in this study was all first trimester pregnant women who checked their pregnancies at PMB Tati Hidayat as many as 65 pregnant women. The sample in this study was 30 people who were taken randomly, using a sampling technique. To prove the hypothesis in this study, statistical tests were carried out using the SPSS program version 26.0 analysis in this study using 2 types of analysis, namely univariate analysis and bivariate analysis.

III. THEORETICAL BASIS

3.1 Nutrition

Nutrients are important substances derived from food that has been digested and processed by our body into substances that are useful for forming and maintaining body tissues, obtaining energy, regulating the physiological system of organs in the body and protecting the body against disease attacks (Makanlehi, 2009). According to Susianto, et al (2008) nutrition is a number of nutrients needed by the body so that its organs can function properly. Meanwhile, according to Soenardi (2006) nutrition means something that affects the process of changing all types of food that enter the body that can maintain life.

3.1.1 Kinds of Nutrition

The nutrients that the body needs in general can be grouped into five, namely carbohydrates, proteins, fats, vitamins, and minerals (Desthi, 2019). There are several nutrients that play an important role in the growth process, namely:

a. Karbohidrat

The main function of carbohydrates is as a provider of the main source of energy for the body in the form of energy. 1 gram of carbohydrates provides the body with 4 kilocalories (Cal). Carbohydrates in the form of glucose are the only source of energy for the brain and nervous system. Carbohydrates are stored as energy reserves in the body in the form of glycogen stored in the liver and muscles (Dewi 2018) Carbohydrates are divided into two forms, namely simple carbohydrates and complex carbohydrates. Simple carbohydrates such as fructose, glucose, and lactose, can be found in fruits, sugars and milk. While complex carbohydrates can be found in fibrous vegetables, wheat, rice, cereals, oats and so on (Apriyani, 2020).

b. Protein

Proteins are the main component of protoplasm in the cell, Besides being a source of energy, it also plays an important role in the growth process. Proteins play a role in tissue maintenance, changes in body composition, as well as tissue regeneration processes. The protein component in the body increases from 14.6% in the period of growth to 18-19% when 4 years old. The estimated protein needs during the growth period are around 1-4g/kg BB (Dewi, 2021). Everyone's protein needs are different, depending on one's gender, lifestyle, and activities as presented in the following table:

c. Fats

Fat contributes 40-50% of the energy consumed by the baby. Fats provide about 60% of the energy that the body needs during rest. Although excess carbohydrates and proteins can be converted in the form of fats, fats cannot be changed in the form of carbohydrates and proteins. Fat as the main component forming cell membranes. Fats also aid in the absorption and storage of fat-soluble vitamins, such as vitamins A, D, E and K. Essential fatty acids, such as omega 3 and omega 6 fatty acids are essential nutrients needed in brain growth. However, these fatty acids are obtained from the outside, not synthesized on their own by the body (Boyle & Roth, 2010)

e. Calcium

Calcium serves for bone growth and mineralization. More than 98% of the body's calcium is in bone and another 1% is in body fluids and muscles. As much as 30-60% of calcium intake is absorbed by the body. In addition, calcium also helps keep the heart rate regular and sends nerve impulses. Calcium is also used in the formation of RNA and DNA proteins to aid neuromuscular activity. Calcium deficiency can result in insomnia, muscle cramps, nervousness, numbness, cognitive impairment, depression and hyperactivity (Boyle & Roth, 2010).

d. Zat Besi

Iron is the basic ingredient in the formation of hemoglobin and also plays a role in the transport of oxygen and food juices to all cells in the body. It is important for growth, immune system and energy production. Iron deficiency can be caused by excessive activity, lack of intake, poor digestion, or excessive consumption of tea and coffee. Signs of iron deficiency, such as dizziness, fatigue, nervousness, and mental reactions slow down (Boyle & Roth, 2010).

