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Linkage between Pregnant Women's Income and Knowledge of Chronic Energy Deficiency

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ABSTRACT

LiLA <23.5 cm is a sign of chronic energy deficiency (CED), a nutritional issue that affects pregnant women and is brought on by prolonged fasting. The purpose of this study is to ascertain how food consumption, income, and knowledge relate to the prevalence of CED in expectant mothers. This study, which had a sample size of 44 participants, was carried out in January 2025 using a cross-sectional design approach and a quantitative methodology. Questionnaires used in respondent interviews provided the primary data. Purposive sampling was employed in the sampling strategy, and the Chi-Square statistical test was applied to analyze the data. Eleven (25%) pregnant women suffer from CED, while the majority have poor family income (72.7%), adequate knowledge (81.8%), inadequate energy intake (79.5%), and adequate protein intake (70.5%). While family income, energy intake, and protein intake do not significantly correlate with the occurrence of CED in pregnant women (p-value = >0.05), there is a strong correlation between nutritional knowledge and the condition (p-value = <0.05).

Keywords: chronic energy deficiency, income, knowledge, pregnant women

BACKGROUND

Maternal Mortality Rate (MMR) is an index to measure women's health status and refers to the quantity of maternal deaths caused by pregnancy, labor and delivery determined by the World Health Organization (WHO). AKI can be caused by direct and indirect events. Direct causes are eclampsia, bleeding, complications of miscarriage, and infection. Indirect causes are chronic energy deficiency (CED) and anemia (Corneles & Losu, 2015).

Pregnant women are a group that is vulnerable to nutritional health, so the First 1000 Days of Life (HPK) is an important period in pregnancy because it requires separate considerations. The development and growth of the fetus greatly influences the consumption of pregnant women. The number of pregnant women with low levels of long-term protein energy adequacy that can be measured by LiLA, is caused by low macronutrient and micronutrient energy intake. Long-term malnutrition in pregnant women, known as KEK, is characterized by a LiLA of less than 23.5 cm (Ministry of Health of the Republic of Indonesia, 2018). Having an upper arm circumference (LiLA) below 23.5 cm is an indication that a pregnant woman has CED. In 34 provinces of Indonesia, 451,350 out of 4,656,382 pregnant women have LiLA less than 23.5 cm or are at risk of developing CED (Ministry of Health of the Republic of Indonesia, 2021).

The prevalence of CED pregnant women in Asia reaches 41%, with the proportion of CED pregnant women aged 15-19 years in Thailand around 15.3%. Meanwhile, in African countries, namely Thanzania, the prevalence of CED pregnant women is 19% (Sari & Deltu, 2019). Nationally, KEK among pregnant women (15-49 years) is still very high, namely

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17.3%. It is estimated that the proportion of pregnant women with CED decreases every year by 1.5% (RI Ministry of Health, 2018).

Currently, there are still seven provinces whose percentage of KEK among pregnant women is still above the minimum target set by the government, namely 14.5%. West Papua is the province with the highest rate of KEK for pregnant women, namely 40.7%, followed by East Nusa Tenggara (25.1%) and Papua (24.7%). DKI Jakarta is the province with the lowest percentage of KEK among pregnant women, namely 3.1% (Ministry of Health of the Republic of Indonesia, 2022).

Research by Novitasari et al., (2019) states that the factors related to the incidence of CED in pregnant women are pregnancy distance, economic status, PHBS, family support, and nutritional intake. Research by Masdiah et al., (2021) states that good knowledge about balanced nutrition for pregnant women usually influences knowledge of fulfilling nutrition during pregnancy. In fulfilling nutrition for pregnant women, one of the most important factors is knowledge and income. In research by Muryani et al., (2022) stated that the nutritional status of pregnant women is influenced by factors such as malnutrition, infectious diseases, and socio-economic conditions.

Pregnant women who experience CED are more likely to experience complications and health risks such as infection, anemia, difficult and long labor, premature birth, postpartum bleeding, and surgical operations. The effect of CED on babies is that it can cause unsuccessful labor and affect the development of the baby in the stomach, lockjaw, contamination, hematological problems, neonatal events, birth deformities, asphyxia and LBW (Ervinawati et al., 2019). The main causes of bleeding in pregnant women are CED and anemia (Aprilia, 2020).

