

CONTROLLING CHRONIC ENERGY DEFICIENCY AMONG PREGNANT MOTHERS THROUGH THE USE OF KIA BOOKLETS

¹Teungku Nih Farisni, ¹Yarmaliza, ¹Fitriani, ¹Veni Nella Syahputri
¹Faculty of Public Health, Teuku Umar University, West Aceh

Abstract: The rate of Chronic Energy Deficiency (CED) cases is still very high in Indonesia, including in West Aceh Regency. In 2018, 168 pregnant mothers in West Aceh suffered from CED. The current research aimed to reduce the number of CED cases among pregnant mothers. The design of this research was observational in nature and utilized a control case, with the population that included all pregnant mothers in Aceh Barat Regency. The sample was composed of a case group was composed of mothers who suffered from CED and did not possess Mother and Child (MCH) booklets, while the control group was composed of pregnant mothers who were closest neighbors to the members of the case group, who did not suffer from CED and owned MCH booklets. Penelitian ini dilakukan pada bulan Februari-Juni 2018. Data collection was conducted through interviews and measurements. Data was analyzed through univariate, bivariate (chi-square), and multivariate (multiple logistic regression test) methods. The research found that there was lack of knowledge among pregnant mothers who suffered from CED (61.4%), who attended less than four sessions of ANC (antenatal care) (60.5%), who did not consume Fe tablets (59.4%), and who did not consume adequate nutrition (67%). The most dominant risk factor was Fe tablet consumption with a value of $p = 0.000$ and $OR = 9.2$. CED among pregnant mothers can be controlled by optimal utilization of MCH booklets through empowering family members and understanding that Fe consumption is essential during pregnancy.

Keywords : Fe, Anemia, ANC, CED, MCH

Introduction

The issue of mothers' health is a national issue that needs to be prioritized because it significantly determines the quality of human resources to come. The high maternal mortality rate (MMR), as well as its slow reduction, shows that Mother and Child Health services need to be improved both in coverage and quality.⁽¹⁾

The problem of nutrition in Indonesia is still dominated by problems related to malnutrition, which include protein deficiency, iron deficiency anemia, iodine deficiency issues, and Vitamin A deficiency. Malnutrition is most often found in vulnerable groups in the society, namely groups that are most prone to malnutrition as well as nutritional deficiencies.⁽²⁾

To date, maternal mortality rate (MMR) and infant mortality rate (IMR) in Indonesia are still considerably high. The Basic Health Research (or "Riskesdas," a nation-wide research conducted every 5-6 years by the Ministry of Health of the Republic of Indonesia) found that the maternal mortality rate (MMR) in 2012 was 228 per 100,000 live births (LBs) and the infant mortality rate (IMR) was 34 per 1,000 LBs.⁽³⁾

Results from the 2012 Health Demography Survey of Indonesia (*Survey Demografi Kesehatan Indonesia*, SDKI) showed that maternal mortality rate (MMR) in Indonesia was as high as 359 per 100,000 LBs and the infant mortality rate (IMR) was as high as 32 per 1,000 LBs. Regional reports received by the Ministry of Health of Indonesia showed that 5,019 mothers died from pregnancy and giving birth. Meanwhile, based on SDKI's estimation, 160,68 Indonesian babies died. This whole condition has not met the Millennium Development Goals (MDGs) for 2015, which was an MMR of 100 per 100,000 LBs and

IMR of 9.1 per 1,000 LBs; thus, it is necessary that all components in the society put all effort to reach the targets.⁽⁴⁾

One of the efforts to raise the level of maternal health is through the Mother and Child Health (MHC) program (or known in Indonesia as “KIA Program”). The goal is to increase family independence in fostering the health of mothers and children. In the family, mothers and children are the most vulnerable to various health problems such as illnesses and malnutrition, which often lead to disability or death. To achieve family independence in maintaining the health of mothers and children, one of the efforts encouraged in the program is increasing knowledge and skills of families by utilizing the Mother and Child Health (MHC) booklets.⁽⁵⁾

The MHC booklet serves as a tool to detect early health problems and other mothers and children issues, a media for communication and education with important information for mothers, families, and the society regarding health services for mother and children, including referrals and standards for mother and child services, nutrition, immunization, and infant growth. Minister of Health of the Republic of Indonesia’s Decree Number 284/Menkes/III/2004 states that Mother and Child Health booklets are the source of information as well as the sole recording tool held by pregnant mothers and mothers of infant; that health officials are responsible for their utilization; that their procurement and distribution are conducted by the Government in collaboration with non-government organizations (NGOs), professional organizations, and the private sector.

