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The Relationship between the Level of Adherence to Antenatal Care and the Incidence of Chronic Energy Deficiency among Pregnant Women in Areas with a High Prevalence of Intellectual Disabilities

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Abstract

Chronic energy deficiency among pregnant women remains an important maternal nutrition problem because it may increase the risk of adverse pregnancy outcomes and reflects inadequate nutritional status during pregnancy. Antenatal care adherence is expected to support early detection and prevention of nutritional disorders through routine maternal assessment, nutritional counseling, and anthropometric monitoring. This study aimed to analyze the relationship between antenatal care adherence and the incidence of chronic energy deficiency among pregnant women in Karangpatihan Village, Balong District, Ponorogo Regency, an area known for a high prevalence of intellectual disability. This study used an analytic observational design with a cross-sectional approach. The study population consisted of pregnant women who met the inclusion criteria and had complete data on antenatal care visits and mid-upper arm circumference measurement. Antenatal care adherence was categorized as adherent when respondents completed at least six visits and non-adherent when fewer than six visits were recorded. Chronic energy deficiency was defined as mid-upper arm circumference below 23.5 cm. Data were analyzed using the Chi-Square test. Among 70 respondents, 42 respondents (60%) were non-adherent to antenatal care and 39 respondents (55.7%) experienced chronic energy deficiency. Bivariate analysis showed a significant relationship between antenatal care adherence and chronic energy deficiency ($p = 0.001$; OR = 0.189; 95% CI: 0.067–0.535). These findings indicate that antenatal care adherence may have a protective role against chronic energy deficiency among pregnant women.

INTRODUCTION

Chronic Energy Deficiency (KEK) in pregnancy is a form of maternal malnutrition that is still an important health problem, especially in developing countries. This condition reflects an imbalance in energy and protein intake in the long term, which can increase the risk of adverse pregnancy outcomes such as stunted fetal growth, low birth weight, prematurity, immune disorders, stunting, and maternal morbidity (Herring et al., 2018; Odhiambo et al., 2020). Recent international studies show that undernutrition in pregnant women is influenced by the interaction of biological, socioeconomic, diet, workload, infectious diseases, and access to health services during pregnancy (Demissie et al., 2026). In Indonesia, SEZs in pregnant women are also still reported as a significant public health problem, with risk factors that include low nutritional intake, pregnancy distance, family income, exposure to cigarette smoke, and frequency of visits *antenatal care* (Irma et al., 2025; Wati et al., 2024).

Antenatal care (ANC) has a strategic role in the prevention and early detection of SEZs because it is the main entry point for monitoring maternal nutritional status, anthropometric measurements such as upper arm circumference, nutrition education, supplementation, and regular identification of maternal risk factors (Arsenault et al., 2024; McCauley et al., 2022;

Odchigue, 2025). The WHO recommendation emphasizes that quality ANC services include nutritional interventions during pregnancy to lower the risk of poor maternal and neonatal outcomes (World Health Organization, 2021). Therefore, the compliance of pregnant women in conducting ANC visits has the potential to be related to the incidence of SEZs, because non-compliance can lead to delays in the detection of nutritional disorders and non-optimal preventive interventions. Based on this, research on the relationship between ANC compliance and the incidence of SEZs is important to be carried out as a basis for strengthening maternal health services and improving maternal malnutrition prevention strategies.

The urgency of this research is therefore twofold. First, it addresses a critical knowledge gap by providing evidence from an understudied, highly vulnerable population where the burden of malnutrition is expected to be high (de Juras & Hu, 2023; Getacher et al., 2023; Kiosia et al., 2024). Second, the findings are urgently needed to inform targeted public health strategies. If ANC adherence is a significant protective factor even in this challenging environment, it would provide a powerful mandate for strengthening ANC programs specifically tailored to communities with low health literacy and multiple socioeconomic deprivations, potentially breaking an intergenerational cycle of poor health (Bosáková, 2021; Woods-Jaeger et al., 2018).