Based on this, researchers are interested in conducting further research to determine the relationship between income and knowledge on the incidence of CED in pregnant women.

METHODS

This study employs a quantitative research method with a cross-sectional design, which aims to examine the relationship between the independent variables income and knowledge and the dependent variable, which is Chronic Energy Deficiency (CED) in pregnant women at the Sekban Health Center, Fakfak Regency, West Papua. The population in this study consists of all pregnant women recorded at the Sekban Health Center, Fakfak Regency, West Papua, in December 2024, totaling **50** individual**s**. The sample includes pregnant women within the working area of the Sekban Health Center, and the sample size was determined using the Slovin formula. The sampling technique used in this study is simple random sampling, which is a method where each individual in the population has an equal chance of being selected as a respondent.

The research was conducted in January 202**5** at the Sekban Health Center, Fakfak Regency, West Papua. Data collection was carried out after obtaining a research permit and approval from the Bachelor of Midwifery Study Program at the Faculty of Health Sciences, University of Kadiri, and officially approved by the Dean of the Faculty of Health Sciences. The research permit was then submitted to the Sekban Health Center to obtain field research approval and further submitted to the Maternal and Child Health (MCH) Unit (Poli KIA) to gain permission for data collection. The initial step of the research involved approaching the respondents to obtain their informed consent to participate in the study. Data were collected by distributing demographic questionnaires directly to the respondents.

The research instruments used were questionnaire sheets and MUAC (Mid Upper Arm Circumference) tapes. The type of data collected was primary data, consisting of respondents' demographic characteristics obtained through interviews using questionnaires and nutritional status data measured by MUAC using a MUAC tape. The MUAC measurement was carried

out following standard procedures as outlined by Supariasa et al. (2012), which include determining the position of the shoulder and elbow, placing the tape between the shoulder and elbow, identifying and marking the midpoint of the upper arm, wrapping the MUAC tape around the midpoint, ensuring the tape is neither too tight nor too loose, and reading the results according to the correct scale. Measurements were taken on the left arm, except for left-handed respondents, for whom measurements were taken on the right arm. It is essential that the arm is relaxed, the muscles are not tense, and the measuring tape is in good condition not wrinkled or damaged to ensure accurate measurements (Supariasa et al., 2012).

RESULTS

Respondent Characteristics

Table 1. Distribution of Characteristics of Pregnant Women

Characteristics	n	%
Pregnant Mother's Age		
<20 Years	1	2,3%
20-35 Years	41	93,2%
>35 Years	2	4,5%
Gestational Age		
Trimester I	8	18,2%
Trimester II	21	47,7%
Trimester III	15	34,1%
Education		
Elementary School	4	9,1%
Junior High School	16	6,4%
Senior High School	22	50,0%
College	2	4,5%
Work		
Work	1	2,3%
Housewife	43	97,7%
Amount	**44**	**100**

Based on Table 1, it states that of the 44 pregnant women, the most common age characteristics of pregnant women were aged 20-35 years, namely 41 people (93.2%), the highest gestational age was in the second trimester, namely 21 people (47.7%), the most education was high school, 22 people (50.0%), and the most employment was not working or as housewives (IRT) as many as 43 people (97.7%).

The incidence of CED in pregnant women

Table 2. Frequency Distribution of KEK Incidents among Pregnant Women

Nutritional Status	n	%
KEK	11	25%
Non KEK	33	75%
Amount	**44**	**100**

Based on Table 2, it states that of the 44 pregnant women, 11 (25%) pregnant women had a KEK nutritional status and 33 (75%) pregnant women had a non-CED nutritional status.

Family Income in Pregnant Women

Table 3. Frequency Distribution of Family Income for pregnant women at Sekban Community Health Center, Fakfak Regency, West Papua

Family Income	n	%
Low	32	72,7%
Tall	12	27,3%
Amount	**44**	**100**

Based on Table 3, it states that of the 44 pregnant women, 32 (72.7%) pregnant women had low family income and 12 (27.3%) pregnant women had high family income.

