



Original Research

Perceived Benefits and Intakes of Protein, Vitamin C and Iron in Preventing Anemia among Pregnant Women

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ABSTRACT

Introduction: Nutritional adequacy is essential in ensuring the normal growth and development the fetus. Perceived benefits will be able to strengthen pregnant women to meet optimum nutritional intake to prevent anemia. Adequacy of protein, vitamin C and iron will reduce the risk of iron deficiency anemia in pregnancy. This study aims to examine the association between perceived benefits with protein, vitamin C, and iron intake in preventing pregnancy anemia.

Methods: This study used a cross sectional design and was conducted in August-October 2017 among 105 pregnant women. This study used the multistage random sampling method. The population of this study were pregnant women who had antenatal care in four Community Health Centre in Surabaya namely Jagir, Medokan Ayu, Sidotopo Wetan, and Gundih.

Results: The average daily protein intake was 76.34 (SD = 35.88) gram / day. There was a significant association between perceived benefits with protein intake ($r = 0.272$; $p = 0.005$). The average daily vitamin C intake was 90.67 (SD = 116.54) mg / day. There was no significant association between perceived benefits and vitamin C intake ($r = 0.175$; $p = 0.074$). The average daily iron intake was 64.73 (SD = 23.13) mg / day. There was a significant association between perceived benefits and iron intake ($r = 0.219$; $p = 0.025$).

Conclusion: The knowledge of pregnant women about the benefits of nutrition will affect the adequacy of pregnancy nutrition. Health workers need to provide health education on the importance of nutrition for pregnant women to prevent anemia during pregnancy.

ARTICLE HISTORY

Received: Feb 21, 2018

Accepted: Nov 28, 2018

KEYWORDS

anemia during pregnancy;
iron deficiency; perceived
benefits; protein;
vitamin C

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Cite this as: Triharini, M., Nursalam, N., Sulistyono, A., Adriani, M., & Hsieh, P.L. (2018). Perceived Benefits and Intakes of Protein, Vitamin C and Iron in Preventing Anemia among Pregnant Women. *Jurnal Ners*, 13(2), 156-161. doi:<http://dx.doi.org/10.20473/jn.v13i2.7712>

INTRODUCTION

Nutritional adequacy during pregnancy will affect the condition of the fetus. The incidence of malnutrition in pregnant mothers will lead to fetal development disorders, preterm labor, infant growth disorders, and the risk of development of chronic diseases (Metgud, Naik, & Mallapur, 2012). Preeclampsia and gestational diabetes are also associated with poor nutrition (Acharya et al., 2016; Ahmed & Tseng, 2013). Iron deficiency anemia remains a common problem in pregnancy. A study in the obstetric department of the First Affiliated Hospital of Guangxi Medical University showed that

there were more than 70% of pregnant mothers having iron deficiency anemia. That study result showed the incidence of preterm deliveries and low birth weight babies were significantly more in mothers who were anemic in the third trimesters of pregnancy (Huang, Purvarshi, Wang, Zhong, & Tang, 2015).

Several studies have shown factors related to the incidence of maternal anemia (Mekuria, Bekele, Tilahun, & Bekele, 2016; P. Singh, Khan, & Mittal, 2013). Study in Nepal found as many as 41.02% of pregnant mothers had anemia and the prevalence was higher in the second trimester of pregnancy and at the age of 20-35 years (P. Singh et al., 2013). A

research in Southern Ethiopia showed labor spacing of less than two years, iron supplementation, and the number of family members which is more than members two affected the incidence of anemia (Mekuria et al., 2016). Several studies supported the relationship between nutrition and hemoglobin levels (Bahar, 2011; M. B. Singh, Fotedar, & Lakshminarayana, 2009; Thomson et al., 2011). A research in Indonesia showed that maternal education level, nutritional status, and the intake of iron supplement, vitamin C were significantly associated with pregnancy anemia (Bahar, 2011). Research in Indian Western Rajasthan shows the majority of pregnant women have anemia showed a lack of protein and iron (M. B. Singh et al., 2009).

Nutritional problems in pregnant mothers can be caused by the presence of micronutrient interactions. Interactions between micronutrients will affect the absorption and bioavailability, such as the negative effects of calcium on iron absorption, while on the other hand vitamin C will increase the absorption of iron. An understanding of the interactions between micronutrients in nutrient intake is necessary as it will help to reduce the risk of micronutrient deficiency, improve micronutrient status, and reduce the risk of deficiency (Sandström, 2001).

