October – December, 2023
Original Article
DOI: http://dx.doi.org/10.30867/action.v8i4.1327

AcTion: Aceh Nutrition Journal
Pages: 675 – 682
p-issn 2527-3310; e-issn 2548-5741

The effect of the family empowerment model on the ability to managing diet and increasing hemoglobin in anemic pregnant women

Pengaruh model pemberdayaan keluarga terhadap kemampuan mengelola pola makan dan peningkatan hemoglobin pada ibu hamil anemia

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Article History:
Received: July 18, 2023; Revised: October 18, 2023; Accepted: November 7, 2023; Published: December 8, 2023.

Publisher:
Politeknik Kesehatan Aceh
Kementerian Kesehatan RI

Abstract

Anemia in pregnant women is generally caused by iron deficiency, bleeding, and other factors. This condition can affect hemoglobin levels, threaten the health of the pregnant woman, and requires prenatal care, including iron supplements, diet, and regular blood monitoring. Therefore, family involvement is very important in supporting diet and health checks in pregnant women with anemia. This study aimed to determine the effect of the family empowerment model on the ability to manage diet and increase hemoglobin (Hb) levels in pregnant women with anemia. The research design is quasi-experimental and will be conducted at the Langsa Baro Health Center in 2021. The sample consisted of 30 pregnant women divided into two groups (intervention, namely, family empowerment and control groups). The sampling was performed using a purposive sampling technique. Data collection was conducted through direct interviews using questionnaire instruments. Data processing was performed by statistical analysis using a Paired T-test test at 95% CI. The results showed that there were differences in Hb levels (p= 0,000), knowledge (p= 0,003), and attitude (p= 0,000) before and after family empowerment ($p < 0.05$) in anemic pregnant women. However, the action variable had no significant effect (p= 0,193). In conclusion, family empowerment has a significant effect on the ability to manage diet and increase hemoglobin (Hb) in pregnant women with anemia.

Keywords: Anemia, attitude, hemoglobin, family empowerment, knowledge

Abstrak

Anemia pada ibu hamil umumnya disebabkan oleh kekurangan zat besi, perdarahan, dan faktor-faktor lain. Kondisi ini dapat mempengaruhi kadar hemoglobin, mengancam kesehatan ibu hamil, dan memerlukan perawatan prenatal, termasuk suplemen zat besi, pola makan dan pemantauan darah secara teratur. Oleh karena itu, keterlibatan keluarga sangat penting dalam mendukung pola makan dan pemeriksaan kesehatanpada ibu hamil yang mengalami anemia. Penelitian bertujuan untuk mengetahui pengaruh model pemberdayaan keluarga terhadap kemampuan mengelola pola makan dan peningkatan haemoglobin (Hb) pada ibu hamil anemia. Desain penelitian adalah Quasy Exsperimental dilakukan diwilayah kerja Puskesmas Langsa Baro pada tahun 2021. Sampel merupakan ibu hamil sebanyak 30 orang yang dibagi kedalam dua kelompok (intervensi yaitu pemberdayaan keluarga dan kelompok kontrol). Pengambilan sampel dilakukan dengan teknik purposive sampling. Pengumpulan data dilakukan melalui teknik wawancara langsung dengan instrumen kuesioner. Pengolahan data dilakukan secara analisis statistik dengan menggunakan uji *Paired T-test* dengan tingkat kemaknaan CI 95%. Hasil penelitian menunjukkan bahwa terdapat perbedaan Hb (p= 0,000), pengetahuan (0,003) dan sikap (0,000) sebelum dan sesudah pemberdayaan keluarga ($p < 0,05$) pada ibu hamil anemia. Sedangkan variabel tindakan tidak memiliki pengaruh (p= 0,193). Kesimpulan,

pemberdayaan keluarga memiliki pengaruh signifikan terhadap kemampuan mengelola pola makan dan peningkatan hemoglobin (Hb) pada ibu hamil yang mengalami anemia.
Kata Kunci: Anemia, hemoglobin, pemberdayaan keluarga, pengetahuan, sikap

Introduction

Maternal Mortality Rate (MMR) is an essential indicator of public health status. To improve the health status of mothers and the life expectancy of babies born, the maternal mortality rate (MMR) is an essential factor that must be considered (Sepanlou et al., 2022). The cause of maternal mortality is delayed handling, which consists of three late factors: late recognition of danger signs, late referrals, and late obtaining optimal service (Sulastri, 2022).

The development of the health sector in Indonesia is not only carried out nationally but also globally, namely, with the *Sustainable Development Goals* (SDGs), where the target of this program is to reduce the Maternal Mortality Rate (MMR) by improving the nutrition of pregnant women (Yekti, 2020). Based on the results of the Inter-Census Population Survey (SUPAS) in 2015, the maternal mortality rate (MMR) in Indonesia is still high, with 305 per 100,000 live births. This is still far from the target set by the *Sustainable Development Goals* (SDGs) of 70 per 100,000 live births (Purba & Nurazizah, 2019).