3.2 Nutrition for Pregnant Women

Food substance that serves as a source of energy, growth, a source of development substances as well as a defense and repair of body tissues. Nutrients consist of carbohydrates, proteins, fats, vitamins and minerals needed for a healthy life. Nutritional status is a reflection of the measure of the fulfillment of nutritional needs (Almatsier, 2016).

3.2.1 Nutritional Benefits during Pregnancy

The adequacy of nutrition of the mother during pregnancy is closely related to the state of the baby being born. The most critical period of pregnancy is the third trimester, which is when the fetus reaches six months of age, the fetus will grow very fast. This can be seen from the rapid weight gain of mothers when entering the second trimester of pregnancy. In addition, the growth of the fetal brain during pregnancy is also greatly influenced by the state of nutrition of the mother. The growth of brain cells begins from twenty weeks or five months of age, in the event of malnutrition in the mother, then the number of brain cells formed also cannot reach the amount it should be. Impaired brain cell growth due to malnutrition will cause impaired mental growth in childhood such as, children's social abilities are reduced, children's verbal abilities are not so good, children are also less able to adjust to the environment. This can affect the intelligence of the child's Quotient I.Q. So that it can cause low concentration or concentration of thoughts (Moehji, 2013).

3.2.2 Nutritional Needs of Pregnant Women

When pregnant a woman requires a lot of nutritional intake. Considering that in addition to the nutritional needs of the body, pregnant women must provide adequate nutrition for the fetus. Therefore, pregnant women need a higher Nutritional Adequacy Rate (AKG) than women who are not pregnant. Malnutrition during pregnancy can cause nutritional anemia, babies born with low body weight can even cause birth de-

fects (Waryana, 2016). Pregnant women must get adequate nutrition in both the amount and arrangement of the menu and get access to health education about nutrition. Malnutrition of pregnancy will cause blood volume to be reduced, blood flow to the uterus and placenta to decrease and the transfer of nutrients through the placenta is reduced so that the fetus's growth of the fetus becomes impaired (Putri, 2012). The factors considered in increasing nutritional needs in pregnant women are (Aritonang, 2010):

- a. Poor nutritional status of the mother
- b. Very young age of the mother
- c. Multiple pregnancies
- d. Tight pregnancy distance
- e. High level of physical activity
- f. Certain diseases that cause malabsorbtion
- g. Cigarette and alcohol consumption
- h. Consumption of legal drugs (antibiotics and phenytoin) as well as illegal drugs (drugs).

Along with the increase in the gestational age of a mother, there is an increase in the need for energy, protein, and other nutrients. If adult women who are not pregnant need energy around 2,500 kcal / day, then in pregnant women in the I trimester need additional energy of about 180 kcal / day. In pregnant women in the II and III trimesters, additional energy is about 300 kcal / day. The added energy comes from macro substances, namely carbohydrates, proteins, and fats (Safrianti & Tuti, 2017).

3.2.3 Impact of Malnutrition on Pregnant Women

Malnutrition in pregnant women can have a bad impact, including that it can cause micronutrient deficiencies such as anemia which can be fatal in pregnant women and newborns, lack of zinc (zinc) mineral intake in pregnancy, for example, can result in significant disruption of bone growth. The administration of folic acid is not only useful for development. Cases of impaired closure of spinal nerve tissue (spina bifida) and conditions in which the fetal brain cannot form normally (anencephaly). The fetus has folic acid deficiency, the main tissue cells (stem cells) will tends to divide more slowly than in the fetus conceived pregnant women with sufficient folic acid intake. So that the stem cells needed to form brain tissue are also reduced. In addition, the dead cells will also increase, much larger than they should be. Then low weight gain during pregnancy and cause vomiting nausea (hyperemesis gravidarum) (Wiku & Tohar, 2005).