Nutritional Knowledge in Pregnant Women

Table 4. Frequency Distribution of Nutritional Knowledge among Pregnant Women.

Nutrition Knowledge	n	%
Not Enough	8	18,2%
Enough	36	81,8%
Amount	**44**	**100**

Based on Table 4, it states that of the 44 pregnant women, 8 (18.2%) pregnant women had a poor level of nutritional knowledge and 36 (81.8%) pregnant women had a sufficient level of nutritional knowledge.

Relationship between family income and the incidence of CED in pregnant women

Table 5. Relationship between family income and the incidence of CED among pregnant women

Family Income	KEK Incident						*p-value*
	KEK		Non KEK		Amount		
	n	%	n	%	n	%	
Low	10	31,3	22	68,8	32	100	
High	1	8,3	11	91,7	12	100	0,240
Amount	**11**	**25**	**33**	**75**	**44**	**100**	

Based on Table 5, it is known that of the 44 pregnant women, 32 pregnant women had a low level of family income, namely 10 (31.3%) pregnant women had CED and 22 (68.8%) pregnant women did not have CED. Meanwhile, in 12 pregnant women with a high level of family income, 1 (8.3%) pregnant mother experienced CED and 11 (91.7%) pregnant women did not have CED. Based on the results of the Chi Square test, the p-value = 0.240 > 0.05, so H0 is accepted, which means there is no significant relationship between family income and the incidence of CED in pregnant women.

The relationship between nutritional knowledge and the incidence of CED in pregnant women

Table 6. Relationship between nutritional knowledge and the incidence of CED in pregnant women

Nutrition Knowledge	KEK Incident						*p-value*
	KEK		Non KEK		Amount		
	n	%	n	%	n	%	
Enough	5	62,5	3	37,5	8	100	
Not Enough	6	16,7	30	83,3	36	100	0,016
Amount	**11**	**25**	**33**	**75**	**44**	**100**	

Based on Table 6, it is known that of the 44 pregnant women, 8 pregnant women had a poor level of nutritional knowledge, namely 5 (62.5%) pregnant women had CED and 3 (37.5%) pregnant women did not have CED. Meanwhile, 36 pregnant women with a sufficient level of nutritional knowledge, namely, 6 (16.7%) pregnant women experienced CED and 30 (83.3%) pregnant women did not CED.
Based on the results of the Chi Square test, the p-value = 0.016 < 0.05, so H1 is accepted, which means there is a significant relationship between nutritional knowledge and the incidence of CED in pregnant women.

DISCUSSION

Characteristics of Pregnant Women

The age of pregnant women can be seen that the majority are 20-35 years old, which is (93.2%). According to research by Husna et al., (2020) Age is the most important factor in the pregnancy process until childbirth, because pregnancy of a mother at a young age will cause competition for nutrients between the fetus and the mother who is still growing. The younger the mother and the older the pregnant mother, the greater the need for nutritional intake that will cause KEK. At a young age, additional nutrition is needed because it is not only used for the growth and development of the mother, but must also be shared with the fetus she is carrying. While at an old age, a lot of energy is also needed, because organ function decreases and sufficient additional energy is needed to support the ongoing pregnancy.
The gestational age can be seen that the majority of gestational ages are in the second trimester, which is (47.7%). According to Alifka's research (2020), the most important gestational age is the first trimester because in the first eight weeks the brain, liver, heart, kidneys and bones of the fetus will be formed. In the first trimester, protein is very important for the mother in helping to form and repair muscles, cells, organs, tissues and hair of the fetus. In the second trimester, fetal development continues to develop rapidly in requiring nutrients for the mother and fetus, and in the third trimester, blood volume and heart increase.
The education of pregnant women can be seen that the majority of pregnant women's education is high school (50.0%). According to research by Husna et al., (2020) The level of education can also influence a person in understanding the information received, where highly educated mothers find it easier to understand the information needed, both in the form of direct counseling, mass media, electronic media and posters so that they will act according to the information, especially in consuming food that contains sufficient substances so that there is no risk of malnutrition during pregnancy or childbirth.
The work of pregnant women can be seen that the majority of pregnant women do not work or are housewives (97.7%). According to research by Halimah et al., (2022), mothers who do not work have heavier work than mothers who work, mothers who do not work have to do everything housework alone so that time to meet nutritional needs is very lacking. Pregnant women who do not work experience KEK events influenced by several factors, one of which is the burden of work carried out by pregnant women every day, namely a heavy workload such as doing housework alone, taking care of children and husbands. KEK pregnant women are also closely related to work where working mothers will help with household finances so that purchasing power for food needs is met, and pregnant women who work can meet their nutritional needs from the food intake consumed.

