Relationship between age, occupation, education, and parity with the chronic energy deficiency among pregnant women

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Article Info

ABSTRACT

Maternal and child health quality depends on maternal nutrition during pregnancy. Chronic energy deficiency (CED), a malnutrition condition common in pregnant women, increases the risk of the mother experiencing postpartum hemorrhage and the fetus experiencing intrauterine growth restriction (IUGR). The prevalence of CED risk among pregnant women in Sukabumi City, West Java, Indonesia is unstable and has not significantly decreased. This study aimed to determine the relationship between age, occupation, education, and parity with the risk of CED among pregnant women in Sukabumi City. An analytical observational study with a case-control approach using cluster sampling was conducted on 126 pregnant women with and without CED risk, respectively. The population for this study was pregnant women who checked at the primary health center in Sukabumi City in 2021. Data were collected from maternity health record and analyzed using Chi-square. The results showed that age had a significant relationship (p=0.000). In contrast, occupation (p=0.162), education (p=0.127), and parity (p=0.313) did not have a significant relationship with the risk of CED among pregnant women in Sukabumi City. Age was associated with the risk of CED among pregnant women in Sukabumi City.

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1. INTRODUCTION

Maternal and child health quality depends on maternal nutrition during pregnancy [1]. Maternal mortality ratio (MMR) in Sukabumi City rises annually, from 97.6 per 100,000 live births in 2016 to 346.6 per 100,000 live births in 2021. Nutritional status during pregnancy can affect the maternal mortality rate, one of the critical indicators of public health [2]. A long-term lack of food intake condition that causes low body weight and fatty deposits, chronic energy deficiency (CED), is one of the nutritional problems in Indonesia, one of which is Sukabumi, West Java, Indonesia [3]. CED during pregnancy can adversely affect both the expectant mother and the developing fetus. Maternal nutritional consumption has a significant impact on fetal growth and development [4]. This situation can elevate the likelihood of infants being born with low birth weight, experiencing miscarriages, premature births, or intrauterine growth restriction (IUGR), which can lead to long-term difficulties and even posing a risk of mortality for both mothers and infants [5], [6]. Babies born with low birth weight, which is caused by poor mother intake during pregnancy, have slower growth and are more susceptible to infectious diseases [7]. Mid-upper arm circumference (MUAC) is an anthropometric measurement employed to evaluate nutritional well-being and establish eligibility for

nutritional assistance, particularly in pregnant women. CED prevalence among women of childbearing age and expectant mothers is determined using the MUAC indicator. An average MUAC measurement of less than 23.5 cm is employed to assess the risk of CED in pregnant women. MUAC measurement provides a simpler alternative to body mass index (BMI) for identifying instances of chronic energy deficiency, and it should be noted that MUAC is exclusively employed for initial screening during pregnancy, not as a tool for monitoring nutritional status throughout pregnancy [3]. The prevalence of CED risk in Indonesia reached 17.3% in 2018 and was highest in the 15-19 year age group, which was 33.5%. The risk of CED affects 23.3% of people at the age of 20-24 years and 16.7%. This shows age can be associated with the risk of CED. The growing fetus and the mother's growth during adolescence (which ends at 18-22 years) place a greater demand on the young mother's diet [8], [9]. According to data from Sukabumi City Health Office, the prevalence of CED risk in 2019 was 7%, increasing in 2020 to 9% and falling again in 2021 to 7%. In January 2022, it rose again to 9%. This data is also higher than the prevalence of CED risk in other districts in the same province, including Banjar City, which was 4% in 2020.

Even though the prevention of the risk of CED in Sukabumi City has not been optimal, which is indicated by unstable prevalence, and has not significantly decreased, there is still no investigation associated with the risk of CED among pregnant women in Sukabumi City. Many factors can affect the risk of CED, including occupation, education, and parity [9]. Based on statistical data, most pregnant women at risk of CED do not work [9]. Pregnant women with low education experience CED more often than mothers with higher education. Likewise, pregnant women with a parity of more than four have a higher risk of CED [10].