The most common causes of maternal death are bleeding, infection, hypertension in pregnancy (HDK), prolonged abortion, and abortion. According to maternal mortality data, as many as 15-20% are caused by anemia. The main causative factor for maternal mortality is hemorrhage due to anemia, with a prevalence of 31,25% (Purba & Nurazizah, 2019). Based on data from the Indonesian Basic Health Research (*RISKESDAS*) in 2018, the rate of pregnancy anemia reached 48,9%, especially compared to 37,1% in 2013, when there was a significant increase in the incidence of pregnancy anemia by 11,8% over 5 years (Kemenkes RI, 2018).

Anemia is a condition of decreased hemoglobin levels in people with anemia, more often called lack of blood and red blood cell levels hemoglobin below normal values. Anemia in pregnant women if the hemoglobin (Hb) or red blood cell level is <11 g/dl. Anemia is caused by a lack of nutrients for blood formation, such as iron, folic acid, and vitamin B12; however, anemia is often caused by iron deficiency (Utari & Rahmad, 2022).

Research conducted Anggraini (2018) on factors associated with the incidence of anemia in pregnant women in the Tanjung Pinang Health Center Working Area states that there is a relationship between diet and the incidence of anemia, and there is a relationship between Fe tablet consumption and the incidence of anemia. Research conducted by (Eweis et al., 2021) states that there is a relationship between diet and the incidence of anemia in trimester III pregnant women in Jetis Health Center Yogyakarta City. Research conducted by (Dewi et al., 2022) states that diet has a significant relationship with the incidence of anemia in third-trimester pregnant women studied at Pleret Health Center, Bantul Yogyakarta.

In the Aceh region, especially at the Langsa Baro Health Center from September to January 2018, there were 1136 pregnant women and those who experienced anemia were 65 people. Therefore, the author is interested in researching the effect of the family empowerment model on the ability to manage diet and increase hemoglobin (Hb) in pregnant women in the Langsa Baro Health Center Working Area.

Methods

This type of research is a *quasi-experiment,* by providing treatment in the form of intervention in the intervention group only, without a control group or comparison group (Suheti et al., 2020). The independent variables were knowledge, attitudes, actions, and Hb levels. The dependent variable was family empowerment. This study was conducted in August 2021 at the Langsa Baro Health Center Working Area.

The study population comprised pregnant women in the Langsa Baro Health Center Working Area of Langsa City. The research sample included pregnant women with the following inclusion criteria: hemoglobin < 11 g/dL. Single Pregnancy alive, no complications such as diabetes mellitus, hypertension, heart

defects, and preeclampsia, domiciled in the Langsa Baro Health Center Working Area, can write, read, and communicate in Indonesian, willingness to be a respondent and sign an *informed consent* agreement sheet. Sampling was done incidentally with a sample size of 15 pregnant women undergoing intervention, and 15 pregnant women in the control group. The total number of samples was 30 pregnant women who experienced anemia.

The first stage of research in preparation begins with a literature review of several research results. They are conducting a research proposal accompanied by a preliminary study at the Langsa City Health Office. Licensing arrangements made after obtaining the data.

The second stage was the implementation of the research by determining and selecting respondents according to the inclusion criteria. Each respondent was interviewed regarding their pregnancy history and complications during pregnancy. Initial observation of all respondents, seeing signs of anemia, and measuring hemoglobin levels in pregnant women.

Enumerators conducted these observations, and family knowledge, attitudes, and actions were measured. The intervention in the intervention group was carried out by providing training using a module on preventing anemia in pregnant women through dietary management. Furthermore, researchers monitored and assisted the activities carried out by families in managing their diet, following the material that had been given. It was done for one month by researchers and assisted by enumerators whom researchers had previously trained. We then evaluated by re-measuring hemoglobin levels after the provision of training one month after the intervention and continued by measuring the knowledge, attitudes, and actions of families in the intervention group.

Data processing was computerized through several stages: editing, coding, scoring, processing, and cleaning. Data analysis was performed using statistical software. Data analysis in this study began by conducting univariate analysis to explain the characteristics of respondents and each variable studied and continued with the second analysis, namely bivariate analysis, conducted to see the effect of interventions on knowledge, attitudes, actions, and hemoglobin levels in pregnant women. Statistical analysis was performed using Paired T-test at 95% significance.

Ethical approval from the ethics commission with number LB.02.03/010/2021 from the Health Polytechnic of the Aceh, Ministry of Health.

Result and Discussion

Data Normality Test

A data normality test was conducted to determine whether the data were normally distributed. The normality test was conducted using the Kolmogorov-Smirnov test, as presented in Table 2.