The novelty of this research lies in its specific geographic and demographic focus (Mooldijk et al., 2021). While the relationship between ANC and CED has been explored elsewhere, this is one of the first studies, to the best of our knowledge, to quantitatively analyze this relationship in an area purposefully selected for its high prevalence of intellectual disabilities. This unique context allows the study to examine the association under conditions of extreme social and educational vulnerability, offering new insights into the resilience and limitations of ANC programs in such settings (Dégano et al., 2017; Ecclestone, 2017; Otto et al., 2017).

Management of chronic energy-protein deficiency syndrome (CED) in pregnant women typically involves nutritional interventions (increased energy-protein intake, micronutrient supplementation), antenatal nutrition education, and socioeconomic measures to improve access to nutritious food; public health programs at the community health center level often use MUAC screening and nutrition counseling as initial steps for detection and referral. Improving maternal nutrition knowledge and access to quality antenatal care, as well as specific interventions for vulnerable groups (young mothers, low-income multiparous women), are recommended strategies to reduce the prevalence of CED and its adverse impact on perinatal outcomes.

RESEARCH METHODS

This study used an analytical observational design with a cross-sectional approach (*cross-sectional*) to analyze the relationship between the level of antenatal care (ANC) compliance with the incidence of Chronic Energy Deficiency (SEZ) in pregnant women. The research was carried out in Karangpatihan Village, Balong District, Ponorogo Regency, which is an area with a high prevalence of intellectual disability. The time for the research is January to April 2026.

The population in this study is all pregnant women who reside in Karangpatihan Village during the research period. The study sample was pregnant women who met the inclusion criteria and had ANC visit data and upper arm circumference (LiLA) measurements. The independent variable in this study was ANC compliance, which was categorized as compliant

if pregnant women made ANC visits ≥6 times according to the standard, and non-compliant if ANC visits <6 times. The dependent variable is the incidence of SEZs, which are categorized as SEZs if the LiLA is <23.5 cm and not the SEZs if the LiLA is ≥23.5 cm.

The research data was collected through recording ANC visit data and the results of LiLA measurement of pregnant women. The collected data were then analyzed univariate to illustrate the distribution of respondent characteristics, ANC compliance levels, and SEZ incidence. Bivariate analysis was performed using the Chi-Square test to assess the relationship between ANC compliance and SEZ incidence. The results of the analysis are statistically significant when the p< value is 0.05.

RESULTS AND DISCUSSION

Based on the results of the study on 70 respondents, the majority of pregnant women were in the age group of 20-35 years, namely 48 people (68.6%), while 14 people (20.0%) were >35 years old and 8 people (11.4%) were <20 years old. All respondents had a low level of education, which was as many as 70 people (100%), so there was no variation in education level in the research population. Most of the respondents were not working as many as 51 people (72.9%), multigravida as many as 46 people (65.7%), had a pregnancy gap of ≥2 years as many as 49 people (70.0%), and came from low-income families as many as 45 people (64.3%). In addition, most of the respondents had exposure to family cigarette smoke, which was 43 people (61.4%).

The distribution of ANC compliance shows that most respondents do not comply with ANC visits, namely 42 people (60.0%), while respondents who comply are 28 people (40.0%). The incidence of SEZ was found in 39 respondents (55.7%), while 31 respondents (44.3%) did not experience SEZ (Table 1). These findings show that the adherence of ANC visits to respondents is still not optimal and the issue of nutritional status of pregnant women is still quite prominent in the study population.

Table 1. Participant Characteristics

Variabel	Category	Frequency (n)	Percentage (%)
Mother's age	<20 years old	8	11,4
	20–35 years old	48	68,6
	>35 years old	14	20,0
Education	Low	70	100,0
	Medium	0	0,0
	Height	0	0,0
Jobs	Not working	51	72,9
	Work	19	27,1
Paritas	Primigravida	24	34,3
	Multigravity	46	65,7
Pregnancy distance	<2 years	21	30,0
	≥2 years	49	70,0
Family income	Low	45	64,3
	Enough	25	35,7

Variabel	Category	Frequency (n)	Percentage (%)
Family cigarette smoke exposure	Ada	43	61,4
	None	27	38,6
ANC Compliance	Obedient	28	40,0
	Non-compliant	42	60,0
SEZ Incident	KEK	39	55,7
	No SEZs	31	44,3

