

# KNOWLEDGE, SUBJECTIVE NORM, ATTITUDE, PERCEIVED BEHAVIOR CONTROL, INTENTIONS ABOUT HEMOGLOBIN IN PANDEMIC PREGNANT WOMEN

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**ABSTRACT**

Anaemia will increase the risk of miscarriage, giving birth to babies with low birth weight, being born prematurely, and the risk of bleeding before and or during delivery which can cause the death of the mother and baby. According to the Indonesian Ministry of Health, in 2021, Banten Province will be part of the six provinces contributing 50% of maternal mortality cases. This study aimed to analyze the effect of anaemia and nutrition education on haemoglobin levels in anaemic pregnant women in primary care during the COVID-19 pandemic. This study uses a quasi-experimental design with a nonequivalent control group design. A sample of 40 pregnant women with anaemia in the second trimester in Primary Services in Tangerang City, Banten Province. Consisting of 20 pregnant women in the experimental group and 20 people in the control group. Anaemia and nutrition education is given to pregnant women individually at the first visit for ANC and follow-up education via WA/SMS every week for four weeks during ANC visits; primary data is collected using a semi-structured questionnaire for interviews, and haemoglobin levels are also checked. At the start of the ANC visit and four weeks later. Data were collected after four weeks for anaemia and nutrition education intervention, and data were analyzed using the T-test, Wilcoxon test, and Mann-Whitney test. Active collaboration support between medical personnel and pregnant women through online media Whatsapp/SMS reminders. Effect of anaemia and nutrition education on haemoglobin levels in anaemic pregnant women in primary care during the Covid-19 period.

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**Introduction**

Anaemia in Pregnancy is a common occurrence that is widely found in low- and middle-income countries.<sup>1</sup> Anemia in Pregnancy is a global problem because it reflects

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the value of people's socioeconomic well-being and enormously influences human quality. In pregnant women, anaemia will increase the risk of miscarriage, giving birth to babies with low birth weight, untimely birth, and the risk of bleeding before and or at the time of delivery that can lead to the death of the mother and her baby.

The prevalence of anaemia is estimated at 9% in developed countries, while in developing countries, the prevalence in pregnant women is 42%. In non-pregnant women aged 15 – 49 years, the prevalence of Anemia is 30%. WHO targets a 50% reduction in the prevalence of Anemia in WUS by 2025.

According to Suryani L, Health Office of Serang City, the cessation of posyandu activities during the pandemic has made it difficult to monitor the development of pregnant women. In the covid-19 pandemic situation, many patients choose to give birth in Taraji or birth attendants because they assess that if they give birth in a hospital or health centre, they are worried about contracting covid-19, even though health protocol preparations have been made. Special medical personnel have been prepared to handle pregnant women and parturients. According to Minister J.G Plate, in a virtual discussion in August 2021, the pandemic made massive changes on all fronts, encouraging all activities and interactions to switch to digital. The pandemic accelerated digital transformation, resulting in people in the world, including in Indonesia, where ordinary people and business units migrated from physical to digital activities.

According to Datareportal, it is specified that the number of internet users in Indonesia in 2022 has reached 204.7 million people. The internet penetration rate in Indonesia reached 73.7% of the total population in early 2022. According to Datareportal, the number of mobile phones connected in Indonesia reached 370.1 million cellular connections in early 2022 in Indonesia. This number is more than the total population in Indonesia as of January 2022 of 277.7 million. Of the population in Indonesia in 2022, 49.7% are women and 50.3% are men and the median age of the largest population in Indonesia is at the age of 30.3 years, whereas at the age 25-35 years, the total population is 14.9%

In 2020, the risk of pregnant women with Anemia showed that the LBW rate is 11.37%, not much different from the LBW rate in 2019. The percentage of children born last alive with a weight of less than 2.5 kg in rural areas is greater (13.24%) than in urban areas (9.85%) based on data from the last two years.

Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 88 of 2014, to protect Women of Reproductive Age (WUS) and pregnant women from malnutrition and prevent Fe deficiency anaemia, they need to consume iron tablets regularly. Quite a long time since 1970, but in pregnant women, the prevalence rate of Anemia is still increasing, and the prevalence is getting higher so that it contributes to obstetric complications.

According to the Banten Province Health Profile in 2019, the percentage of pregnant women who received blood supplement tablets in Banten Province in 2019 was recorded at 88.8% of the total number of 264,191 pregnant women. From the Maternal Mortality Rate in Banten Province, it was reported that 88.1% of cases per 100,000 live

births. The situation proves that changes in health behaviour are under the determinants of behaviour in Blum's Theory and Theory of Planned Behavior. Still, according to WHO, 1980, health education cannot achieve its recommendations. If it focuses on efforts to change behaviour only, but must include efforts to change the physical, social, cultural, political, economic and other environments as a support for this behaviour (Taghipour et al., 2019).

The results of research conducted by (Sukmawati et al., 2019) at the Haurpanggung Health Center from July to September 2018 on 37 pregnant women showed that there was an effect of education on the prevention and treatment of Anemia in pregnant women. It is hoped that health workers can intensively educate pregnant women to prevent and treat Anemia in pregnant women (Cole-Lewis & Kershaw, 2010). Nutrition education refers to actions and efforts to change people's thoughts and attitudes per these educational goals. Knowledge of proper nutrition and a balanced diet during Pregnancy is considered important for the well-being of the mother and fetus. 8 The results of a study conducted by (Hedianti et al., 2015), used a quasi-experimental method with a one-group pretest-posttest design on 60 third-trimester pregnant women in the Bone District. Bawang Barat and Tulang Bawang Tengah from July to August 2019 showed that experiments in the form of education and assistance regarding balanced nutrition increased the knowledge and attitudes of pregnant women regarding balanced nutrition in Trimester III in the West Tulang Bawang district and Central Tulang Bawang province of Lampung.

The results of a study conducted by (Khani Jeihooni, Jormand, et al., 2021), using a quasi-experimental design method on 150 pregnant women in 2021 in Shiraz, Iran, showed a positive effect of the TPB model-based nutrition education intervention program on increasing behaviour to prevent iron deficiency anaemia in pregnant women. By (Ahmad et al., 2022), using a randomized cluster control study method, research conducted from October 2020 to March 2021 at the Darul Imarah Health Center in Aceh Besar District during the covid 19 pandemic showed that a structured education program for mothers during Pregnancy could improve the application of nutrition practices and health to prevent Anemia and KEK during Pregnancy. 11 Based on this background, the authors are interested in knowing how anaemia and nutrition education influence knowledge, subjective norms, attitudes, perceived behaviour control and intentions on haemoglobin levels in anaemic pregnant women in primary care during the Covid-19 pandemic (Khani Jeihooni, Rakhshani, et al., 2021).

## **Method**

This research was conducted to determine the effect of education on Anemia and nutrition on knowledge, subjective norms, attitudes, perceived behaviour control and intentions on haemoglobin levels in anaemic pregnant women in primary care during the Covid-19 pandemic at the Primary Multi Medika clinic, Tangerang City in 2022. This research was carried out from February to April 2022. This research was conducted using a Quasi-Experimental Design method. It used variables consisting of the Independent

Variables, namely education on Anemia and nutrition, and the dependent variable, namely haemoglobin levels in pregnant women. Using primary data, the samples taken were pregnant women with a gestational age of 13-32 weeks in the Multi Medika Clinic area of Tangerang City.

