The Prevention of Anaemia among Pregnant Women: A Literature Review

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Abstract: Background: Anaemia is a serious problem and has a negative impact on pregnancy. WHO reported that 40% of pregnant women in the world are anaemic. This review aimed to identify evidence-based prevention of anaemia among pregnant women. **Method:** This is a literature review. Articles searching were conducted from a number of electronic databases including Science Direct, PubMed, Springer Link, Sage pub, and Google Scholar from 2016-February 2022. Researchers used the PRISMA method. **Result:** Ten studies were included in the final analysis (three cross-sectional, one RCT, six quasi-experiments). Two studies discussed the efficiency of supplements in expecting mothers, two studies discussed the effectiveness of Moringa leaves, and six studies discussed the effectiveness of health education on preventing anaemia in pregnancy. **Conclusion:** Iron supplementation, multi micronutrient supplementation, giving Moringa leaf biscuits along with iron supplementation, and providing health education are effective ways to prevent anaemia in pregnancy.

Keywords: Anaemia, Prevention, Maternal anaemia.

1. INTRODUCTION

Pregnancy anaemia is a serious global problem and can have a negative impact on pregnancy. Anaemia in pregnancy is a condition in which the body cannot produce enough red blood cells, which is characterized by a haemoglobin concentration of less than 11 g/dL, thereby preventing oxygen from reaching the body's tissues and affecting the normal function of organ systems (1).

At least 40% of pregnant women are anaemic in the world, according to an estimate from the World Health Organization (WHO) (2). Globally, 32.4 million pregnant women are anaemic, and anaemic pregnant women in southeast Asia are around 48.7% and in Africa are around 46.3% (1). Based on the results of the 2018 Basic Health Research *(Riskesdas)* in Indonesia, there were 48.9% of pregnant women who had anaemia (3).

Anaemia in pregnancy is characterized by maternal fatigue, weakness, dizziness, and paleness. The impacts of anaemia in pregnancy are abortion, uterine atony, prematurity, bleeding, even shock (3). In addition, anaemia in pregnancy can also cause decreased physical and cognitive performance of the mother, increased risk of infection, inhibition of lactation, intra uterine fetal death (IUFD), low birth weight (LBW), neurological disorders in infants (4), low APGAR score in the first five minutes of the baby's birth, intrauterine growth restriction (IUGR) which is the risk of stunting in children, maternal immune disorders, increased risk of heart disease in the mother, even death (5).

There are numerous causes of anaemia, but iron deficiency is by far the biggest factor (6). Beside the iron deficiency anaemia, anaemia in pregnancy can also be caused by megaloblastic anaemia with folic acid deficiency (7). Apart from physiological causes, social causes such as early marriage, teenage pregnancy, too close time interval between pregnancies, and poor nutritional supplementation also contribute to anaemia (8).

The World Health Organization (WHO) recommends iron supplementation during pregnancy. Pregnant women are recommended to take iron tablets of 30 mg to 60 mg every-day and folic acid supplementation as much as 400 g (0.4

mg) (9). Other treatments for anaemia in pregnancy include dietary modification, vitamin supplementation, intravenous iron administration, and blood transfusions (10).

Anaemia in pregnancy should be prevented, controlled, and medically treated (6). If anaemia is detected early, blood transfusions can be avoided (8). As the importance of preventing anaemia in pregnancy, this study aims to identify evidence-based prevention of anaemia among pregnant women.

2. METHODS

Design

A literature review.

Eligibility criteria

The questions in this literature study were determined using the PICO framework.

P (population): pregnant women

I (intervention): anaemia prevention

C (comparison): control group of RCT study

O (outcomes): normal haemoglobin

The inclusion criteria of this study were articles with full text, accessible for free, in English, articles from 2016-2022, as well as articles with RCT and cross-sectional research designs. The exclusion criteria were articles in the form of conference papers, chapters, editorials, theses, and dissertations.

Searching Strategy

The searching strategy was carried out by PICO application. The researcher used the following search strategy in each database with the keywords “anaemia prevention”, “anaemia during pregnancy”, “maternal anaemia”, and “prevention of anaemia in pregnancy”.

Source

The data sources in this study were articles found in the electronic databases of Science Direct, PubMed, Springer Link, Sage pub, and Google Schoolar from 2016 to February 2022.