Chronic Energy Deficiency (CED) is the malnourished condition of pregnant mothers and women during productive age caused by continuous lack of energy and protein intake, which can lead to certain illnesses and disorders. Those who suffer from CED tend to give birth to babies with low birth weight. Such condition is characterized by body weight of less than 40 kg or appearing thin with mid upper arm circumference value lower than 23.5 cm.⁽⁶⁾

In 2018, the Health Agency of Aceh Barat Regency recorded that, from 13 Community Health Centers (Puskesmas), 168 mothers suffered from Chronic Energy Deficiency (CED).⁽⁷⁾ The current research aimed to reduce the number of CED cases among pregnant mothers in Aceh Barat Regency.

Method

The design of this research was observational in nature and used a control case, with a population consisting of all pregnant mothers in Aceh Barat Regency. The sample was composed of a case group of 51 pregnant mothers and a control group of 51 pregnant mothers. The case group was composed of mothers who suffered from CED and did not possess MHC booklets, while the control group was composed of pregnant mothers who were the closest neighbors to the members of the case group, who did not suffer from CED, and who possessed MHC booklets.

The sampling technique of this study is purposive sampling. The Inclusion criteria are :

1. Pregnant women in II trimester pregnancy
2. Pregnant women who are willing to be interviews and do the measurement
3. Pregnant women who are willing to be given Fe tablets for 90 days (control group)

Whereas, the exclusion criteria of this research are :

1. Pregnant women in trimester I dan III
2. Pregnant women who are not willing to be interviews and are not willing to do the measurement

The data collection of this study were collected by interviewing 51 pregnant women, providing 90 Fe tablets for pregnant women of the control group, observing, and measuring LILA of pregnant women. this research was conducted on february up to june 2016. The obtained data applying quantitative approach was processed by implementive univariat,bivariat, and multivariat analysis.

Results

Most of the respondents (32.4%) were of the age group of 30-34 years. About 52.9% of them had completed high school education. Most respondents (72.5%) were unemployed. Table 1 presents the complete data.

Based on univariate analysis of independent variable distribution on the case and control groups, it was found that a greater percentage of the cases lacked the adequate maternity-related knowledge, had a history of attending less than 4 ANC (antenatal care) sessions, had a history of consuming less than 90 Fe tablets, and had a history of poor nutritional status.

Tabel 1.

| Variable | Category | n | % |
|---------------------|------------------|----|------|
| Maternal Groups | Age 20-24 years | 22 | 21.6 |
| | 25-29 years | 24 | 23.5 |
| | 30-34 years | 33 | 32.4 |
| | 35-39 years | 11 | 11.4 |
| | 40-44 years | 12 | 11.8 |
| Maternal Education | No Schooling | 6 | 5.9 |
| | Elementary | 11 | 10.8 |
| | Middle | 16 | 15.7 |
| | High | 54 | 52.9 |
| | Diploma | 4 | 3.9 |
| | Higher Education | 11 | 10.8 |
| Maternal Occupation | Civil Servant | 5 | 4.9 |
| | Teacher | 4 | 3.9 |
| | Employee | 9 | 8.8 |
| | Farmer | 7 | 6.9 |
| | Merchant | 3 | 2.9 |
| | Housewife | 74 | 72.5 |

Table 2. Relationship of Model Variables with CED Control in Pregnant Mothers

| Model Variable | Category | CED Control on Pregnant Mothers | | | | P-value RP |
|---------------------------|--------------------|---------------------------------|------|---------|------|-------------------|
| | | Case | | Control | | |
| | | n | % | n | % | |
| Knowledge | Good | 21 | 36.2 | 37 | 63.8 | 0.020 RP = 3 |
| | Poor | 27 | 61.4 | 17 | 34.1 | |
| ANC | 4 visits | 22 | 37.3 | 37 | 62.7 | 0.002 RP = 5.4 |
| | Less than 4 visits | 26 | 60.5 | 17 | 39.5 | |
| Consumption of Fe Tablets | Done | 7 | 21.2 | 26 | 48.1 | 0.000 RP = 8.9 |
| | Not done | 41 | 59.4 | 28 | 51.9 | |
| Role of Health Officials | Present | 14 | 29.8 | 33 | 70.2 | 0.002 RP = 4 |
| | Absent | 34 | 61.8 | 21 | 38.2 | |
| Nutritional Status | Good | 16 | 33 | 35 | 64.8 | 0.001 RP = 8.4 |
| | Poor | 32 | 67 | 19 | 35.2 | |