The adequacy of nutritional needs in pregnant mothers will be met if they understand about the importance of nutrition in pregnancy. Knowledge of nutrition in pregnant mother sis influenced by several factors. A study at Gote Geda Woreda, East Wollega Zone, Ethiopia showed that the information on nutrition had a significant relationship with the knowledge of pregnant mothers about nutrition .That study showed women who had information about nutrition were 3.6 times more likely knowledgeable about nutrition as compared to the pregnant women with no information about nutrition during pregnancy (AOR=3.59) (Fekadu Beyene, 2013).The adequacy of protein, vitamin C, and iron in the daily diet of pregnant mothers needs to be considered because it has a role to prevent anemia (Abdelwahid, 2013; Brown & Shapiro, 1996; Rivera-rodriguez, Rodríguez-rivera, Roman-julia, & Raul, 2016; Sriramanakoppa, Sreenivas, & Jayaram, 2015). Pregnant mothers need to be given a health education about foods that contain of protein, vitamin C, and iron during antenatal care. Midwives play an important role to improve the understanding of pregnant mothers (Arrish, Yeatman, & Williamson, 2017).

Health education for pregnant mothers which focus on the perceived benefits about healthy nutrition will improve the nutritional behavior (Khodaveisi, Omid, Farokhi, & Soltanian, 2017). Currently there are not many studies that see the association between perceived benefits and nutritional intake to prevent anemia. This study aimed to examine the association between perceived benefits and the intake of protein, vitamin C, and iron in preventing pregnancy anemia.

MATERIALS AND METHODS

The population of this study were pregnant mothers who examined the pregnancy in four Community Health Center in Surabaya namely Jagir, Medokan Ayu, Sidotopo Wetan, and Gundih Surabaya. This study used multistage random sampling. This study used a cross sectional design which was conducted in August-October 2017 among 105 pregnant mothers. The inclusion criteria were pregnant mothers and those who had obtained iron tablet from Community Health Center. The exclusion criteria were pregnant mothers who had complications that required medical treatment. The data collected in this research included perceived benefits and the intake of protein, vitamin C, and iron. The demographic characteristics questionnaire consists of several questions that include age, parity, education level, income, and gestational age.

The questionnaires of perceived benefits were developed by researchers with items based on the theory of prevention of maternal anemia and the Pender health-promotion model (HPM) (Pender, 2011; Sharma & Shankar, 2010). Whilst preparing the questionnaire contents, the researchers were assisted by two experienced nurses in the field of maternity nursing. Translation was accomplished by a qualified translator from Indonesia. Perceived benefits were measured using a questionnaire based on Health Promotion Model theory and anemia theory (Sharma & Shankar 2010; Pender 2011). Before use in data collection, the compiled questionnaires were tested for validity and reliability on 15 pregnant women who attended antenatal care at the Community Health Centre of Keputih Surabaya. The questionnaire consists of six questions. The Cronbach's α was 0.911. The six questions featured a Likert scale with the following option strongly agree, slightly agree, hesitate, slightly disagree, strongly disagree.

Measurement of the intake of protein, vitamin C, and iron was done by 1 x 24 hours of food recall method in which the result was expressed in grams and mg (Supariasa, Bakri, & Fajar, 2002). Sample recruited was conducted after obtaining ethical approval from health research ethics committee of Faculty of Public Health Airlangga University Surabaya Indonesia (No 123-KEPK). Informed consent was obtained after pregnant mothers agree to participate in this research. Data analysis using Spearman's rho was used to determine the association between the perceived benefits and the intake of protein, vitamin C and iron. Descriptive statistics used frequency, percentage, mean and standard deviation to identify demographic characteristics, perceived benefits, and nutritional intake. The level of significance used alpha 0.05. The p value <0.05 indicated a significance. All data were analyzed using SPSS software.

RESULTS

Table 1 shows the socio demographic characteristics and nutrition intake of protein, vitamin C, and iron. The majority of respondents (n = 73, 68%) were 25-35 years old. Most of respondents (n = 73, 69.5%) had parity 1-3. Most of respondents (n = 81, 77.1%) had secondary education. The majority of respondents (n = 72, 68.6%) had an income below 3 million rupiah per month. Most of the respondents (n = 88, 83.8%) had gestational age below 37 weeks.

The greatest protein intake was in age 25-35 years (79.82 ± 38.09), parity was > 3 (93.90 ± 125.31), elementary education (79.04 ± 61.54), income was ≥ 3 million rupiah (80.56 ± 44.76), and gestational age was ≥ 37 weeks 81.02 ± 36.36). The greatest vitamin C intake was in age > 35 years (102.15 ± 130.03), parity was > 3 (209.70 ± 176.35), university education (116.58 ± 156.27), income was ≥ 3 million rupiah (101.42 ± 139.76) and gestational

age was ≥ 37 weeks 81.02 ± 186.05). The greatest iron intake was in age > 35 years (66.11 ± 15.87), nullipara (322.3 ± 112.8), university education (65.42 ± 9.67), income was <3 million rupiah (65.81 ± 24.14) and gestational age was ≥ 37 weeks 71.98 ± 10.11).