3.3 Avocado Fruit

3.3.1 Benefits of Avocado Fruit

Avocado is a very nutritious fruit, contains 3-30 percent oil with the same composition as olive oil and contains a lot of B vitamins. With this large nutritional content, avocados can be used for various needs, including monosaturated (unsaturated) fats contained in avocados containing aleic acid which is proven to increase healthy fat levels in the body, and control diabetes. By using avocados as a source of fat, diabetics can lower triglycerides levels by up to 20%. Avocados also contain a lot of fiber which is very beneficial for preventing high blood pressure, heart disease, and some types of cancer. Avocado fruits can be used to lower the level of triglycerides in the blood. Other benefits of avocado fruit are that it can prevent hardening of the arteries, improve blood circulation and urinary tract, lower LDL cholesterol levels, antibiotics, antifertility, prevent nausea in early pregnancy, help the development of the brain and spine of the fetus, stimulate the formation of collagen tissue, maintain skin health, discolor hair, as a face conditioner (mask) and for cosmetic basic ingredients (Ashari, 2006).

3.3.2 Nutritional Content in Avocado Fruit

Avocado Fruit, contains many compounds that are important for the human body including:

Table 3.1. Chemical composition of avocado fruits in 100 grams of pulp

Component	Kadar
Buh Energy (cal)	85--233
Water (%)	87,49 – 84,30
Fat (gr)	6,5 – 25,18

Protein (%)	0,27 – 1,7
Carbohydrates (gr)	5,56 -8
Ash (gr)	0,70 – 1,4
Vitamin A (mg)	0,13 – 0,15
Vitamin B1 (mg)	0,025 – 0,12
Vitamin B2 (mg)	0,13 – 0,23
Vitamin B3 (mg)	0,79 – 2,16
Vitamin B6 (mg)	0,45
Vitamin C (mg)	2,3 – 7
Vitamin D (mg)	0,01
Vitamin E (mg)	3
Vitamin K (mg)	0,008
Ca (mg)	10
Fe (mg)	0,9
P (mg)	20

Source : Bagakali (1997)

3.3.3 Benefits of Avocado Fruit for Pregnant Women and Fetuses

Avocado fruit is like butter, which is the fruit that is known to have the highest fat content. However, the fat in avocado is a type of fat that is indispensable to support health. Avocado fruit is a balanced source of nutrition for all stages of life, especially in this case it starts from the moment it is still in the womb. There are no compounds in the avocado fruit that are known or suspected to cause pregnancy complications. And there is no particular reason to avoid avocado fruits during pregnancy. Here are the special benefits for pregnant women and fetuses contained in avocado fruits:

a. Avocado Fruit Rich in Folic acid

According to Joseph Hersh, MD one of the pediatricians at the University of Louisville School of Medicine, Kentucky, United States states that folic acid is very important in the first trimester of pregnancy to build the baby's nervous system including brain and spinal cord development so that it can reduce the risk of birth defects for the baby. Folic acid is also useful for preventing depression, lethargy, difficulty sleeping (insomnia), lack of blood (anemia), preeclampsia and mood swings that often occur in pregnant women.

b. Good calcium content for mother and fetus

Calcium is great for bone formation and bone health. For mothers, calcium helps to maintain bone health during the weight of the womb, while for the fetus calcium is very important for bone formation.

c. Avocado Fruit Contains Very Complete Vitamins

The benefits of avocado for pregnant women are the content of a lot of vitamins. If pregnant women often experience Morning Sickness, it can be overcome using avocado. Morning sickness is a condition of nausea that is usually accompanied by vomiting. Morning sickness usually occurs in the first trimester / early pregnancy.

d. Preventing Anemia During Pregnancy

Anemia is one of the obstacles that occurs during pregnancy. An easy way to overcome and prevent anemia is to consume foods that contain iron, for example avocados. Avocado fruit is famous for having iron content that can prevent anemia during pregnancy.

e. Improves Digestion

Pregnant women often experience constipation or other stomach problems due to lack of fiber. The fiber content in avocados is very sufficient to overcome these problems and improve the digestive process in the intestines.