Results of bivariate analysis showed that based on various risk factors being researched, 5 factors were proven to be related to the incidence of CED among pregnant mothers. The univariate and bivariate analysis results can be seen in Tables 1 and 2 below:

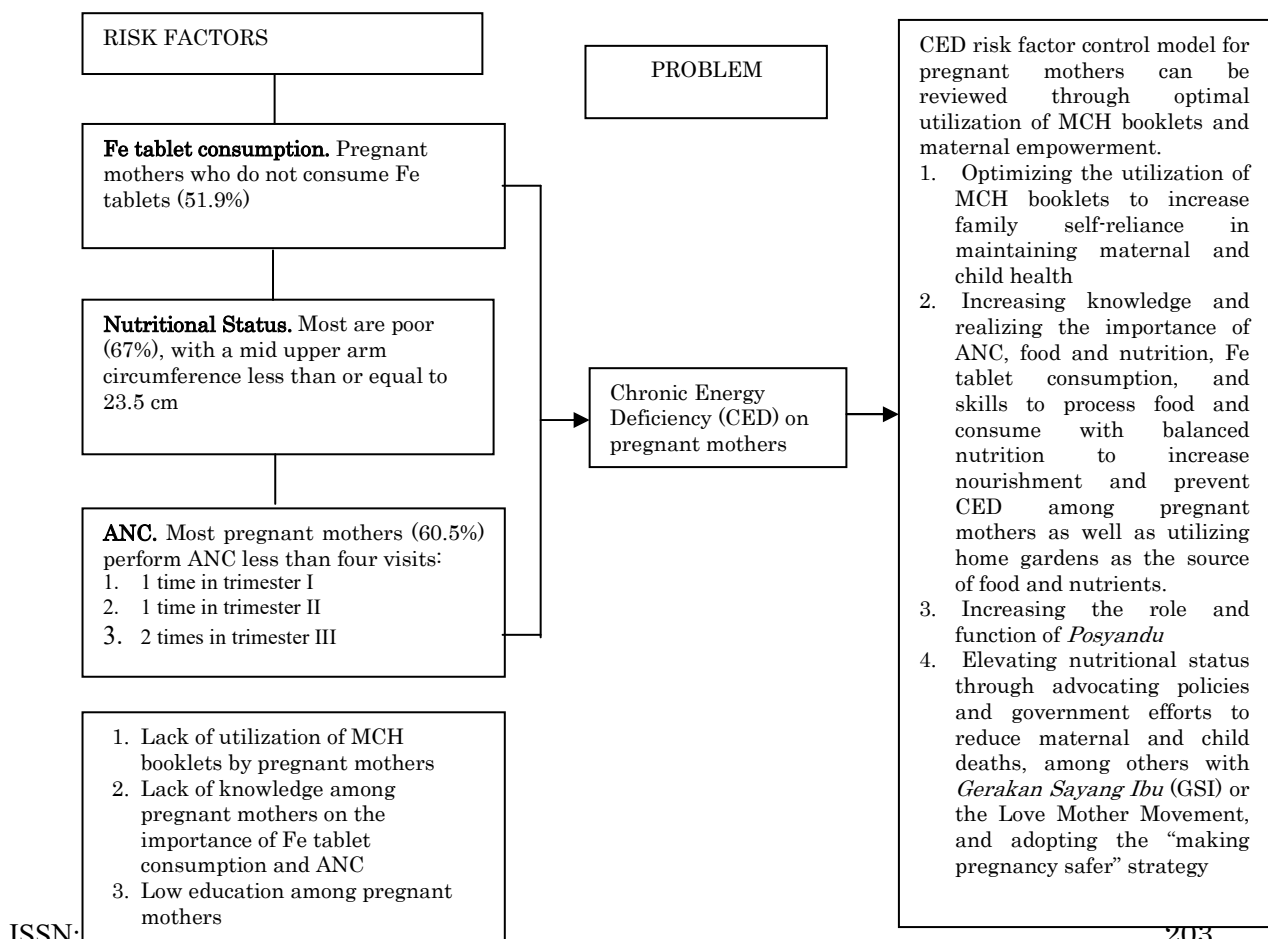
Based on Table 2, from the bivariate results of the relationship between maternal knowledge and CED, it was found that CED events significantly affects (p -value < 0.020) pregnant mothers (OR = 3). It could be interpreted that the factor of less knowledge, derived from the MCH booklets possessed by pregnant mothers, will increase the risk of suffering from CED by 3 times. The ANC factor was found to be significantly related to the incidence of CED (p -value < 0.000) where OR = 5.4. It could be interpreted that the ANC factor < 4 time invitations increases the risk for pregnant mothers to suffer from CED by 5.4 times. The factor consumption of Fe tablets was found to be significantly related to the incidence of CED (p -value < 0.000) where OR = 8.9.