Selection of studies

The first step was screening the title, abstract and full text of the article for eligibility by the researcher. When the above keyword indication was found in all abstracts, the whole article was taken. The references to the chosen articles were reviewed and confirmed for any new articles that qualified in the second phase. The articles were assessed by the authors in this step while taking the inclusion and exclusion criteria into account. The full-text articles were rated for further analysis in the third step.

Data analysis

Researchers used the Preferred Reporting Items for Systematic Reviews and Meta-analyses Statement (PRISMA) method to follow the correct stages or research protocols, as presented in Figure 1. Based on the search strategy and selection criteria above, out of 458 articles in total 18 studies were fully reviewed. Finally, only 10 studies had been analysed to the end. The process of selecting these 10 studies has been presented in Figure 1.

3. RESULTS

Characteristics of research articles

Based on Table 1, there are three studies using (huruf a dihapus krn tdk relevan) cross-sectional design (11-13), one research was randomized clinical trial/RCT (14), and six researches were quasi-experimental (15-20). Three researches were conducted in Africa (11, 12, 14), two researches were from the middle east (17, 19), and five researches were from Asia (13, 15, 16, 18, 20). The sample from all studies was pregnant women.

Effective method in preventing anaemia in pregnancy

Out of the ten research literatures reviewed, two studies discussed the effectiveness of supplementation in pregnant women in preventing anaemia. Research conducted in Nigeria stated that haemoglobin levels were significantly lower in respondents who were given iron supplementation once a day compared to those who received iron supplementation twice a day. However, The twice daily group had much more negative effects. In terms of prophylaxis, ferrous sulphate taken once daily (65 mg elemental iron) was just as efficient as taken twice daily (130 mg elemental iron). According to research from Indonesia, the average increase in haemoglobin levels following iron supplementation was 0.757 (0.742) g/dl as opposed to 1.545 (1.292) g/dl after multi-micronutrient supplementation. There was a significant difference of haemoglobin levels before and after multi micronutrient supplementation. Multi-micronutrient supplementation could increase haemoglobin levels. The increase of haemoglobin levels with multi micronutrient supplementation was higher than Fe supplementation.

Two studies from Indonesia discussed the effectiveness of Moringa leaves to prevent anaemia in pregnant women. There was a significant increase in haemoglobin (MCH and MCV) and iron levels after giving 2 pieces of Moringa leaf biscuits /day containing 2.8gr Moringa leaves and Fe tablets 2x250mg/day for 60 days. There was also an increase in zinc levels but it was not statistically significant. There was no effect of Moringa leaf biscuits on increasing MCHC levels in pregnant women with anaemia.

Six other studies discussed the effectiveness of the importance of health education in preventing anaemia in pregnant women. Research from Ethiopia found that prevention of anaemia can be done by increasing health education, strengthening positive perceptions of the consumption of iron and folic acid, and consuming nutritious foods. Research from Nigeria found that there was a significant relationship between the presence of pregnant women at the antenatal clinic with knowledge about preventive measures for anaemia in pregnancy. The research from Indonesia found that health promotion regarding perceived benefits and barriers as well as family support was correlated with maternal adherence to iron supplementation. The research from Iran also found the same results that the prevention of anaemia in pregnant women can be prevented by providing health promotion based on the Health Belief Model.

According to studies from Indonesia, monitoring pregnant women and providing them with face-to-face educational interventions might boost family support for maternal behaviour that helps avoid pregnancy anaemia, such as increasing adherence to taking iron supplements. The research from Iran also found that direct educational interventions through the provision of materials, questions and answers, group discussions, posters, pamphlets, videos and power points provided a significant increase in mothers' knowledge, attitudes, behaviour, and willingness to consume optimal nutrition.

4. DISCUSSION

This literature study aims to discuss the prevention of anaemia in pregnancy. From the results of the literature study, it was found that iron supplementation was proven to be effective in preventing anaemia in pregnant women. This is in accordance with the recommendations from the World Health Organization (WHO) which advises pregnant women to consume 30 mg to 60 mg iron tablets every day and folic acid supplementation of 400 g (0.4 mg) during pregnancy (9). A micronutrient is iron. In order to support the production of haemoglobin in infants and developing fetes, iron is necessary for all organ systems. Iron is necessary for the healthy growth and continued metabolic operation of every cell and organ system in the body (21).

