The Analysis of Anemia Prevention Model in Pregnant Women in Banten

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Abstract: Anemia among pregnant women, especially in developing countries is still becoming problematic. Although several programs implemented, they showed a modest impact on the reduction. It is essential to develop the efficient approach for tackling this problem. This study was aimed to identify and develop the model of anemia associated modality care that can be used for preventing and managing of anemia during pregnancy. This research was a cross-sectional study of creating a prevention model using Structural Equation Modeling (SEM PLS) technique. This technique was to find out which indicator variables has the direct and indirect influence of causing anemic pregnant women. This research was conducted in the Kaduhejo, Pandeglang, Banten in 2018 and involved 258 pregnant women living with their families. These respondents were recruited using multistage cluster sampling. Data collection was conducted by a questionnaire to identify the pregnant women characteristics and maternal knowledge, attitudes, perceptions, and family support. The models were constructed to arrange the intervention module as well as analyzing model using SEM-PLS. The results of this study showed that exogenous variables had a statistically significant T value reflected on the variable> 1.96, thus indicating that the indicator block had a positive and significant effect of reflecting the variable. In conclusion, anemia among pregnant women influenced by direct factors, such as family support, maternal knowledge and perception.

Keywords: Anemia, pregnant women, family support, knowledge, perception, attitude.

INTRODUCTION

Maternal Mortality Rate (MMR) is one indicator that is considered to the quality and accessibility of health care facilities. The maternal mortality rate in developed countries is 9 per 100,000 live births, and in developing countries, it reaches 450 per 100,000 live births. Indonesia has a maternal mortality rate of 200 - 499 per 100,000 live births. Indonesia is ranked 12th (out of 18 countries in ASEAN and SEARO) for the maternal mortality rate of 359 per 100,000 live births [1].

A systematic review concluded that in Asia, anemic pregnant women are 7.26 times more at risk of maternal death. The breakdown of direct causes of maternal death in Indonesia included 30.3% by bleeding, 27.1% by hypertension, 7.3% by infections, and 40.8% by other causes. There was no contribution of old parturition and abortion in maternal death [2]. In Indonesia, it was reported that among around 4 million pregnant women, half had anemia, and one million had a chronic energy shortage. There were almost 37.1% anemic pregnant women with Hb level less than 11.0 g/dl and, almost the same proportion in the urban areas (36.4%) and countryside (37.8%) [3, 4].

Research that was conducted by Suega (2002) states that education, knowledge and occupational are the main factors of anemia. The factor of intake iron tablet is a factor that reduces the risk of anemia in pregnant women. A factor that contributes to anemia is a belief or culture about certain dietary restrictions for pregnant women [5].

The Indonesian Ministry of Health has implemented a free iron tablet program for pregnant women at the Puskesmas and Posyandu and distribute 300 mg iron tablets and 0.5 mg folic acid tablet for free to all pregnant women, one tablet per day for 90 days. One iron tablet contains 200 mg of ferrous sulphate and 0.25 mg of folic acid, which is equivalent to 60 mg of iron and 0.25 mg of folic acid [1]. Data from the Ministry of Health found coverage of Fe tablets in Indonesia in 2012 was 85%. However, this does not necessarily reduce the rate of anemia in pregnant women [6].

Compliance of pregnant women taking blood-added tablets is an important factor in ensuring an increase in hemoglobin levels in them. Various factors, such as poor knowledge and attitudes as well as the practice of pregnant women about the side effects of iron tablets can trigger a person to not adhere to the consumption of iron tablets properly, hence, not achieving the purpose of the iron tablet [7]

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The results of the FGDs for pregnant women and families contrasted with the results of the FGDs conducted for three village midwives. Two out of three village midwives reported that they carried out counseling at pregnant mothers' classes held at the Puskesmas. Counselling is carried out only as a recommendation to consume Fe tablets and nutritious foods without accompanied by a system or means of controlling the compliance of Fe tablets and nutritious food consumption. In addition, counselling also only focuses on pregnant women without involving family or the surrounding environment, which can affect the perceptions and behavior of pregnant women in carrying out their pregnancy.

The importance of protein consumption for pregnant women is one of the focus points on managing anemia. The level of protein consumption is influenced by maternal behavior, including person's beliefs. A growing evidence in the literature showed that family support can influence maternal behavior, through affecting beliefs, social identity, provide information and services when interacting with the community [8] [9]. Thus, a family, as the smallest component of society, should be involved in handling anemia in pregnant women. Based on this description the researchers felt that it was necessary to create a model that could ultimately foster self-awareness and independence, and the support of the families of pregnant women in dealing with anemia.