From five statements about the perceived benefits, the statement of "Consumption of nutritious and high iron will make the baby healthy" has the highest score (4.48 ± 0.54) and "Regular consumption of iron tablets can prevent infection" has the lowest score (4.10 ± 0.74) (Table 2).

The average score of perceived benefits was 25.64 (95% CI 25.08-26.20). The average protein intake of the study population was 76.34 (SD = 35.88) g/day. This was equivalent to 99.14 per cent of RDA recommended value for pregnant mothers in this population. There was a significant association between perceived benefits and the protein intake with positive and moderate association (r = 0.272; p

Table 1. Nutrition Intake in Pregnant Mothers (N=105)

No	n(%)	Protein (gram/day)		Vitamin C (mg/day)		Iron (mg/day)	
		Mean	SD	Mean	SD	Mean	SD
Age							
< 25 years	25 (23.8)	67.07	30.01	67.78	78.43	63.86	26.93
25-35 years	73 (69.5)	79.82	38.09	102.15	130.03	64.89	22.58
> 35 years	7 (6.7)	73.16	27.99	52.67	49.27	66.11	15.87
Parity							
0	30 (28.6)	73.77	35.31	106.49	119.33	65.14	26.07
1-3	73 (69.5)	76.92	36.56	80.91	113.38	64.64	22.01
>3	2 (1.9)	93.90	25.31	209.70	176.35	61.95	32.46
Education							
Elementary	14 (13.3)	77.49	31.76	115.25	166.31	65.26	33.86
Secondary	81 (77.1)	75.81	32.89	83.22	100.83	64.55	22.34
University	10 (9.5)	79.04	61.54	116.58	156.27	65.42	9.67
Income (Rupiah)							
< 3 million	72 (68.6)	74.40	31.15	85.75	104.94	65.81	24.14
≥ 3 million	33 (31.4)	80.56	44.76	101.42	139.76	62.37	20.94
Gestational age							
< 37 week	88 (83.8)	75.44	35.92	80.31	95.91	63.33	24.67
≥ 37 week	17 (16.2)	81.02	36.36	144.30	186.05	71.98	10.11

Note: 13.500 rupiahs equal to 1 US \$

Table 2. Items of Perceived Benefits Analysis (N=105)

No	Items	Mean	SD
1	Consumption of nutritious foods and high iron will make the baby healthy	4.48	0.54
2	Consumption of nutritious foods and high iron will make deliveries smooth	4.29	0.63
3	Regular consumption of iron tablets will make mothers become not quickly tired	4.24	0.69
4	Regular consumption of iron tablets can prevent infection	4.10	0.74
5	Washing hands before eating is important in preventing anemia of pregnant mothers	4.18	0.83
6	Using footwear when out of home is necessary for the health of pregnancy	4.36	0.69

Table 3. The Relationship between Perceived Benefits and Nutritional Intake (N=105)

No	Variable	Mean	SD	RDA value	% of RDA Value	Min-Max	r	p-value
1	Perceived benefits	25.64	2.89			19-30		
2	Protein (gram)	76.34	35.88	77	99.14	76.34-250.9	0.272	0.005
3	Vitamin C (milligram)	90.67	116.54	85	106.67	0.8-629.7	0.175	0.074
4	Iron (milligram)	64.73	23.13	126	51.37	9.6-125.3	0.219	0.025

SD - Standard Deviation; RDA: Recommended Dietary Allowance; r = Spearman correlation coefficient; p < 0.05

= 0.005). The average of vitamin C intake of the study population was 90.67 (SD = 116.54) mg/day. This was equivalent to 106.67 per cent of RDA recommended value for pregnant mothers in this population. There was no significant association between perceived benefits and vitamin C intake ($r = 0.175$; $p = 0.074$). The average of iron intake of the study population was 64.73 (SD = 23.13) mg/day. This was equivalent to 51.37 per cent of RDA recommended value for pregnant mothers in this population. There was a significant association between perceived benefits and iron intake with positive and weak association ($r = 0.219$; $p = 0.025$) (Table 3).