f. Avocado Fruit Is Rich in Minerals

Avocado fruit is known by medical circles to contain phosphorus, magnesium and niacin are minerals that function to maintain the health of the mother and the fetus they contain.

g. Plays a Role in Infant Brain Development

The benefits of avocado fruit for pregnant women that mean a lot to the fetus are to form brain nerve tissue. Avocados are known to help in terms of neurodevelopment for the fetal brain.

h. Balanced Cholesterol and Sugar Levels

This fruit has a balanced content and helps lower cholesterol with not too high sugar levels.

i. Treating Leg Cramps During Pregnancy

Avocado Fruit contains potassium which is a substance that can help pregnant women to treat leg cramps.

j. A Balanced Source of Fat that is Good for the Body

When pregnant, pregnant women also need to maintain their weight condition. Do not allow the body to become thin and malnourished at the time of pregnancy. Avocado fruit is also known as an excellent source of monounsaturated fats for health. The main function of saturated fat is to build membrane cells to be required by the fetus.

IV. RESULTS AND DISCUSSION**4.1 Results****4.1.1 Univariate Analysis****Table 4.1.** Distribusi Frekuensi Pemberian Avocado Fruit

Variable	Frequency	Percentage (%)
Avocado Feeding Fruit		
Routine	21	70
Not Routine	9	30
Total	30	100

Based on table 4.1, it is known that the majority of avocado fruit is given regularly as many as 21 people (70%) while 9 people (30%) do not regularly consume avocado fruit.

Table 4.2. Weight Frequency Distribution

Variable	Frequency	Percentage (%)
Weight		
Climb	19	63.3
Reduced	11	36.7
Total	30	100

Based on table 4.2, it is known that the majority of weight gained as many as 19 people (63.3%) while 11 people (36.7%) lost weight.

Table 4.3. Frequency Distribution of Respondents' Blood Pressure

Variable	Frequency	Percentage (%)
Blood pressure		
110/70 – 120/80	27	90.0
<110/70	3	10.0
Total	30	100

Based on table 4.3, it can be seen that the majority of respondents' blood pressure <110/70 is 27 people (90%), and the minority of respondents' blood pressure < 110/70 is 3 people (10.0%)

Table 4.4. Frequency Distribution of Respondents' Hemoglobin

Variable	Frequency	Percentage (%)
Hemoglobin		
>11,6	8	26.6
<11,6	12	73.4
Total	30	100

Based on table 4.4, it can be seen that the majority of respondents' blood pressure < 11.6 is 12 people (73.4%), and the minority of respondents' blood pressure > 11.6 is 8 people (26.6%)

Table 4.5. Frequency Distribution of Respondents' Nutritional Needs

Variable	Frequency	Percentage (%)
Nutritional Needs		
Good	7	23.3
Less	23	76.7
Total	30	100

Based on table 4.5, the majority of respondents' nutritional needs were less with 23 people (76.7%) and the minority of respondents' nutritional needs were 7 people (23.3%).

4.1.2 Bivariate Analysis

Table 4.6. Relationships Between Giving Avocado Fruit with the Nutritional Needs of Respondents at PMB Tati Hartati Bekasi

Gift Avocado Fruit	Nutritional Needs				Sum		P Value
	Add		Reduced		F	%	
	F	%	F	%	F	%	
Routine	21	70	0	0	21	70.0	0.000
Not Routine	0	0	9	30	9	30.0	
Total	21	70.0	9	30.0	30	100.0	

Based on table 5.6 of the results of the relationship analysis of avocado fruit administration regularly, it was found that 21 people (70%) mothers whose nutrition increased. Meanwhile, 9 people (30%) mothers whose nutrition is reduced due to not regularly consuming avocado fruit. The results of the Chi Square test by looking at continuity correction obtained a P value of 0.000 (<0.05), so it can be concluded that there is a significant relationship between the implementation of avocado fruit administration and the improvement of nutrition at PMB Tati Hidayati Bekasi in 2022 which means that avocado fruit administration is effective in improving nutrition.