Based on the problem described, we intend to develop a model that can prevent and reduce the occurrence of anemia in pregnant women through efforts to manage anemia in pregnant women. This model is based on a variety of theories related to behavior, degree of independence and family support such as the theory of planned behavior, health belief model theory, family support theory, proceed-precede theory, and behavioristic theory. The model formed in this study is called the RUKMA Model with emphasis on pregnant women and their families.

METHOD

This research is a quantitative study carried out by statistical tests to identify the frequency distribution and proportion of research variables and proceed by using the Structural Equation Modeling (SEM PLS) technique to find out which indicator has the direct and indirect effect on the factors in the model that encourage anemia in pregnant women.

This research was conducted in the Kaduhejo, Pandeglang, Banten, in 2018. This study involved 258

pregnant women living with their families. The sampling technique is *multistage cluster sampling*. The data collection was carried out through questionnaires developed by researchers to obtain characteristics of pregnant women, maternal knowledge, attitudes, perceptions, and family support.

RESULTS

The frequency distribution test results showed that anemic mothers were 60.9%. The result showed that

Table 1: Frequency Distribution of the Anemia Prevention Model in Pregnant Women

Variable	Frequency	Percentage (%)
Anemia		
Yes	157	60.9
No	101	30.1
Age		
Risky	50	19.4
Not at risk	208	80.6
Family relationship		
Husband	218	84.5
Mother/father	17	6.6
In-laws	4	1.6
Others	19	7,4
Ethnics		
Java	12	4.7
Sunda	240	93.0
Betawi	2	0.8
Batak	1	0.4
Others	3	1,2
Income		
> = UMR	60	23.3
<UMR	198	76.7
Family support		
Less	178	69
Well	80	31
Family Knowledge		
Less	214	82.9
Well	44	17.1
Family Attitude		
Less	160	62
Well	98	38
Mother's Knowledge		
Less	156	60.5
Well	102	39.5
Mother's Perception		
Less	158	61.2
Well	100	38.8
Mother's behavior		
Less	219	84.9
Well	39	15.1

Table 2:   The Evaluation of Reflection Value of T Value on Indicators from Each Variable

Significant Test	Indicator	T-statistic	Reflection > 1,96
T Statistic	Fe Knowledge	14,966	Significant
	Nutritional knowledge	124,335	Significant
	Anemia Knowledge	304,911	Significant
	Affective attitude	21,463	Significant
	Cognitive attitude	5,725	Significant
	Conative attitude	82,782	Significant
	Perception of seriousness	49,326	Significant
	Perception of vulnerability	65,699	Significant
	Perception of obstacles	80,329	Significant
	Perception of Profit	72,982	Significant
	Informational Support	105,421	Significant
	Award support	58,083	Significant
	Instrumental support	16,621	Significant
	Emotional support	35,223	Significant
	Consumption of Fe	96,505	Significant
	Protein Consumption	67,426	Significant
	HB levels	178,415	Significant
	Physical Signs	15,273	Significant

80.6% of women were not at risk while remaining were at a risky age. Most of the pregnant had income less than UMR. Not enough support from family, lack of knowledge of the family (82.9%) and mother (60.5%) about anemia, less maternal perception (61.2%), less maternal behavior (84.9%), and less husband/family attitude (62%) showed highest percentages.

The results of the inner model significant evaluation were arranged in the Smart PLS output below by evaluating the reflection of the T value of the indicator statistics on the variable.

By looking at Table **2**, it can be deduced that the statistical T value reflects mostly on the variable > 1.96,

thus indicating that the indicator block has a positive and significant effect to reflect the variable.

Table **4** illustrates that family support has direct and indirect effects on anemia prevention behavior in pregnancy. The coefficient test shows that for anemia, family support showed that there is 19.36% of the effect on anemia, while knowledge has 59.23%, the perception has 7.75%, and attitude has 97.8%. The indirect effect between family support and anemia prevention behavior is 6.79%, the indirect effect between knowledge and anemia prevention behavior is 3.60%, the indirect effect between perception and anemia prevention behavior is 13.75%, and the indirect effect between attitude with anemia prevention

Table 3:   The Effects of Variables on Knowledge, Attitude, Perception, Family Support and Prevention of Anemia Behavior