Prevention of CED can be done through education with minimal resources, so the number of incidents of CED risk should have been eliminated. This study aimed to investigate which factors influence the incidence of the risk of CED according to the characteristics of the people in Sukabumi City so that the prevention that will be carried out can be more specific on target and education run effectively and optimally. Appropriate prevention can lead to a more optimal reduction in the prevalence of the risk of CED. Hopefully, the community, especially women at reproductive age, can understand the relationship between age, occupation, education, and parity with the risk of CED so they can be more optimal in preparing for pregnancy and taking precautions to maintain the health of mothers and babies, as well as giving birth to babies who can grow and develop optimally until they are an adult.

2. METHOD

An analytical observational study with a case-control approach using cluster sampling was conducted. In a case-control investigation, individuals are chosen to participate in the study according to their existing outcome condition. Consequently, certain participants exhibit the specific outcome of interest or cases. This study was conducted in Sukabumi City from January 1 to December 31, 2021. This research has received clearance from the Research Ethics Committee of Padjadjaran University no. 921/UN6.KEP/EC/2022 dated September 19, 2022.

The dependent variable is the risk of CED, and the independent variables are age, occupation, education, and parity. In the present investigation, chronic diseases, including tuberculosis and diabetes, were identified as confounding variables. Consequently, pregnant women afflicted with chronic diseases were deliberately excluded as subjects to mitigate potential confounding effects in the study. The target population was all pregnant women in Sukabumi City. Based on the calculations that we had carried out using the formula for case control design [11] and the possibility of drop-out 30% were then selected using inclusion and exclusion criteria, samples were obtained from 252 pregnant women with and without CED risk in Sukabumi City in 2021. The subjects were divided into two groups: 126 pregnant women with CED risk as the case group and 126 pregnant women without CED risk as the control group. The inclusion criteria included a woman with a fully filled maternity health record. Exclusion criteria were mothers suffering from other diseases that could affect the mother's nutrition. The data used is secondary data in the form of maternity health record collected from five primary health center in Sukabumi City, with the highest number of CED pregnant women in 2021. Maternity health record for the case and control groups were obtained from the same primary health center. The maternity health record (*Kartu Ibu*) is a maternal and child health documentation tool that can provide important information about the mother's condition during pregnancy, childbirth, and postpartum, as well as the mother's personal information that can be a risk factor such as age, occupation, education, and parity, as well as detect risks, thus decreasing maternal and infant mortality rates. The validity of a maternity health record can be ascertained since it was filled in objectively by a competent and trained midwife or doctor. Every time a mother comes in for an examination, midwife or doctor fills out the maternity health record, which is stored at the primary health center. The maternity health record is filled in based on objective data, age, and occupation are filled in according to the data on the ID card. Meanwhile, data on education level and parity are obtained by asking the patient. The level of education is demonstrated by a diploma which proves that a person has

completed a certain level of education, and the parity is the number of pregnancies that result in live or dead babies, not miscarriages.

The collected data will be analyzed using the Chi-square test in bivariate analysis. Bivariate analysis involves examining two variables to uncover potential connections between them. Such analyses are commonly featured in studies related to quality of life [12].

3. RESULTS AND DISCUSSION

Table 1 shows the characteristics of pregnant women's upper arm circumference, age, occupation, education, and parity. The mean age in this study was 26 years, and most subjects were in the 20-24 years group (39.7%). A total of 232 (92.1%) pregnant women were housewives or included in the category of not working. Most subjects (51.6%) had a secondary level of education (high school graduates). Based on the parity, almost all were in the no-risk category or no more than four.

Table 1. Distribution of age, occupation, education, and parity among pregnant women

Characteristics of pregnant women	n (%)	Mean (sd)
Upper arm circumference		24.2 (3.28)
Age		26 (5.59)
15-19 years	14 (5.6)	
20-24 years	100 (39.7)	
25-29 years	66 (26.2)	
30-35 years	54 (21.4)	
>35 years	18 (7.1)	
Occupation		
Work	20 (7.9)	
Not work	232 (92.1)	
Education		
Primary school	32 (12.7)	
Middle school	81 (32.1)	
High school	130 (51.6)	
Post-secondary (tertiary) education	9 (3.6)	
Parity		1 (1.16)
0	104 (41.3)	
1	87 (34.5)	
2	45 (17.9)	
3	9 (3.6)	
4	3 (1.2)	
>4	4 (1.6)	

Table 2 shows the Chi-square test analysis of the relationship between age, occupation, education, and parity with the risk of CED among pregnant women. The results revealed a significant relationship between age and the risk of CED (p=0.000). However, there was no significant relationship between occupation (p=0.162), education (p=0.127), and parity (p=0.313).