Table 2. Data Normality Test Results

Variable	Kolmogorov-Smirnov Statistic	df	Sig. (p>0,05)	Data Distribution
Hemoglobin				
Pre-test	0,180	15	0,200	Normal
Post-test	0,200	15	0,107	Normal
Knowledge				
Pre-test	0,913	12	0,232	Normal
Post-test	0,884	12	0,100	Normal
Attitude				
Pre-test	0,880	12	0,088	Normal
Post-test	0,932	12	0,404	Normal
Action				
Pre-test	0,658	12	0,000	Not Normal
Post-test	0,878	12	0,082	Normal

Table 2 shows that, based on the results of the data normality test using the Kolmogorov–Smirnov test of normality, hemoglobin, knowledge, and attitudes in the

pre-test and post-test, were normally distributed (p> 0,05). Knowledge and attitude variables in hemoglobin can be continued at the Paired T-test stage. While the action variable obtained data were not normally distributed (p< 0,05), the Wilcoxon test was performed as an alternative to the Paired T-test.

Table 3. Effect of Hemoglobin, Knowledge, attitude, and action before and after intervention

Variables	Paired Sample T-test				
	T	Mean	Standard deviation	Mean difference	p-value
Hemoglobin	-5,100	12,7	0,183	4,2	0,000
Knowledge	-3,852	79,4	9,051	22,9	0,003
Attitude	-9,059	80,5	4,281	30,7	0,000
Action	-1,303	65,6	15,604	14,3	0,193

Table 3 shows differences in Hb, Knowledge and Attitude before and after the intervention in the form of family empowerment. The statistical test results showed a significant effect (p< 0,05) on hemoglobin levels, knowledge, and attitudes of pregnant women in the model of empowering the families of pregnant women with anemia at the Langsa Baro Health Center in 2018.

However, in the action variable, the data are not normally distributed, so the alternative Paired t test is the Wilcoxon test, which shows that the statistical test results show (p> 0,05) that there is no significant effect on the actions of pregnant women in the model of empowering the family's ability of pregnant women with anemia at the Langsa Baro Health Center in 2018.

Family Empowerment to Improve Hemoglobin, Knowledge and Attitude in Anemic Pregnant Women

This study found an effect of the family empowerment model on the ability to manage diet and increase Hb in pregnant women with anemia. Family is the basic unit of society and has a series of tasks and developments. Family members influence each other through interactions and provide mutual support according to their roles, which is necessary to achieve well-being. Interactions between family members depend on the structure and function of the family (Novianti et al., 2017).

Family support is an effort to increase family values, family concerns, and goals, and family support for pregnant women can be realized by helping to overcome the problems experienced by pregnant women who experience anemia and by making decisions to treat or bring pregnant women to available health services at the right time, maintaining their diet, and giving Fe tablets every day. The family is the closest person and the most valuable support system for pregnant women, especially pregnant women who experience anemia. Family support is essential for improving pregnant women's health (Suheti et al., 2020).

Family support can be addressed through involvement in maintaining the health of family members during pregnancy. Pregnant women who receive attention and support from their families tend to accept and follow the advice given by health workers more quickly than pregnant women who lack support and attention from their families (Novianti et al., 2017).

Knowledge results from knowing, which occurs after people perceive an object, and individuals are urged to understand with their experience gaining knowledge. A person's attitude towards an object shows that a person's knowledge of the object is a concern. It indicates that positive and negative attitudes are formed from the knowledge component. The more knowledge gained, the more positive are the attitudes formed (Margwe & Lupindu, 2018).

Anemia in pregnant women increases the risk of low-birth-weight babies (LBW), the risk of bleeding before and during childbirth, and can even cause the death of the mother and baby if the pregnant woman suffers from severe anemia. To determine whether someone is anemic, it is necessary to check hemoglobin levels. One method that can be used is the *Sahli* method of hemoglobin examination, which is

still widely used in laboratories and is the simplest (Purba & Nurazizah, 2019).

The mother's hemoglobin level dramatically affects the weight of the baby that will be born. Pregnant women who are anemic due to low Hb levels not only endanger the mother's life but also interfere with growth and development and endanger the life of the fetus. It is due to the lack of supply of nutrients and oxygen to the *placenta,* which affects the *placenta's* function of the placenta towards the fetus (Juwita, 2018).

This study aligns with research conducted by Gibore et al. (2021) entitled. The results showed that pregnant women experiencing anemia had a poor diet (73,7%) compared to pregnant women with a good diet (33,3%). The results of the chi-square statistical test obtained a ρ value of 0,025 (p<0,05), indicating that there is a significant relationship between diet and the incidence of anemia in pregnant women in an air-cold village, air-cold health center working area, Padang. The results of another study by Srimiati & Melinda (2020) showed a significant relationship between the level of knowledge of pregnant women and the prevention of anemia during pregnancy. One of the factors that can affect the knowledge of pregnant women about anemia during pregnancy is a lack of information.

