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RESEARCH ARTICLE

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Improvement of Knowledge, Behavior and Health of Pregnant Women in Preventing Prenatal Stunting

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ABSTRACT

Stunting is a growth failure due to malnutrition in the first thousand days of a child's life, affecting growth and development during adulthood. The prevalence of stunting in the Bondowoso Regency reached the national prevalence, about 38%. One of the causes is inadequate nutrition of the mother during pregnancy. Malnutrition in pregnant women induces anemia, especially iron deficiency. This condition affects infant growth and development. The public health center regularly gives pregnant women iron tablets to prevent it. However, not all pregnant women are aware of the advantage of good nutrition and iron tablets. This study aimed to examine changes in aspects of health, knowledge, and behavior in anemia pregnant women after specific nutrition interventions, education, and mentoring. This study was qualitative with a case study design, which used in-depth interviews and direct observation toward respondents and assistance to three anemia pregnant women in Cindogo Village, Bondowoso Regency. The data collected were primary and secondary about respondents' health status, knowledge of nutrition, and behavior of living style. The data obtained were analyzed descriptively. The result showed that before education, the respondents were not aware of their nutrition. However, after intervention and mentoring, they know about the advantages of nutrition and iron tablets and are also aware of their health and infants. Briefly, the respondent's awareness about prenatal stunting, nutrition, and health during pregnancy changed. This alteration was expected to be able to prevent prenatal stunting in Cindogo Village, Bondowoso Regency.

Keywords: knowledge; behavior; health; pregnant women; prenatal stunting

INTRODUCTION

Stunting or short stature (shortness) is a growth failure due to malnutrition in the first thousand days of a child's life, affecting growth and development during adulthood. Calculation of the Z-score of Height according to Age (Height/Age) determines stunting status. Stunted children present their TB/U Z-index score below -2 SD (standard deviation) ^(1,2). Malnutrition in pregnant women has significantly contributed to the high stunting prevalence in Indonesia. Poor nutrition during pregnancy implicates 85% of the stunted infants. Several studies described that the nutritional status of pregnant women was significantly associated with growth retardation in children ^(3,4). Besides it, it caused low birth weight (LBW), stunted fetal growth (PJT), and death due to a low immune system ⁽⁵⁾. Malnutrition in pregnant women is a poorer quality of life and health status because inadequate nutrition during pregnancy causes decreased immune system, weakness, fatigue, and lethargy, like anemia symptoms and signs. Inadequate iron levels frequently accompany malnutrition, whereas iron presents essential minerals for increasing pregnant women's health status, enhancing the immune system, and supporting fetus growth and development ⁽⁶⁾. During pregnancy, good intake and iron supplements are essential to reduce stunting risk ⁽⁷⁾.

The World Health Organization (WHO) in 2019 shows that the stunting prevalence in the Southeast Asia exhibited the second highest globally, about 31.9% ⁽⁸⁾. Interestingly, the prevalence in Indonesia is relatively high compared to other middle-income countries. Based on Basic Health Research (Riskesdas) 2018, the prevalence of stunting in children under three years old was 10.2% and in children under five years old was 30.8%. Unfortunately, the prevalence in East Java province presented higher than the national prevalence, about 32.8% ⁽⁹⁾, especially in the Bondowoso, about 38% ⁽¹⁰⁾. The high prevalence must be reduced because stunting has a long-lasting negative impact on the country, such as hampering economic growth, increasing poverty, and widening inequality.

The government has a program to enhance the health status of pregnant women and reduce prenatal stunting risk. The program implementation has been carried out in public health centers (*puskesmas*) and integrated healthcare

centers (*posyandu*), such as giving iron tablets regularly. However, the pregnant women did not take the tablets regularly⁽¹¹⁾. In another study conducted by Ekayanthi & Suryani (2019), namely providing education to pregnant women in the first trimester about stunting prevention, the results showed that there was a significant effect of the class of pregnant women on increasing knowledge and attitudes of pregnant women about stunting prevention⁽¹²⁾. Knowledge of pregnant women about balanced nutrition has increased after providing education⁽¹³⁾. Based on observation, 3 out of 5 pregnant women who experienced anemia were in Cindogo village, Bondowoso district. Although they regularly visited *posyandu* and obtained iron tablets, they did not regularly take them. They said that the tablet's taste was unpleasant and stimulated nausea and vomiting. In addition, they said that they were the lack consumption of foods such as vegetables and fruits that contain nutrition, vitamin, and minerals, including iron.