### Results and Discussion

The haemoglobin level measures the respiratory pigment in red blood cells. The normal amount of haemoglobin in the Blood is approximately 15 grams for every 100 ml of Blood, and this amount is usually called "100 per cent". Based on gender and age, which has determined the limits of normal haemoglobin levels as in the following table:

**Table 1. Limits of Hemoglobin Levels**

Age Group	Hemoglobin Level Limit(gr/dl)	Limits of Hemoglobin Levels (gr/dl)
Child 6 months – 6 years	11.0	11,0
Children 6 years – 14 years	12.0	12,0
Adult Male	13.0	13,0
Pregnant Women	11.0	11,0
Women giving birth/Not Pregnant	13.5	13,5
Mature Female	12.0	12,0

And pregnant women are divided into three criteria: Normal > 11 gr/dl, Mild Anemia 8-11 gr/dl, and Severe Anemia < 8 gr/dl. According to the World Health Organization (WHO), these general limits are the criteria for seeing how many degrees of Anemia occur in pregnant women. Pregnancy haemoglobin levels are checked at least two times during Pregnancy, namely in the first trimester (1-11 weeks) and third trimester (29-40 weeks) (Ridwan et al., 2018).

Anaemia is defined as a decrease in the number of red blood cells or the amount of haemoglobin (an oxygen-carrying protein) in red blood cells below normal (Darmawati et al., 2020). Red blood cells contain Hemoglobin which transports oxygen from the lungs and delivers it to all body parts.

**Table 2. Criteria for Anemia according to WHO (2017)**

Kelompok	Anemia Criteria (Hb)
Adult Male	< 13 g/dl
Non-Pregnant Adult Women	< 12 g/dl
Pregnant Women	< 11 g/dl

Source : Widiastuti W, 2017

#### A. Patofisiologi Anemia Pada Kehamilan

Women will lose iron by 30 to 40 mgr due to menstruation. Besides that, during Pregnancy, mothers need additional iron to increase the number of red blood cells and form red blood cells in the fetus and placenta (Arisman, 2004). The more frequently a woman experiences Pregnancy and childbirth, the more she loses iron and the more feeble. 7 Daily iron intake is needed to replace iron lost through faeces, urine and skin. Loss of iron base in women 0.8 mg/day, the need for iron during pregnancy increases. This increase is intended to supply the needs of the growing fetus (fetal growth requires a lot of iron), growth of the placenta and increase in maternal blood volume: the amount is about 1000 mg during Pregnancy. The need for iron during the first trimester is relatively small, namely, 0.8 mg a day, which then increases sharply during the second and third trimesters, namely 6.3 mg a day.

During Pregnancy, there is an increase in blood volume (hypervolemia). Hypervolemia results from an increase in plasma volume and erythrocytes (red blood cells) in the body, but this increase is not balanced; namely, the increase in plasma volume is much greater so that it has an effect, namely, the haemoglobin concentration decreases from 12 g/100 ml.

In Pregnancy, relatively Anemia occurs because pregnant women experience hemodilution (dilution) with an increase in the volume of 30% to 40%, which peaks at 32 to 34 weeks of gestation. The increase in blood cells was 18% to 30%, and Hemoglobin was around 19%. If the mother's Hemoglobin before Pregnancy is around 11 gr%, hemodilution will result in Anemia in Pregnancy, and the mother's Hb will be 9.5-10 gr%.

#### B. Supplementation of Tablets Add Blood

Tablets Add Blood is an iron supplement that contains 200 mg of Ferrous Sulfate or 60mg of elemental iron and 0.25 folic acid ( according to WHO recommendations) to prevent and overcome nutritional Anemia. Add Blood Tablets are taken regularly and according to the rules to prevent and overcome nutritional Anemia. According to Saifudin et al., 2006 giving 60 mg of elemental iron in blood-added tablets daily can increase Hb levels by one gr% per month. Iron folate tablet supplementation is one of the effective strategies for preventing and controlling anaemia strategies will be successful when individuals adhere to consumptive rules. One of the strategies to increase Fe consumption in low-cost communities is the fortification of cereal products.