DISCUSSION

The result of this study found that the statement of "Consumption of nutritious foods and high iron will make the baby healthy" had the highest score, while the statement of "Regular consumption of iron tablets can prevent infection" had the lowest score. The knowledge of pregnant mothers about the prevention of anemia had been obtained by mothers through health education from healthcare providers during antenatal care, as well as from the mass media. Pregnant mothers had understood the benefits of eating nutritious foods but had not fully figured out the benefits of the adherence to iron supplementation. There were still many pregnant mothers who did not adhere to taking iron supplementation although iron supplements have been shown to increase the levels of hemoglobin to prevent the occurrence of anemia (Sajith et al., 2016). Iron supplements need to be taken regularly by every pregnant mother every day during her pregnancy or at least 90 tablets. Daily oral iron supplementation with 60 mg of elemental iron and 0.4 mg folic acid (Health Ministry of health, 2014).

The adequacy of nutrients during pregnancy will contribute greatly to the health of the fetus and the well-being of pregnant mothers. However, the result of the study found that many pregnant mothers having not received adequate nutrition were those who were among the group of underweight or overweight/obese, smokers, adolescents, and those with previous unfavorable pregnancy outcomes (Marangoni et al., 2016). Underweight conditions during pregnancy are associated with poor fetal development, preterm, and an increased risk of chronic disease later in life, while pregnant mothers will be at risk of gestational diabetes and preeclampsia (Ahmed & Tseng, 2013).

Food recall in this study showed that the intake of protein and vitamin C in this population was in good category but the intake of iron was still in the low category. The adequacy of iron in the diet is influenced by maternal adherence to Fe supplements. Each iron supplement for pregnant mothers at least containing iron that was equivalent to 60 mg of iron elements (in the form of Ferro Sulfate, Ferro Fumarate or Ferro Gluconate)

preparations; and Folic Acid 0.400 mg (Health Ministry of health, 2014). Some studies supported the low iron adequacy in pregnant mothers (Mosha et al., 2017; Sato, Fujimori, Szarfarc, Borges, & Tsunehiro, 2010). The inadequacy of iron in the diet in this population might be influenced by the respondent's characteristics with the lowest mean intake of iron with more than 3 parities. The majority of respondents in this study had income less than 3 million. The provision of food in the family is closely related to the appetite of other family members and the priority of financial use. A study supported the relationship between socioeconomic and dietary patterns in pregnant mothers. A study showed the mother with higher level of financial resources to buy food, has higher consumption of saltwater fish, fruit, products being the source of animal protein (Suliga, 2013; Völgyi et al., 2013).

The result showed a significant association between the perceived benefits and the intake of protein and iron. Perceived benefits of actions reinforce consequences for certain health behaviors. Perceived benefits can increase individual's commitment in conducting health behavior. Perceived benefit is a concept of Pender Health Promotion Model that supports 6 major components of healthy lifestyle. These components include health responsibility, physical activity, nutrition, spiritual growth, interpersonal support and stress management (Eshah, Bond, & Sivarajan, 2010). The results of several studies supported that perceived benefits can improve health behavior in various areas (Kim, Ahn, & No, 2012; Lovell, Ansari, & Parker, 2010; Noroozi, Esmaili, Tahmasebi, & Vahdat, 2017; Salahshoori, Sharifirad, Hassanzadeh, & Mostafavi, 2014). In this study perceived benefits were associated with the prevention behavior of anemia during pregnancy. Pregnant women with good perceived benefits will try to meet the daily nutritional adequacy despite the obstacles experienced.

Pregnant mothers can experience many obstacles in fulfilling daily nutritional needs. A study of iron supplementation showed that the majority of pregnant mothers suffered from gastrointestinal disorders such as nausea, diarrhea and constipation (Tolkien, Stecher, Mander, Pereira, & Powell, 2015). A study looked at the perception of anemia pregnancy and its prevention in several countries. That study showed Pregnant mothers in Bolivia, Guatemala, and Honduras had realized that the consequences of anemia were serious and anemia can be fatal for both mother and baby. Result that study in Indonesia showed that anemia was equal to the term low blood pressure. Some pregnant mothers stated that consumption of iron supplements would increase blood and was associated with hypertension (Galloway et al., 2002). The difference in perceptions of pregnant women about anemia shows the importance of health education about anemia to

improve anemia prevention behavior in pregnant women.

CONCLUSION

The finding from this study has confirm that mother with good perception on benefits will have better intake of protein and iron in pregnant mothers. Health workers need to provide health education to every pregnant woman to increase the perceived benefits of preventing anemia. A good understanding of the importance of prevention of anemia, will improve the behavior of mothers in fulfilling daily nutritional needs, especially protein, vitamin C and iron.

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