This research needs to be done in order to optimize government programs for reducing stunting prevalence, intervention and education by community assistance are practical and efficient methods. The assistances are not only for *posyandu* cadres but also for pregnant women as the main target of reducing stunting program. The assistance was expected to increase the health status, knowledge, and pregnant women behaviour alteration. Finally, it may prevent stunting prevalence. This study aimed to examine changes in aspects of health, knowledge, and behaviour in anemia pregnant women after specific nutrition interventions, education, and mentoring.

METHODS

This study was a case study conducted in the Cindogo Village, Bondowoso Regency, East Java, which examined anemia pregnant women's health status, knowledge, and intake behavior in July-August 2021. This study collected data from primer and secondary data. However, not only collecting data, this study presented community assistance. The population of this research was pregnant women who live in the Cindogo Village, Bondowoso Regency, East Java. The sample was determined by the purposive sampling method, where the researcher chose a sample of pregnant women who experienced symptoms of anemia. Based on observations, there were 3 pregnant women who entered the criteria as research samples. For the primary data collection, the researchers had to conduct in-depth interviews with village midwives and respondents (pregnant women) about the pregnant behavior and activity in *posyandu* in the first week of the study. Besides it, this study carried out a direct observation of the respondents every day to monitor the nutritional intake and compliance of the respondents in consuming iron tablets from *posyandu* for 45 days. In addition, the researchers observed the general health status of respondents once a month, such as signs, symptoms of anemia, and hemoglobin levels. Therefore, secondary data was collected by observing the health status card of pregnant women at the *posyandu*. This card contains the health history, pregnancy, and nutritional intake of pregnant women.

The researchers educated the respondent about pregnant women's health, stunting, prenatal stunting, nutrition during pregnancy, and iron tablet supplements for the community assistance program. Before the class session (educative program), the respondents had to fulfill a questionnaire to know their knowledge. After that, three times a week, the researchers assisted the respondents in how to care for their infant's health, choose good nutrition based on local potency, and fulfill their infant nutrition with iron tablets. Besides it, the respondents were assisted with specific nutrition and monitored every day. The data obtained were compiled and grouped into three aspects: health status, knowledge of nutrition, and behavior of living style. After that, data was collected and processed, such as checking, compiling, and classifying the data. Furthermore, data analysis was carried out by compiling the data. Data before and after the counseling and assistance were analyzed descriptively.

RESULTS

Based on observations, interviews, and questionnaires during the intervention, data describing health, knowledge, and behavioral aspects were shown in Table 1-Table 7. At the beginning of the meeting, complaints and clinical signs of pregnant women showed symptoms of anemia. They complained and looked weak, tired, and lethargic. They also said that they frequently presented those symptoms. However, the health status of pregnant women improved after 45 days of intervention (Table 1).

Table 1. The health status of pregnant women before and after assistance

No.	Sign of anemia	Before		After	
		Yes	No	Yes	No
1	Weak	√			√
	Tired	√			√
	Sluggish	√			√
2	Weak	√			√
	Tired	√			√
	Sluggish	√			√
3	Weak	√			√
	Tired	√			√
	Sluggish	√			√

Hb levels examination is one of the First 1000 Days of Life (FDL) supporters program for stunting prevention. Hb level is one of the health indicators in pregnant women to see the status of anemia which can affect the growth and development of the fetus. Before assistance, the hemoglobin level of pregnant women in the Cindogo village showed a value below 11 g/dL, in the category of mild anemia was 8-11 g/dL. After diet and

consumption of iron tablets assistance, hemoglobin levels increased to 11 g/dL, which indicated normal hemoglobin levels (Table 2).