Direction of influence	Coefficient	T value	P
Knowledge-Behavior-Anemia	.804	89,223	0,000
Knowledge-Attitude-Behavior-Anemia	0.690	23,040	0,000
Knowledge-Behavior-Anemia	0.385	10248	0,000
Attitudes-Behavior-Anemia	-0,021	1,089	0.277
Perception-Behavior-Anemia	0.115	3,483	.001
Support-Behavior-Anemia	0.288	6,013	0,000

Table 4: The Percentage of Influence between Knowledge, Attitude, Perception, Family Support and Mothers Behavior Variables

Source	LV Correlation	Direct Path	Indirect Path	Total	Direct %	Indirect %	% Total
Anemia	1,000	-	-	-			
Support	0.880	0.220	0.125	0.345	19.36	6.79	26.15
Knowledge	0.917	0.646	0.218	0864	59.23	3.60	62.83
Behavior	0.928	-	-	-	-	-	-
Perception	0.834	0.093	0.031	0.124	7.75	6.0	13.75
Attitude	.652	0.015	-0.005	0.01	.978	0.01	.998

behavior by 0.01%. From each of the direct influences of these exogenous latent variables, R *square* result of family support, mother's knowledge, perceptions and attitudes of the mother is 87.318 (19.36% + 62.83% + 13.75% + 0.998%). It can be concluded that anemia in pregnancy is majorly caused by the direct influence of family support, knowledge and perception of the mother.

Prevention Efforts Model of Anemia for Pregnant Women

Based on the results of the construction model further developed the model as effort prevention and treatment of anemia in pregnancy (Figure **1**). Figure **1** shows that the RUKMA model consists of five interrelated variables. A knowledge variable consists of the domain of knowledge about anemia, proteins and blood enhancer tablets. Variable perception consists of domain perception barriers, vulnerabilities, seriousness and profit perception. Variable of family support consists of domain support informingly, awards, instrumentals and emotional support indirectly affect

the behavior of pregnant women in consuming blood enhancer tablets and foods containing proteins that further affect anemia in pregnancy.

DISCUSSION

The results of this research at first step obtained that 157 respondents (60.9%) suffering from anemia. 60.5% of respondents had low knowledge of anemia, having a perception with a negative category as much as 158 (61.2%) and negative behavior category less than 219 people (84.9%). Low family knowledge included as much as 178 people (69%), and the family support category had 178 (69%). This research shows that the majority of pregnant women (59.5%) have a little knowledge regarding anemia. This is different from previous research that found that the level of knowledge about anemia is almost universal, which meets the target (95%) established by the Malawi Health Department [10].

From the results of the analysis using Smart PLS obtained the effect of knowledge variables, family
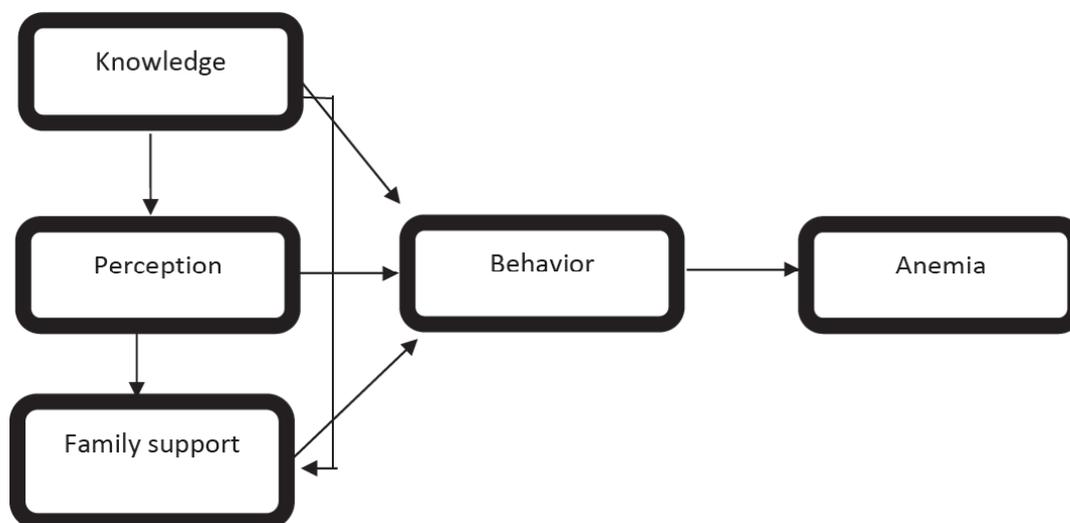

Figure 1: Prevention efforts Model of Anemia for Pregnant Women.

knowledge, family support, mother's perception and behavioral variables on mother. Health education can change and improve the behavior of people because the knowledge of the mother and family improved. This is in accordance with the research conducted by Venkatrama *et al.* (2017) where most of the research participants had little knowledge of anemia [11]. The other research also mentions that there is still a lack of knowledge in pregnant women about anemia, high intake of food Fe and knowledge of the importance of iron consumption in pregnancy [12].