Table 3. Final Model that Affects CED

| Independent Variable | Constant | OR | 95% CI | p-value |
|---------------------------|----------|-----|------------|---------|
| ANC | 1.9 | 5 | 1.55-11.4 | 0.0014 |
| Nutritional Status | 2.11 | 8 | 3.01-22.37 | 0.002 |
| Consumption of Fe Tablets | 3.15 | 9.2 | 3.81-25.10 | 0.000 |

It could be interpreted that are not consumption of Fe tablets increases the risk for pregnant mothers to suffer from CED by 8.9 times

The factor of health officials was found to be linked to CED incidence with a significant relationship (p -value < 0.002) with OR = 4. It could be interpreted that the factor of health officials unupport increases the CED risk among pregnant mothers by 4 times. The factor of nutritional status has a relationship with CED incidence on pregnant mothers (p -value < 0.0001) and it was found that OR = 8.4. It could be interpreted that the poor nutritional status factor increases the risk of CED among pregnant mothers by 8 times.



Based on Table 3, the results of multivariate between risk factors toward the incidence of CED among pregnant mothers, three variables were found to demonstrate meaningful model variables (p -value < 0.05). The three models are consumption of Fe tablets, nutritional status, and ANC. The most dominant variable in relation to CED incidence among pregnant mothers is consumption of Fe tablets, with the highest OR value of 9.2, which means that pregnant mothers who do not consume Fe tablets during pregnancy are 9.2 times more vulnerable to CED compared than pregnant mothers who consume enough Fe tablets during pregnancy.

Based on the statistical analysis that has been performed and based on the 1990 UNICEF framework on nutritional determinants, a multilevel promotion model was then developed to control the risk factors of CED among pregnant mothers.

Discussion

From all the factors analyzed, the factor of Fe tablet consumption showed the highest value and greatest risk factor in CED cases among pregnant mothers. Based on the National Food and Nutrition Workshop in 1998, a pregnant mother needs additional nutrition in the amount of 20 mg per day on the average. Meanwhile, in normal conditions or during pre-pregnancy, a woman needs on average 26 mg Fe per day (ages 20-45 years).⁽⁸⁾ A pregnant woman tends to suffer from anemia during the last three months of pregnancy because, during this time, the fetus builds iron reserves for itself in order to supply its needs during the first postnatal month.⁽⁹⁾

In this research, most pregnant mothers (51.9%) did not consume Fe tablets and around 70% of pregnant mothers only consumed 30 Fe tablets during pregnancy. Pregnant mothers who did not consume Fe tablets were at greater risk of suffering from CED during pregnancy. This research is in line with previous research that revealed the relationship between Fe consumption and the incidence of CED among pregnant mothers.