Table 2. Blood Hb levels of the three pregnant women before and after assistance (health aspects)

Respondents	Before		After	
	Blood Hb level	Category	Blood Hb level	Category
1	10.2 g/dL	Mild anemia	13.3 g/dL	Normal
2	8.3 g/dL	Mild anemia	11.8 g/dL	Normal
3	9.1 g/dL	Mild anemia	12.7 g/dL	Normal

Table 3. Knowledge of pregnant women before and after assistance (knowledge aspect)

Respondents	Indicator	Before		After	
		Know	Don't know	Know	Don't know
1	Brief definition, stunting is a short child or stunted child		√	√	
	Lack of nutritious food intake can cause stunting		√	√	
	Not regularly taking blood-boosting tablets can cause fetal growth disorders due to disrupted oxygen supply		√	√	
	Stunting prevention can be done with adequate nutrition and iron intake		√	√	
	A balanced nutritious diet is important for pregnant women to meet the nutritional needs of the mother and fetus	√		√	
	Exclusive breastfeeding is given to infants aged 0-6 months.	√		√	
	Colostrum is a content in mother's milk that is very important for babies and comes out on the first to the third day.		√	√	
	The position of the baby when breastfeeding is that the baby's head and body must be straight.	√		√	
	MP-ASI is given to babies over 6 months to 2 years old	√		√	
	MP-ASI is given to babies over 6 months to 2 years old	√		√	
2	Brief definition, stunting is a short child or stunted child		√	√	
	Lack of nutritious food intake can cause stunting		√	√	
	Not regularly taking blood-boosting tablets can cause fetal growth disorders due to disrupted oxygen supply		√	√	
	Stunting prevention can be done with adequate nutrition and iron intake		√	√	
	A balanced nutritious diet is important for pregnant women to meet the nutritional needs of the mother and fetus	√		√	
	Exclusive breastfeeding is given to infants aged 0-6 months.	√		√	
	Colostrum is a content in mother's milk that is very important for babies and comes out on the first to the third day.		√	√	
	The position of the baby when breastfeeding is that the baby's head and body must be straight.	√		√	
	MP-ASI is given to babies over 6 months to 2 years old	√		√	
	MP-ASI is given to babies over 6 months to 2 years old	√		√	
3	Brief definition, stunting is a short child or stunted child		√	√	
	Lack of nutritious food intake can cause stunting		√	√	
	Not regularly taking blood-boosting tablets can cause fetal growth disorders due to disrupted oxygen supply		√		√
	Stunting prevention can be done with adequate nutrition and iron intake		√		√
	A balanced nutritious diet is important for pregnant women to meet the nutritional needs of the mother and fetus	√		√	
	Exclusive breastfeeding is given to infants aged 0-6 months.	√		√	
	Colostrum is a content in mother's milk that is very important for babies and comes out on the first to the third day.	√		√	
	The position of the baby when breastfeeding is that the baby's head and body must be straight.		√		√
	MP-ASI is given to babies over 6 months to 2 years old	√		√	
	MP-ASI is given to babies over 6 months to 2 years old	√		√	

Table 4. Changes in the behavior of pregnant women before and after assistance

Respondents	Indicator	Before		After	
		Yes	No	Yes	No
1	Washing hands 6 steps with soap	√	√	√	√
	Take blood-boosting tablets regularly every day	√	√	√	√
	Applying for the correct breastfeeding position	√	√	√	√
	Cook a balanced nutritious meal every day	√	√	√	√
	Do the light physical activity regularly	√	√	√	√
2	Washing hands 6 steps with soap	√	√	√	√
	Take blood-boosting tablets regularly every day	√	√	√	√
	Applying for the correct breastfeeding position	√	√	√	√
	Cook a balanced nutritious meal every day	√	√	√	√
	Do the light physical activity regularly	√	√	√	√
3	Washing hands 6 steps with soap	√	√	√	√
	Take blood-boosting tablets regularly every day	√	√	√	√
	Applying for the correct breastfeeding position	√	√	√	√
	Cook a balanced nutritious meal every day	√	√	√	√
	Do the light physical activity regularly	√	√	√	√

Health education is an effort to increase knowledge and understanding of the importance of health in order to achieve better health behavior, especially for pregnant women related to nutrition. Knowledge of pregnant women increased after mentoring was carried out, especially related to stunting, pacification, and nutritional adequacy of pregnant women (Table 3).