4.2 Discussion

This study aims to identify the effect of avocado fruit administration on improving the nutrition of trimester I pregnant women at PMB Tati Hidayati Bekasi. In this chapter will discuss the results of the study. The interpretation of the research results that have been obtained will be compared with the theory or related research results. The results showed that there was a significant relationship between avocado fruit administration and improved nutrition of pregnant women trimester I which was shown with a p value of 0.000. This is supported by research data where giving avocado fruit increases nutrition more, namely as much as 70% while not regularly consuming avocado fruit a lot there is no increase in nutrition as much as 30%. The results of this study were reinforced by Bawazir (2018) that there was a positive influence of avocado juice administration for 14 days on the increase in Hb levels and the average erythrocyte count, but there was no difference between the intervention group and the control group.

Winarno (2018) also reinforced that there was a significant difference between blood glucose levels before and after the intervention. For the average dragon fruit juice kelomok is 24.19 mmHg, while avocado juice is 8.81 mmHg. Utami's research results (2019) stated that pregnant women who have below-normal Hb levels can be given Fe tablets only or can be combined with consuming avocado juice. According to the researchers' assumptions, based on the theory, it is correct that the nutritional adequacy aspects of pregnant women can be improved by consuming avocado fruit. Because Avocado fruit contains many nutrients needed by pregnant women.

V. CONCLUSION

Based on the results of research and discussion in the previous chapter, it can be concluded several things as follows:

- a. The results showed that there was a significant relationship between avocado fruit administration and improved nutrition of pregnant women trimester I which was shown with a p value of 0.000. This is supported by research data where giving avocado fruit increases nutrition more, namely as much as 70% while not regularly consuming avocado fruit a lot there is no increase in nutrition as much as 30%.
- b. According to the researchers' assumptions, based on the theory, it is correct that the nutritional adequacy aspects of pregnant women can be improved by consuming avocado fruit. Because Avocado fruit contains many nutrients needed by pregnant women.

REFERENCES

- [1] Aldi Patria, D., Praseno, K., & Tana, S. (2013). hemoglobin level and number of quail erythrocytes (*Coturnix coturnix japonica* linn.) after administration of a combination solution of microminerals (CU, FE, ZN, CO) and vitamins (A, B1, B12, C) in drinking water. *ANATOMY OF PHYSIOLOGY*, 21(1), 26-35.
- [2] Andonotopo, Wiku & M. Thohar (2005). Malnutrition in Pregnant Women: Threats to the Fetus. (*University of Zagreb & Hiroshima Journal of Medical School Innovation*, University Hospital, Hiroshima.
- [3] APRIYANI, E. (2020). Overview of Nutritional Knowledge for People with Diabetes Mellitus, *Husada Health Journal* Vol 2 No. 1
- [4] Azizah, A., & Adriani, M. (2017). The level of adequacy of protein energy in pregnant women in the first trimester and the incidence of chronic energy deficiency. *Media Gizi Indonesia*, 12(1), 21-26.
- [5] Azwar, Shaifudin. 2000. Human Attitudes Theory and Its Measurements. Yogyakarta: Student Library
- [6] Bawazir, F. (2019). Effect of Avocado Juice (*Persea Americana* [Mill]) on Increasing Hemoglobin Levels of Pregnant Women Tm Ii at the Sindang Health Center, Indramayu Regency. *Indra Husada Health Journal*, 7(2), 93-99.
- [7] Ministry of Health. (2013). Basic Health Research. Health Research and Development Agency, Ministry of Health of the Republic of Indonesia.
- [8] Desthi, D. I., Idi, S., & Rini, W. A. (2019). The Relationship Between Food Intake And Physical Activity With The Nutritional Status Of The Core Platoon Of SMP N 5 Yogyakarta (Doctoral dissertation, Poltekkes Kemenkes Yogyakarta).
- [9] DewiI, P. Y. K. (2018). Overview of Nursing Care in Thalassemia Children With Nutritional Deficits in the Aftercare Room of Sanglah Hospital in 2018 (Doctoral dissertation, Department of Nursing 2018).
- [10] Herawati, C. and Astuti, S. (2010) 'Factors Related to Nutritional Anemia in Pregnant Women at the Jalaksana Kuningan Health Center in 2010', *Kartika Health Journal*
- [11] Jaedun, A. (2011). Experimental research methodology. Faculty of Engineering UNY, 12.
- [12] Kusumah, U. W. (2009) 'Haemoglobin levels of pregnant women in the II-III trimester and factors affecting it at RSUP H. Adam Malik Medan in 2009', University of North Sumatra
- [13] Kusumastuti, A., Khoiron, A. M., & Achmadi, T.A. (2020). Quantitative Research Methods. Deepublish vol 3 no. 1
- [14] Latipun. 2004. Psychology of Experiments. Malang: UMM Pres
- [15] Lestari, D., Sulistiawati, F., & Naelasari, D. N. (2021). Socialization of Clean and Healthy Living Behavior and Balanced Nutrition in Pregnant Women to Increase Immunity During the Covid-19 Pandemic. Abdinesia: *Journal of Community Service*, 1(1),
- [16] Makanlehi, M. S. T., & Redjeki, G. S. (2018). Factors related to the nutritional status of toddlers in Alor Regency. *Carolus Journal of Nursing*, 1(1),