Therefore, health workers, especially nurses or midwives in direct contact with pregnant women in the community, must provide sufficient information, especially about anemia during pregnancy. It is hoped that with sufficient information, pregnant women will be able to make efforts to prevent anemia in pregnancy by consuming iron tablets regularly to decrease the incidence of anemia and indirectly reduce mortality and morbidity rates in mothers and newborns (Anjarwati, 2016).

The sources of iron are animal foods, such as meat, chicken, and fish. Other good sources are eggs, mashed cereals, beans, green vegetables, and fruit. In addition to the amount of iron, it is necessary to pay attention to the quality of the iron in food. Iron in meat, chicken, and fish generally has moderate biological availability, whereas iron in most vegetables, especially those containing high oxalic acid, such as spinach, has low biological availability. It is better to pay attention to the combination of daily food, which consists of a mixture of iron sources derived from animals and plants and other nutritional sources that can facilitate absorption (Semahegn et al., 2014).

Animal proteins can increase iron absorption in the body. Proteins are nutrients required for iron absorption. Low protein consumption can lead to low iron absorption in the body. This situation can cause the body to lack iron, anemia, or decrease Hb levels (Tarigan et al., 2021).

Organic acids such as vitamin C greatly aid the absorption of non-heme iron by converting the ferrous form to ferrous iron. The ferrous form was more easily absorbed. Vitamin C also forms iron-ascorbate groups that remain soluble at a higher pH in the duodenum. Therefore, consuming vitamin C foods at every meal is highly recommended. Citric acid is a type of organic acid. Folic acid is added to or supplemented with milk. However, folic acid is naturally present in our daily food, such as green vegetables, liver, meat, nuts, and seeds. According to the Indonesian food nutrition table, high folic acid is found in chicken liver, seaweed, kidney beans, and soybeans (Kusumaningrum & Azinar, 2021; Nugroho et al., 2023).

Vitamin A plays a role in mobilizing iron reserves in the body to synthesize hemoglobin. Poor vitamin A status is associated with altered iron metabolism in patients with iron deficiency. Vitamin A is explicitly found in animal foods such as beef liver, chicken, and eggs. In contrast, plant foods only contain provitamin A, called carotene, and are found in carrots, spinach, kale, red sweet potatoes, corn, and green beans. Diverse types of food must meet the nutritional adequacy of the mother during pregnancy, maintain maternal health, and avoid anemia (Gibore et al., 2021).

Family Empowerment has no Effect on Actions for Anemic Pregnant Women

This study indicates no significant difference in the actions of anemic pregnant women after receiving family empowerment intervention. Several factors may explain this result. First, family empowerment methods and strategies may not match the needs or preferences of the target group. In addition, the family's socioeconomic, cultural, and educational factors may have influenced the response to the intervention. Inadequate information delivery or

a lack of practical support from families may also be determining factors.

It should be noted that family involvement does not always result in direct action changes, and psychosocial factors can also play an important role. Future research needs to look at these variables in more depth to understand why family empowerment interventions were not successful in influencing the actions of pregnant women with anemia. Relevant references include previous studies on the effectiveness of similar interventions, which could provide further insight into the factors that influence the success or failure of similar interventions in maternity care (Skolmowska et al., 2022; Tokhi et al., 2018).

In looking at the failure of family empowerment interventions on the actions of pregnant women with anemia, it is important to consider the study design, such as sample size and evaluation methods. The results may be inaccurate if the sample is underrepresented or the study parameters are inappropriate. Pre-intervention baseline assessments and inadequate control factors may have affected the results. Additionally, unidentified internal and external factors may have contributed to this finding. The success of an intervention often depends on the commitment and active participation of the family as well as ongoing support from healthcare providers. Therefore, further evaluation is needed to identify and understand the specific factors that influence the outcomes of family empowerment interventions in pregnant women with anemia. Future studies could extend this research by integrating a qualitative approach better to understand families' experiences and perceptions regarding the intervention. Which go in-depth on evaluating public health interventions and family empowerment (Cislaghi et al., 2019; McGill et al., 2021).

Conclusion

There was an increase in hemoglobin levels after the provision of the family ability empowerment model in managing diet to increase hemoglobin compared to before the provision of the family ability empowerment model. However, the empowerment model of the family's ability to manage diet and hemoglobin levels did not affect the actions of pregnant women with anemia.

Advice, it is expected that pregnant women and families can apply the empowerment model of family capacity to manage diet to increase hemoglobin levels in pregnant women with anemia. It is hoped that the Langsa Baro Health Center will improve the quality of service and provide interventions that can increase knowledge, attitudes, actions, and hemoglobin levels in pregnant women and prospective brides to avoid anemia.

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