#### C. Clinical Manifestations of Anemia

Clinical manifestations that often occur are weakness, lethargy, fatigue, pale or yellowish skin, irregular heartbeat, shortness of breath, dizziness, chest pain, cold hands and feet, and headaches. At first, the Anemia may be so mild that you may not notice it, but symptoms worsen as the Anemia worsens. Clinical manifestations of Anemia arise from very low Hb concentrations and Anemia that persists for a long time. In iron deficiency anaemia, lack of supply of nutrients (Fe) which is the core of the haemoglobin molecule as the main element of red blood cells. As a result of iron deficiency, anaemia causes the size of Hemoglobin to shrink, Hemoglobin to be low,

and a decrease in the number of red blood cells. Signs of iron deficiency anaemia are total Hb levels below normal (hypochromic) and red blood cells smaller than normal (microcytosis). The above symptoms will usually interfere with energy metabolism, so productivity decreases.

D. Send feedback

Side panel, Iron deficiency anaemia, is commonly found in developing countries, including Indonesia. In Indonesia, the main problem is nutritional Anemia in addition to 3 other nutritional problems, namely lack of protein calories, vitamin A deficiency and endemic goitre. Meanwhile, the need for pregnant women for Fe increases (for forming the placenta and red blood cells) by 200-300%.

During Pregnancy, it is estimated that the amount of iron that needs to be added is the body retains 1040 mg. Of this amount, 200 mg of Fe during childbirth and the remaining 840 mg is lost. As much as 300 mg of iron is transferred to the fetus, with details of 50-75 mg for the formation of the placenta, and 450 mg is lost during delivery. Even women with good nutritional status need to be given iron supplements.

E. How to Give Tablets to Add Blood Provision of blood-boosting tablets to pregnant women according to the RI Ministry of Health (2003), it is recommended to take 1 (one) tablet every day for 90 days (3 months). Some things that must be considered about iron tablets are:

1. Blood supplement tablets are consumed together with water, not allowed with tea, milk or coffee because it will cause the absorption of iron in the body to decrease so that it is less useful.
2. Sometimes side effects occur, such as nausea, discomfort in the stomach, difficulty defecating, and black stools. But the above things are not dangerous. Liposomal Iron may be a strategy that can overcome the above side effects. On treatment with Oral Blood Supplement Tablets in pregnant women with Iron Nutrition anaemia. This Liposomal Iron compound exhibits high gastrointestinal absorption and bioavailability and a low incidence of side effects. Therefore, Liposomal Iron provides good tolerability and supports better adherence than Iron salt tablets.
3. To reduce the symptoms of side effects, blood-boosting tablets are taken at bedtime after dinner. It supports iron absorption after taking blood-boosting tablets and eating bananas, oranges, papayas and others.
4. Blood tablets are stored in containers that must be protected from direct sunlight. After opening, the lid of the container must be tightly closed and kept out of reach of children. If the colour of the blood-added tablets has changed, you should not take them (the original colour is Blood red).
5. Iron supplement tablets do not cause high blood pressure or too much Blood. The indicator used to state the number of targets that have been included in the anaemia management program is by monitoring the number of iron tablets used by targets concerning their distribution and logistics.

#### F. Sources of Iron

Pregnant women need additional iron to increase the mother's iron stores. From the mother's iron stores, the fetus also deposits iron which will be used so that when the baby is born, it meets its needs, especially if breast milk is deficient in iron. Mothers who perform caesarean sections lose a lot of Blood, thus depleting the mother's iron stores.

According to WHO (1989), food sources containing iron are divided into 2: Heme iron, such as meat, poultry, processed Blood and fish. Non-heme iron is divided into three types, namely; Dietary iron (cereals, tubers, nuts, vegetables), impurity iron (water, iron pans, soil, dust), fortified iron (food components determine its bioavailability)

#### G. Factors Affecting Iron Needs

Vitamin C and other organic acids boost the absorption of non-heme iron. While phytate, vegetable protein, calcium and polyphenols are inhibitors of non-heme iron absorption. Iron derived from animal sources (heme) can be absorbed (30%) better than that from vegetable sources (5%). Sources of heme (fish, chicken, meat) itself contain non-heme (60%) and heme (40%). Heme consumption has a double advantage in that iron is easily absorbed (23%) compared to iron from non-heme (2-20%). Heme also helps non-heme absorption. The presence of oxalic acid, folic acid and fibre harm the absorption of iron. In contrast, vitamin C will increase the absorption of iron.