A study concluded that counseling has a significant influence on knowledge (the P value of the < 0.0001) attitude (value P 0.007) and Behavior (0.02). That is why counselling is necessary to prevent the occurrence of anemia in pregnant women [13]. In research conducted by Wati and Rahardjo (2003) mentioned that the behavior of pregnant women has a significant relationship with the occurrence of anemia, but the knowledge was not significant relationship against anemia [14]. According to a study by Kautsar *et al.* (2013), it indicated that the efforts made by family especially the husband in the face of pregnancy could increase the compliance of pregnant women in consuming iron tablets [15]. Other researchers have also shown that one of the factors that could affect a person's level of compliance in the process of treatment is family support [16].

Another factor is the perception of expectant pregnant women. The perception does not just appear to be. There are several factors affecting a person's perception depending on the ability of individuals responding to the stimulus. The ability to interpret something can differ between one person and the other, and it could be due to different reasons. In addition, public health workers have a very important role, can be said as a pioneer of community development, especially public health development at the level of Public Health Center or district [17] [18] [19].

The results of this research illustrated that women with good knowledge of iron supplementation in pregnancy are more than six times likely to fulfill iron supplementation than those with less knowledge. Therefore, it can be concluded that by providing education in pregnant women about the importance of iron supplementation in pregnancy can increase their adherence to the consumption of iron supplements during pregnancy [20] [21]. As theory reveals that education can affect a person, as well as a person's

behavior, can be a motivating factor in influencing the lifestyle, especially in motivating to behave. Education affects the learning process, the higher one's education, the more easily the person receives information from either another person or from the mass media [22].

The way women see anemia and react to the consumption of iron tablets differs depending on region, country or ethnic group. The study found that the majority of pregnant women (91.5%) is Sundanese ethnicity. It allows them to have the same viewpoint about anemia and prevention of anemia. In addition, the majority of expectant pregnant women have a negative perception and attitude regarding the prevention of anemia. Perception is closely related to attitude. Perception is the process by which organisms interpret and regulate sensations to produce a meaningful world experience [23].

Perceptions of pregnant women in visiting Prenatal healthcare services are often exposed to even prescribed with iron supplements, but generally, do not know why they are prescribed. Some women have the belief that consuming iron tablets has many adverse side effects. Women of reproductive age may not consider themselves risky, and then they may not seek treatment before childbirth, including the iron supplement.

Women who are exposed to nutritional education have a much better understanding of the causes, symptoms and prevention of anemia. Another study found that maternal education was important in reducing the risk of anemia and iron deficiency [21]. In addition, education-based interventions employ small group discussions effective in empowering young women to prevent iron deficiency anemia [24] [25]. Efforts should be made to educate women and increase their level of economic status. Thus, the prevalence of anemia can be reduced substantially. The research involved family members who treated expectant pregnant women to increase their knowledge, attitudes, and support to reduce anemia. Partoazam suggests that education interventions on the knowledge and practices of students and their pregnant women can effectively prevent anemia due to iron deficiency [26].

The research reveals that involving family members as targets to receive health education carries a positive effect. Advocacy is required at the level of governance after developing a frame of reference to understand anemia in pregnancy. We suggest that healthcare

professionals should involve families in providing health education in pregnant women, which has proven beneficial in lowering the prevalence of the disease. Health education and mobile phone control application programs are required to be applied in antenatal service [27-29].

A study demonstrated that the family support factor helps pregnant women who suffer from anemia not only in terms of monitoring of the consumption of iron tablets by pregnant women routinely but also about the adequacy of nutritional needs of pregnant women and motivate pregnant women to have their pregnancies inspected through the scheduled antenatal care. Support of family will motivate a pregnant woman to make a change of behavior in the form of obedience and independence to better maintain her health [30].

CONCLUSION

Pregnant women who have anemia in developing countries according to WHO amounted to 52%, while in Indonesia there are still 37.1% pregnant women have anemia. The factors majorly affecting anemia in pregnant women consists of three variables family support, perception and behavior. The indirect relationship of these factors has a smaller role compared to the direct relationship of these variables with anemic pregnant women.

ETHICS

Research Ethics Committee at the Faculty of Medicines, Andalas University, Padang, Indonesia N0. 343/KEP/FK/2017.

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