Table 2. Relationship between age, occupation, education, and parity with the risk of CED among pregnant women

Variables	Risk of CED				Total		p value	OR
	Yes		No					
	n	%	n	%	n	%		
Age							0.000	
15-19 years	12	4.8	2	0.8	14	5.6		
20-24 years	63	25	37	14.7	100	39.7		
25-29 years	30	11.9	36	14.3	66	26.2		
30-35 years	17	6.7	37	14.7	54	21.4		
>35 years	4	1.6	14	5.6	18	7.1		
Occupation								
Work	7	35	13	65	20	100	0.162	0.511
Not work	119	51.3	113	48.7	232	100		
Education								
Primary	62	54.9	51	45.1	113	100	0.127	
Secondary	62	47.7	68	52.3	130	100		
Tertiary	2	22.2	7	77.8	9	100		
Parity								
At risk (>4 children)	1	25	3	75	4	100	0.313	0.328
Not at risk (≤4 children)	125	50.4	123	49.6	248	100		

This study showed a significant relationship between age and the risk of CED in pregnant women (p=0.000). This showed that the younger the pregnant women are, the more they are at risk of CED. A mother's age during pregnancy determines the nutritional requirements. The best age for a pregnant woman is over 20 years. Pregnant women younger than 20 years are at risk for malnutrition (e.g., short stature, wasting, overweight, obesity, and anemia) [13]. This can happen because young mother requires more nutrition for fetal growth and development; they are also used for their growth and development, so food competition occurs between the fetus and the mother, who are still in the growth stage [9]. Teen pregnancy produces a very complex of medical, psychological, financial, and societal issues. Teenage pregnancy is associated with an increased likelihood of domestic abuse, poor health, sexual and reproductive health issues, lower levels of education, and higher levels of poverty when compared to women who postpone marriage age [14]. This study was in line with the study conducted by Abel [15], which divided age into two categories (adolescent snd adult) and showed the age of pregnant mothers was found to be associated with their nutritional status. The risk of undernutrition decreases by 10% as the mother's age increases by one year. This is because aside from the insufficient development of the reproductive organs and a requirement for nutrition for the growth of their body, young mothers are frequently surrounded by unfavorable nutritional conditions. Different from a study conducted in Wongsorejo District (2019), there is no significant effect between age and the incidence of CED in pregnant women [16]. However, dietary requirements change with aging; people become less active, their metabolism slows, and their energy requirement decreases [17]. According to nutritional needs, people who are older than 35 years could not be categorized as people who are at risk.

This study had no significant association between occupation and the risk of CED (p=0.162), consistent with the findings of a study conducted in East Nusa Tenggara (2022) [18]. This is different from the study conducted in Pati (2018), which showed a significant association because most pregnant women who do not work experience CED more often, with the assumption that a working mother has better health because she can recognize family health problems and make decisions to deal with these problems [9], [18]. Women who have higher educational levels are likely to have better career possibilities and hence be wealthier, making them less vulnerable to food insecurity [19]. Work can also increase knowledge because of extensive experience, association, and social interaction that can change attitudes, behavior, income, economic status, and eating patterns, including choosing the type and amount of food consumed [9]. However, work can affect daily physical activity, which impacts how much energy a person needs. The need for nutritional intake for pregnant women who work is more significant than for those who choose not to work since they require more nutrition to sustain their physical activities while they are working, their health, and the fetus. Pregnant women who work get a workload that relies on physical and psychological factors that can cause mothers to be inattentive to nutritional, physical, and prolonged stress [18]. It is crucial to emphasize that for an accurate assessment of stress levels during pregnancy, factors such as prior stress experiences, epigenetic markers, personality traits, dietary patterns, and physical activity routines should also be considered [20]. Pregnant women who work also have less time to prepare food, which impacts the amount of food consumed, thereby affecting the dietary habits of pregnant women [16].