#### H. Iron Adequacy Recommendations

The need for iron during Pregnancy is very high. Prevention of decreased Hb due to hemodilution by increasing iron intake is proven possible through food and/or supplementation. Without supplementation (the Committee on Maternal Nutrition recommends iron supplementation during the second and third trimesters), iron reserves in the mother's body will be depleted by the end of Pregnancy (Taylor et al., 1982). Every pregnant woman must ingest as much as 30 mg of iron daily to keep these reserves from depleting and avoid deficiency. If only through food, the measure will not be fulfilled. Therefore, supplementation is given at 30-60 weeks, starting at the 12th week of Pregnancy, which is continued until three months postpartum and is given every day.

#### I. Signs and Symptoms of Iron Deficiency Anemia

Clinical manifestations that often occur are body fatigue, weakness, lethargy, pale or yellowish skin, dizziness, shortness of breath, cold hands and feet, headache, irregular heartbeat, and chest pain. At first, the Anemia may be so mild that you may not notice it, but symptoms worsen as the Anemia worsens.

Typical signs of iron deficiency anaemia are the presence of spoon nails, the nails becoming brittle, vertical stripes and becoming concave like spoons, atrophy of the tongue papillae, and the surface of the tongue becomes shiny and smooth because the tongue papillae disappear.

Sufferers also have angular stomatitis, inflammation of the mouth's corners so that it appears as pale, whitish patches. Signs of dysphagia or painful swallowing occur because the hypopharyngeal epithelium is damaged, atrophy of the gastric mucosa, inflammation of the tongue (glossitis), inflammation of the labia (cheilitis) and stomatitis. 23 During Pregnancy, blood tests are carried out at least twice during Pregnancy, namely in the first and third trimesters.

The classification of blood laboratory results is as follows:

Hb 11 gr%	:	Not Anemia
9-10gr %	:	Mild Anemia
7-8gr %	:	Moderate Anemia
<7gr %	:	Severe Anemia

#### J. Nutrition in Pregnancy

According to Supariasa idn, 2017, Pregnancy is an event that occurs in a woman, starting from the process of fertilization or conception to the birth of the baby. According to Pari HM 2019, nutritional status is a condition that involves a balance between the intake of nutrients from food and the need for nutrients needed by the body. 8 Pregnancy is a period that determines the quality of human resources in the future. The condition when the fetus is in the womb alone determines growth. Child flower. The condition of Pregnancy and the baby to be born is directly affected by the nutritional status of pregnant women, so the fetus's growth and development can be affected by malnutrition at the beginning and during Pregnancy.

Pregnant women need to consume a wider variety of foods to meet their needs for energy, protein and micronutrients such as vitamins and minerals because they are used for fulfilment, growth and development of the fetus in the womb as well as reserves during breastfeeding. The need for carbohydrates during Pregnancy will increase. Carbohydrates from starch and fibre types such as rice, bread, noodles, vermicelli, corn, breadfruit, bananas, cassava, sweet potatoes, taro and other tubers (Dahlan, 2012).

The need for protein during Pregnancy also increases for the fetus's growth and maintaining the mother's health. Animal protein sources such as fish, milk and eggs are highly recommended. The need for iron during pregnancy increases because it is used for forming new cells and tissues and forming red blood cells. Lack of Hemoglobin can cause Anemia which can endanger the health of the mother and baby, for example, LBW or low birth weight, namely birth weight less than 2500 grams (Pawlak et al., 2008). And bleeding and the risk of death increases. Fish, meat, liver and tempeh are good for pregnant women because they are high in iron content. Pregnant women are advised to consume one tablet of the iron supplement every day. During Pregnancy and continued during the puerperium. Folic acid during Pregnancy is needed to form cells and the nervous system, including red blood cells. Green vegetables, such as spinach and beans, contain many folic acids, which are needed during Pregnancy.