Changes in the behavior of pregnant women presented in Table 4 show positive changes. The healthy living style of pregnant women after assistance was better than before, although the alteration needed monitoring and evaluation. Interestingly, respondent number 3 showed there was no improvement life style.

Table 5. Changes in diet (side dishes) of pregnant women before and after assistance (behavioral aspects)

Respondents	Food and drink/time	Early week (before)	Weekend (after)
		Per Week	Per week
1	1. Egg	4	4
	2. Meat	2	0
	3. Fish	4	2
	4. Tempe	4	6
	5. Tahu	4	4
	6. Milk	6	0
2	1. Egg	6	6
	2. Meat	2	2
	3. Fish	6	6
	4. Tempe	6	6
	5. Tahu	6	6
	6. Milk	0	0
3	1. Egg	6	4
	2. Meat	0	4
	3. Fish	2	4
	4. Tempe	4	4
	5. Tahu	2	4
	6. Milk	6	6

This study also carried out assistance about diet and side dishes regulation for pregnant women. The assistance offered positive impacts, such as they could consume side dishes regularly. However, two pregnant women (respondents number 1 and 2) could not drink milk due to economic factors.

Table 6. Changes in diet (vegetables consumption) of pregnant women before and after assistance (behavioral aspects)

Respondents	Early week		Weekend	
	Total	Vegetable name	Total	Vegetable name
1	16 kinds	Cucumber, string beans, green beans, carrots, mushrooms, spinach, broccoli, kale, chayote, genjer, cabbage, potatoes, eggplant, mustard greens, gambas, cassava leaves.	10 kinds	Spinach, kale, genjer, eggplant, mustard greens, cassava leaves, carrots, long beans, cabbage, potatoes.
2	18 kinds	Cucumber, string beans, green beans, carrots, mushrooms, spinach, broccoli, kale, chayote, genjer, cabbage, potatoes, eggplant, mustard greens, komak, gambas, cassava leaves, papaya leaves.	13 kinds	Cucumber, carrots, mushrooms, spinach, broccoli, chayote, genjer, potatoes, mustard greens, long beans, cabbage, eggplant, gambas.
3	13 kinds	Cucumber, string beans, carrots, mushrooms, spinach, broccoli, kale, chayote, cabbage, eggplant, mustard greens, komak, gambas.	11 kinds	Cucumber, carrots, mushrooms, spinach, broccoli, kale, chayote, eggplant, mustard greens, komak, cassava leaves.

Assistance in regulating a vegetable diet was also provided to pregnant women. After assistance, the pregnant women consumed various vegetables every week. It was quite different before the assistance, in which they less consumed the kind of vegetables (table 6).

Table 7. Changes in diet (fruit consumption) of pregnant women before and after assistance (behavioral aspects)

Respondents	Early week		Weekend	
	Total	Fruits name	Total	Fruits name
1	7 kinds	Orange, banana, apple, mango, papaya, pear, guava	3 kinds	Banana, watermelon, orange
2	9 kinds	Orange, banana, apple, grape, mango, melon, papaya, pear, rambutan	3 kinds	Mango, papaya, guava
3	8 kinds	Orange, banana, apple, grape, mango, melon, papaya, guava	8 kinds	Oranges, bananas, apples, mangoes, melons, papayas, watermelons, guava

The pregnant women also got the assistance of fruit consumption. Almost all respondents showed significant changes in fruit consumption, although the one respondent did not consume fruits regularly. Respondents number 1 and 2 still tried to consume fruit even though the amount was not as much as before the mentoring. They realized that fruit consumption is the best nutrition for their infants. The health status and level of knowledge of pregnant women increased after the counseling and assistance for 45 days. Changes in attitude in a positive direction also appear in the lifestyle of

pregnant women after providing education. A good lifestyle will have consequences on the implementation of a healthy lifestyle which will have an effect on reducing the risk of stunting in the baby's to be born.