- [17] Muchtar, F., & Anggraeni, N. L. A. (2021). Knowledge, Attitudes and Adherence to Taking Blood Added Tablets (TTD) in Pregnant Women During the Covid-19 Pandemic. *Nursing Care and Health Technology Journal (NCHAT)*, 1(3),
- [18] Prawita, A., Susanti, A. I. and Sari, P. (2018) 'Intervention Survey of Chronic Under-Energy Pregnant Women (SEZ) in Jatinangor District in 2015', *Journal of Health Systems*. doi: 10.24198/jsk.v2i4.12492
- [19] Rahayu, D., Ummah, F. and Juanita, F. (2010) 'The Relationship between Pregnant Women's Diet and the Incidence of Constipation in BPS Aida Hartatik Ndalunggu Village, Deket District, Lamongan Regency', *Surya Husada*, vol 1 no.1
- [20] Grace, P. S. (2021). The development of learners. Bumi Aksara, Yogyakarta
- [21] Resti Pratiwi, E. (2021). Nursing Care In The Elderly With Nutritional Deficit Nursing Problems (Doctoral dissertation, University of Muhammadiyah Ponorogo).
- [22] Rukmana, S. C. and Kartasurya, M. I. (2014) 'The Relationship between Nutritional Intake and Nutritional Status of Third Trimester Pregnant Women with Baby's Birth Weight in the Working Area of Puskesmas Suruh Semarang Regency', *Journal of Nutrition College* vol. 5 no.2
- [23] Seniati, et al. 2005. Psychology of Experiments. Jakarta: Index Publish vol. 2 no.2
- [24] Tambunan V. (2004). Energy, protein, fat and fiber adequacy figuresfood. Proceedings of the National Widyakarya of Food and Nutrition VIII. Jakarta May 17-19, 2004. Jakarta: LIPI.
- [25] Ulfiana, E., Yuliandani, F. A., Dewi, R. K., & Ratri, W. K. (2019). Effect of Purple Sweet Potato Administration on Increased Haemoglobin Levels in III Trimester Pregnant Women. *Journal of Midwifery*, Vol. 9 no.1,
- [26] Yuliandani, F. A. et al. (2017) 'Strategies in preventing anemia in pregnancy', *Widya Scientific Journal*. doi: ISSN 2337-6686.