The incidence of KEK in pregnant women

One of the determining factors of the risk of nutritional and health problems in newborns is chronic energy deficiency (KEK) in pregnant women. According to the findings of the 2018 Riskesdas, KEK was experienced by 17.3% of pregnant women in Indonesia. Because the younger the gestational age, the greater the chance of pregnant women experiencing KEK (Ministry of Health of the Republic of Indonesia, 2018a). The results of LiLA measurements of 44 pregnant women, showed that 25% of pregnant women experienced KEK. When compared with the results of the 2018 Riskesdas (17.3%), the KEK rate is still quite high.

The high number of KEK in pregnant women is due to a lack of knowledge about nutrition and KEK, including what causes KEK and how to prevent it, and the emergence of a problem regarding nutrition is due to ignorance or lack of information obtained for pregnant women regarding nutrition during pregnancy (Puspitaningrum, 2017).

Family Income of Pregnant Women

In the family income variable, it can be seen that the majority of pregnant women's income is low with a percentage of 72.7%. Family income is categorized based on the UMK Level II in 2024 which is in West Papua province of 3,393,000. Income is said to be low if it is less than the UMK, while income is high if it is more than the UMK. According to Andini's research (2020), the amount of income obtained by pregnant women can affect eating patterns so that it can indirectly affect the nutritional condition of pregnant women and their babies. The higher the family income, the more able the family will be to meet good nutritional intake. Likewise, the lower the family income, the more difficult it will be to meet the nutrition and nutritional intake needed by the body. Economic factors are related to income levels and create a person's purchasing power if the income level is balanced with the number of family members who are their burden. Mothers who have a high economy will always try to meet the needs of the family by prioritizing its quality.

Nutritional Knowledge of Pregnant Women

In the nutritional knowledge variable, it can be seen that the majority of pregnant women's nutritional knowledge is sufficient with a percentage of 81.8%. According to research by Fitrianingtyas et al., (2018), the knowledge possessed by a mother will influence decision making and will also affect her behavior. Mothers with good nutritional knowledge are likely to provide sufficient nutrition to their babies. This is even more important when the mother enters a craving period, which usually the stomach is reluctant to enter any nutritious food, because of the nausea felt, instead it will choose food with a fresh and sour taste. Even in such conditions, if a mother has good knowledge, the mother will try to meet her nutritional needs and also her baby's.

Education will affect a person's knowledge, the higher the education, the easier it will be to get information from other people or from the mass media, conversely, low education will hinder a person from developing the information they get and knowledge affects the occurrence of KEK where dietary habits and food choices can be influenced by a person's knowledge. Based on the results of the study, the education of pregnant women is elementary school 9.1%, junior high school 36.4%, high school 50.0% and college 4.5%. The majority of education possessed by pregnant women is only up to high school and there are also pregnant women who do not want to continue to the next level and according to research by Retni & Puluhulawa (2021) several studies show that if the level of education influences mothers' knowledge about nutrition, which will improve their ability to choose nutritious food. Housewives who have good knowledge of nutrition will choose more nutritious food than less nutritious food.

CONCLUSION

Based on the characteristics of the respondents, the majority of pregnant women (93.2%) were aged 20–35 years, in their second trimester (47.7%), had a high school education (50.0%), and mostly worked as housewives (97.7%). A total of 25% of pregnant women experienced Chronic Energy Deficiency (CED). In addition, most respondents had low family income (72.7%), insufficient nutritional knowledge (81.8%), as well as inadequate energy (79.5%) and protein intake (70.5%). The study found no significant relationship between family income and the incidence of CED among pregnant women; however, there was a significant relationship between nutritional knowledge and the incidence of CED.

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