In addition, multi-micronutrient supplementation has also been shown to be effective in preventing anaemia in pregnancy. This is in line with a review conducted in 2020, where the results showed that multi-micronutrients were effective for anaemia in pregnancy. This study found that in pregnant women with anaemia, who have low preconception weight, consumption of multi micronutrients can increase maternal weight and reduce low birth weight and anaemia in infants (22).

A literature study conducted in 2021 also found that the administration of multi-micronutrients increased Hb levels in pregnant women. In this literature study it was confirmed that micronutrient supplementation during the periconception period is more important than only given during late pregnancy (23). Six out of ten studies proved that health education in preventing anaemia in pregnant women is very important and can prevent anaemia in pregnancy. This is in line

with other studies which confirm that providing health education about nutrition and diet to pregnant women based on iron-rich foods can prevent anaemia in pregnancy (24-27).

Diet and nutrition education programs based on iron-rich foods during pregnancy can lead to increased haemoglobin levels, maternal weight gain, and increased consumption of iron-rich foods, so that anaemia in pregnancy could be prevented (24). During prenatal visits, health education and counselling can improve pregnant women's nutritional understanding of foods high in iron (28). Providing health education to pregnant women regarding appropriate dietary information could help mothers becoming more familiar with food classifications, increase their ability to choose foods rich in iron, protein, and other nutrients, which in turn will help increasing maternal haemoglobin levels (25).

Health education intervention methods such as group discussions, providing health materials with videos and power points, question and answer sessions, poster presentations and pamphlets were effective methods used in health education interventions (25, 27). By continuously providing pregnant women with exposures to health education information about anaemia prevention, it will increase understanding in pregnant women which in turn allows them to practice health behaviours (27).

Two other studies have shown that Moringa leaves were effective in preventing anaemia in pregnant women. This is supported by other studies that have proven that Moringa leaves can be used as a nutritional supplement for pregnant women in reducing the prevalence of anaemia. Giving Moringa leaves to pregnant women will increase iron levels in their body so that Moringa leaves can prevent anaemia in pregnant women (29-32). To boost both the mother's health and the development of the fete, the mother must consume a suitable amount of nutrients during pregnancy. Pregnant women who take extract of moringa leaves get a lot of micronutrients like iron, vitamin A, vitamin C, and selenium during pregnancy. Both macronutrients and micronutrients are abundant in moringa plants (29).

The increasing haemoglobin effect can be related to the iron content and various vitamins and minerals contained in Moringa leaves (33). Iron levels in Moringa leaves that have been converted into powder are 25 times higher than iron levels in spinach, vitamin A levels are 10 times higher than carrots (34). Other nutrients such as potassium, calcium, and amino acids were also found to be significantly higher in Moringa leaves than the leaves of other plants (35).

Instead of using iron, the bioactive substances in moringa leaves enable the body to store more iron. Additionally, the amount of antioxidants in Moringa leaves may improve the body's ability to absorb iron. One study has shown that iron from moringa leaves has a substantially higher bioavailability than iron from commercial supplements (35). Haemoglobin levels were shown to increase after consuming 2 pieces of Moringa leaf biscuits/day containing 2.8gr Moringa leaves and Fe tablets 2x250mg/day for 60 days (15, 16).

Limitation

This review is limited by the small number of studies found and this literature review includes the prevention of anaemia from (the dihapus krn tdk perlu) nutritional and educational aspects. However, relevant studies were identified using a structured and methodology-based search in scientific databases.

5. CONCLUSION

This study literature reveals that the administration of iron supplementation, multi micronutrient supplementation, providing Moringa leaf biscuits along with iron supplementation, and providing health education are effective ways to prevent anaemia in pregnancy.

Ethical considerations

This research has been conducted through ethical consideration. There was no conflict of interest that might influence the results or interpretation of the result.

Acknowledgement

We would like to deeply express our thanks to the Universitas Nasional Jakarta-Indonesia for funding support and also all of the participants in this study at the Cikeusik Public Health Center, Pandeglang Regency, Banten, Indonesia.

Conflict of interests

The authors declare that there is no conflict of interests.

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DOI: https://doi.org/10.15379/ijmst.v10i2.2978