The nutritional status factor that puts pregnant women at greater risk of CED is the body mass index (BMI) of less than 18.5. The nutritional status of pregnant mothers is determined by weight gain during pregnancy, which is obtained from the subtraction of body weight of the mother before giving birth by the pre-pregnancy body weight.⁽¹⁰⁾ This is in line with previous research that revealed the relationship between nutritional status and the incidence of CED among pregnant mothers.⁽¹¹⁾ Nutritional status is affected by the consumed nutrients and may reflect the nourishment of a person. Pregnant mothers comprise one of the groups that are prone to nutrition problems, and thus the non-optimal intake of nutrients such as the essential microelement of iron during pregnancy can lead to CED. Evaluation of nutritional status by anthropometric measurement of pregnant mothers can be done in several ways, one of which is by measuring mid upper arm circumference. Normal nutritional status can be determined by measuring mid upper arm circumference. If the mid upper arm circumference is greater than 23.5 cm, the nutritional status of a pregnant mother is normal.⁽¹²⁾

The results of the research on the ANC factor found that pregnant mothers have not yet understood the importance of ANC during pregnancy. When a mother becomes pregnant, then she must visit or be visited in order to be recorded, observed, and examined until the pregnancy is complete, as they are risky individuals and immediate intervention may be needed. This is in line with previous research that showed the relationship between ANC and the incidence of CED on pregnant mothers.⁽⁹⁾

MCH booklets serve to provide information on MCH services. MCH booklets can be used as a standard of service and health education and counseling so that service to mothers and children can be provided in full and continuously. The utilization of MCH booklets by

officials in examining mothers and children can prevent anemia, CED, and low birth weight among babies; reduce maternal and infant mortality rates; and prevent infant malnutrition.⁽¹²⁾

As an education material for antenatal care, an MCH booklet contains these topics: (1) what needs to be done by pregnant mothers; (2) how to maintain the health of pregnant mothers; (3) good eating patterns during a pregnancy; (4) warning signs for pregnant mothers; (5) what the family needs to prepare for the labor; (6) what are the signs of labor; (7) what a mother does in labor; (8) what a mother does during childbirth; (9) how to maintain the health of mothers in childbirth; (10) warning signs for mothers in childbirth; and (11) what contraceptive devices are available.⁽⁶⁾

Based on this research, pregnant mothers who optimally utilized the MCH booklets, measured by their obedience in bringing the MCH booklets and filling in the necessary details, are 78.8% less vulnerable to CED. If the MCH booklet is used well, then its coverage amounts to the coverage antenatal care (K1). If the coverage of the KIA book is less than that of K1, health officials must pursue pregnant mothers who are already K1 but without MCH booklets by utilizing Mothers' Cohort registration.⁽⁵⁾

From the multivariate analysis results, Fe tablet consumption leads to a significant risk (p-value < 0.05) toward CED among pregnant mothers, with a logistic regression test that returns the p-value = 0.000 and OR = 9.2. It could be interpreted that pregnant mothers who do not consume 90 Fe tablets at the pregnancy age of 6 months could face the risk CED 9.2 times greater. Iron deficiency during pregnancy results in deficient iron supply for the baby at birth, and yet iron is highly needed for the development of a baby's brain. When left unresolved, pre-pregnancy iron deficiency can result in the pregnant mother vulnerable to CED. CED during pregnancy increases the possibility of pregnancy and labor complications, risk of maternal death, rate of prematurity, possibility of underweight babies, and rate of perinatal death. It also carries a risk of antepartum and postpartum bleeding. When occurring during pregnancy, anemia can cause the pregnant mother to experience issues such as easily fainting, increase the risk of miscarriage, or result in a long birth process due to bad contractions.⁽¹³⁾

Iron deficiency also causes deficiency of hemoglobin (Hb), of which iron is one of the elements in its structure. Hemoglobin acts as binders for oxygen, which is requisite for cell metabolism. Lacking hemoglobin may cause children to be born underweight, miscarriage, as well as infant anemia.⁽¹¹⁾

Conclusion

This research showed that three factors concurrently affected CED among pregnant mothers: consumption of Fe tablets, nutritional status, and antenatal care (ANC); the most dominant of these factors was consumption of Fe tablets. Based on the results of multivariate analysis and combined with the UNICEF framework of 1990 and the multilevel promotion model with the MATCH approach, it is suggested that the model for CED risk factor control for pregnant mothers be conducted by optimizing the utilization of MCH books, empowering families, increasing the roles and functions of *Posyandu*, and increasing nutritional status through advocating policies related to **the Gerakan Sayang Ibu** (GSI) (the Love Mothers Movement) and adopting the "making pregnancy safer" strategy.

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