Our study revealed no statistically significant association between education and the risk of CED in pregnant women (p=0.127). Similarly, some studies found that education had no significant association with the risk of CED in pregnant women [10], [21]. The results of this study contradict another study conducted by Hanifah [18], which divided education into two categories (high and low) and showed a relationship between education and the risk of CED for pregnant women. Pregnant women with a low education level had a higher incidence of CED than pregnant women with a high education level [18]. The level of education had an impact on dietary quality [22]. Aspects of eating behavior, such as the habit of not eating with family, less varied and energy-sourced eating patterns, lack of frequency and portion, avoidance of dishes which are nutritious for consumption, the way to distribute inadequate household food, as well as how to choose ingredients for foods that are not good are and how to combine various foods to attain the best nutrition all contributing factors to CED in pregnant women [23], [24]. Individuals become able to better understand through the educational process [25]. The lack of information about pregnant women's nutritional status will impact the food they consume [26]. Nevertheless, a mother with a lower education does not mean she does not have information about health during pregnancy. Health education can be provided during antenatal care [10]. Information related to nutrition during pregnancy is obtained through more than formal education. However, it can also be obtained through education or counseling with health workers, print media (for example, newspapers, books, posters, and others), and electronic media. Especially nowadays, electronic media has developed rapidly, so information about nutrition during pregnancy is easy to obtain from reliable sources. The family is essential to a mother's nutrition awareness. The type of food purchased will be determined by the family's financial status [27]. Low household income has an impact on household food intake. Low income might also result in low purchasing power, limiting them from getting food in adequate quantity and quality [28]. The results of the study conducted by Nofita [29], reveal that mothers with

household incomes above regency/City minimum wage (UMK) are less likely to develop CED than mothers with incomes below UMK. In addition, support from the family may affect the occurrence of chronic energy deficiency because having enough family support can motivate mothers to consume nutritional food and avoid chronic energy deficiency [4].

The parity had no significant relationship (p=0.313) with the incidence of CED. The same result was also found in the studies conducted in Talise, Palu [30]. Expectant mothers with more than three pregnancies are prone to CED. High parity also necessitates that women focus on their children rather than on their own diet and health state [26]. Grand multiparity has been shown to cause an increased risk of obstetric and medical issues, including anemia, birth asphyxia, preterm birth, low birth weight, macrosomia, stillbirth, and a high perinatal mortality rate, according to the evidence [31]. Frequent childbirth can cause the uterus to stretch, loosen the uterine wall, decrease the flexibility of the uterine wall, scar degeneration, and necrosis caused by placental implantation in the uterine wall, leading to a deterioration in the condition of the endometrium in the corpus uteri and diminished vascularity. When pregnancy recurs, the region is not ready to take the products of the conception, so the nourishment and oxygenation to the products of conception could not be optimum, which leads to a risk to pregnancy and childbirth. Thus, the mother needs sufficient energy to heal after delivery and supports fetal growth when she gets pregnant again. Principally, maternal nutritional status before pregnancy plays an important role [21]. In our study, pregnant women with parity at risk may have planned the spacing of their pregnancies so that the mother can recover fully from childbirth and have a good nutritional status. Several theories have been proposed in the literature to explain how the interpregnancy interval affects pregnancy outcomes. The physiologic regression hypothesis explains why there is a link between a long interpregnancy period and poor pregnancy outcomes. A woman behaves like a primigravida after a prolonged period between pregnancies [32].

4.   CONCLUSION

The most characteristics of pregnant women in Sukabumi City in 2021 are 20-24 years old, not working, having secondary education, and having parity of no more than four. Age had a significant relationship with the risk of CED among pregnant women in Sukabumi City. Meanwhile, occupation, education, and parity had no meaningful relationship with the risk of CED among pregnant women in Sukabumi City.

The limitation of this study is the lack of data on research instruments because not all maternity health record filled in completely, so it can only analyze four variables with the risk of CED among pregnant women, and the number of data taken from each primary health center was not the same. Other variables that can be analyzed are the mother's knowledge regarding nutrition during pregnancy and the distance between the mother's pregnancies. Further research can be conducted with a prospective cohort design study by taking data on a primary basis to show a stronger relationship between each risk factor and the risk of CED events. Primary data collection can also reduce the inequality of data taken from maternity health record. This study shows that the maternity health record is substantial, not only for the patient but also in the research area. In the future, every health facility can educate and assist the health workers in fully completing the data in maternity health record.

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