Colourful fruit is a good source of vitamins for the body, and fibrous fruit can facilitate bowel movements, reducing the risk of constipation. The need for calcium increases during Pregnancy and to replace the mother's calcium reserves for forming new tissue in the fetus. If calcium consumption is, insufficient pregnant women can experience preeclampsia and bone and tooth loss. In teenage pregnant women who are still in a growth period that requires more calcium, the sources of calcium are green vegetables, nuts, anchovies and milk.

Iodine is part of the hormones thyroxine (T4) and triiodothyronine (T3), which regulate the baby's growth and development. Iodine deficiency will delay the development of the brain and nervous system, especially reducing IQ and increasing the risk of infant death. As well as in children can result in the impaired physical growth of children born, namely cretin. The impact on the brain and nervous system development is usually permanent. Good sources of iodine are fish, shrimp, shellfish and seaweed. Every cooking requires using iodized salt (Sukmawati et al., 2019).

#### K. Health Education for Pregnant Women

Health education for pregnant women can be communicated by counselling pregnant women. A counsellor gives advice and direction to another person (client) to solve his problem. The definition of counselling is the professional relationship between the counsellor and the client to help the client understand and explain his outlook on life and learn to achieve his goal thoughts from many meaningful choices. Counselling is helping a person or group learn to solve interpersonal and emotional problems or decide certain things.

Counselling is an approach that can be used in health education to help individuals and families or groups become an important part of curing diseases and health problems because counselling helps people to understand the efforts they make to stay healthy. All healthcare workers should be counsellors. Health workers should be willing to listen as much as possible to what people are saying and encourage people to take responsibility for solving problems. Counselling is a right of the relationship, so the counsellor will assist the client in problem-solving.<sup>32</sup> The purpose of counselling is to invite people to think about their problems and understand the cause so that the person is expected to have the initiative to solve the problem (Mazloomi-Mahmoodabad et al., 2017).

The result that can be taken in counselling is a thought, not a compulsion or advice that the health worker thinks is not necessarily appropriate for others because it suits different situations and conditions (Fatikasari et al., 2022). Education is the addition of knowledge and knowledge abilities of a person through the practice of learning or instruction to remember real conditions by encouraging self-direction or Self Direction, actively providing information or reading ideas. Education is a series of efforts aimed at expecting others from individuals, groups, families and communities, so that healthy living behaviours are carried out (Ikram et al., 2022). So health education is a form of behavioural engineering. When studying Blum's theory of factors that affect health, education is second only to environmental factors

that can affect health. It can change through two things, namely coercion or education.

L. Anaemia and Nutrition Education

Anaemia and nutrition education interventions consist of education about Anemia and nutrition for experimental groups and general education and nutrition anaemia education for control groups during the study period. Anaemia and nutrition education interventions are conducted face-to-face individual counselling with pregnant women (Adawiyani, 2014). The key message of anaemia and nutrition education in the experimental group consisted of the causes, signs and symptoms of Anemia in pregnant women, the impact of Anemia on pregnant women, iron-rich foods, enhancers and inhibitors of iron absorption. General Education in the control group includes pregnancy danger signs, sanitary hygiene, healthy, clean living education, rest and exercise, smoking sufferers, physical activity, pregnancy knowledge, neonatal visits, vegetable and fruit consumption, routine ANC, Birth Control, PNC, up to 40 days.

### Conclusion

Based on the results of the study, it was stated that there was an influence of anaemia and nutrition education on knowledge, subjective norms, attitudes, perceived behaviour control and intention through direct counselling and delivery of anaemia and nutrition education and counselling through social media intensely so that there was a significant increase in haemoglobin levels in pregnant women with Anemia in primary care during the Covid 19 pandemic.

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