DISCUSSION

The standard of the expected results in this study was classified into three aspects: knowledge, behavior, and health status. Knowledge represents the main factor for determining individual behavior and health status. Therefore, behavior and health status present vital factors in determining the quality of human resources supporting development in a country⁽¹⁴⁾. Every human being has a different level of knowledge. Human ability influences the knowledge level from knowing, understanding, application, analysis, synthesis, and synthesis. evaluation (evaluation). The higher a person's level of knowledge, the higher the individual's ability to make assessments, including assessments in interpreting the meaning of health (health literacy)⁽¹⁴⁻¹⁶⁾. Its implementation is in the form of changes in health behavior which will later determine health status. This health status is the individual's primary responsibility to themselves and their family because its high and low health status is the foundation of family health and welfare. HL Blum stated that the main factors affect a person's health status or a community. These factors are genetic, environmental, economic, political, cultural, level of knowledge, behavior, and health care facilities⁽¹⁷⁾.

This study showed that respondents experienced mild anemia; however, their health status was better than before after the assistance. This is reflected in the health status of pregnant women who initially experienced several symptoms of anemia and whose hemoglobin levels were less than normal and changed for the better. The assistance might influence their mind mapping to know and analyze their health literacy. The three drivers that make health a shared value are mindset and hope; a sense of togetherness; and community engagement. Mindsets and hope reflect that someone should have a comprehensive view of health beyond the disease's absence. In addition, individuals understand that health is interdependent and make it a living culture. Therefore, the value of togetherness shows that each individual and community are interconnected and have the same goal of achieving health. Changes in mindset, hope, and a sense of togetherness will create interdependence and involvement of community group assistance. This is in accordance with the statement of Papp et al and Trujillo et al, namely that the value of the health interdependence and well-being track the degree to which individuals believe that their health is affected by their environment, including the health of others, and view health and well-being as priorities, respectively^(18,19).

Knowledge of pregnant women is fundamental to supporting the creation of clean and healthy behavior. This study showed that pregnant women's knowledge increased, although one respondent did not increase her knowledge; she just knew three of the nine indicators. Because she did not participate in the assistance completely, besides it, based on the interview why she did not participate regularly, she experienced depression and stress due to thinking about the baby outcome (baby blues) and economic problems. Knowledge of balanced nutrition will increase awareness of pregnant women about the importance of maternal nutrition which will have an impact on increasing efforts to prevent stunting. The assistance and counseling during pregnancy presented essential factors to determine the health status of pregnant women. in counseling, they know about the best diet for pregnancy, iron supplements, and how they must survive and be happy during pregnancy. Besides it, it might reduce complications during pregnancy, childbirth, and stunting. Several studies described early integrated interventions to reduce stunting in Indonesia, such as practical education to increase pregnant women's knowledge, attitudes, and practices about nutrition and reproductive health with a multi-sector approach⁽²⁰⁻²³⁾. Moreover, pregnant women need promotion and education to improve their maternal knowledge, attitudes, and practices due to more than a third of pregnant women do not know about stunting. Thus, increasing knowledge, attitudes, and behavior of pregnant women about diet, nutrition, and reproductive health consistently reduces stunting prevalent in Indonesia^(20,23).

The same as the knowledge of pregnant women and adequate nutrition, family support was also a critical factor influencing the life quality of pregnant women in this case study. According to Iskandar and Sofia's study, maternity mothers who had internal family problems had an 8,229 times risk of experiencing childbirth complications compared to those who do not have internal family problems⁽²⁴⁾. Family support provides for the physical needs of pregnant women and contributes to their psychological needs. So it might prevent anxiety, depression, and stress during pregnancy and baby labor. Several studies showed that symptoms of depression, anxiety, and stress were factors that had a strong negative impact on the quality of life of pregnant women. Sexual and domestic violence correlated to a lower quality of life and the experience of life-threatening events, and the experience of infertility^(25,26). Happiness at being pregnant and being optimistic make a better quality of life.

CONCLUSION

The conclusion of this study is that the health status, level of knowledge, and behavior of pregnant women showed an increase and change in a positive direction after the counseling and assistance. The counseling and assistance might prevent the risk of stunting. The assistance of pregnant women in Cindogo Village, Bondowoso Regency, improved anemia condition in pregnant women, knowledge about stunting, iron tablet supplements, diet during pregnancy, breastfeeding, and complementary feeding.

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