Table 2. Cross-Tabulation of Respondent Characteristics with SEZ Incidence

Variabel	Category	SEZ Incident	
		KEK	No SEZs
Mother's Age	<20 years old	5 (12.8%)	3 (9.7%)
	20–35 years old	25 (64.1%)	23 (74.2%)
	>35 years old	9 (23.1%)	5 (16.1%)
Education	Low	39 (100%)	31 (100%)
	Medium	0 (0%)	0 (0%)
	Height	0 (0%)	0 (0%)
Jobs	Not working	26 (66.7%)	24 (77.4%)
	Work	13 (33.3%)	7 (22.6%)
Paritas	Primigravida	12 (30.8%)	12 (38.7%)
	Multigravity	27 (69.2%)	19 (61.3%)
Pregnancy Distance	<2 years	14 (35.9%)	7 (22.6%)
	≥2 years	25 (64.1%)	24 (77.4%)
Family Income	Low	25 (64.1%)	20 (64.5%)
	Enough	14 (35.9%)	11 (35.5%)
Family Cigarette Smoke Exposure	Ada	23 (59%)	20 (64.5%)
	None	16 (41%)	11 (35.5%)
Total		**39 (100%)**	**31 (100%)**

Based on Table 2 on the cross-tabulation of respondent characteristics with the incidence of SEZs, it is known that out of a total of 70 respondents, there are 39 respondents who experience SEZs and 31 respondents who do not experience SEZs. These results show that the proportion of pregnant women who experience SEZs is greater than pregnant women who do not experience SEZs, so that the incidence of SEZs is still a fairly high nutritional problem in the study respondent group.

Based on the age of the mother, in the age group <20 years, there were 5 respondents (12.8%) who experienced SEZs and 3 respondents (9.7%) who did not experience SEZs. In the age group of 20-35 years, there were 25 respondents (64.1%) who experienced SEZs and 23 respondents (74.2%) who did not experience SEZs. Meanwhile, in the age group >35 years, there were 9 respondents (23.1%) who experienced KEK and 5 respondents (16.1%) who did not experience SEZ. These results show that most of the respondents, both in the SEZ and non-SEZ groups, are in the healthy reproductive age range, which is 20-35 years. Nevertheless, the proportion of SEZs at high-risk ages (<20 years and >35 years) remains quite large, suggesting that extreme reproductive age may be a contributing factor to the increased risk of SEZs in pregnant women. Mothers who are too young still need nutritional intake for their own body

growth, while older mothers are at risk of deteriorating physical and health conditions that can affect nutritional status during pregnancy.

Based on education level, all respondents, both those who experienced SEZ and those who did not experience SEZs, were in the category of low education, as many as 39 respondents (100%) and 31 respondents (100%) respectively. There were no respondents with medium or higher education. This condition shows that the education level of the respondents is relatively homogeneous. Low education can affect the mother's ability to receive, understand, and apply information related to pregnancy health and nutrition. Low levels of education can also have an impact on a lack of understanding of the importance of meeting nutritional needs during pregnancy so that it can increase the risk of KEK.

Based on employment status, in the group of mothers who did not work, there were 26 respondents (66.7%) who experienced SEZs and 24 respondents (77.4%) who did not experience SEZs. Meanwhile, in the group of working mothers, there were 13 respondents (33.3%) who experienced SEZs and 7 respondents (22.6%) who did not experience SEZs. These results show that the majority of respondents, both those who experience SEZs and non-SEZs, are mothers who do not work. Not working conditions can cause mothers to depend on family income to meet daily living needs, including food and nutrition needs during pregnancy. However, in the group of working mothers, the proportion of SEZ is also still found to be quite high, which may be influenced by heavier physical activity, workload, and less optimal rest patterns and nutritional consumption during pregnancy.

Based on parity, in the primigravida group, there were 12 respondents (30.8%) who experienced SEZs and 12 respondents (38.7%) who did not experience SEZs. Meanwhile, in the multigravida group, there were 27 respondents (69.2%) who experienced SEZs and 19 respondents (61.3%) who did not experience SEZs. These results show that the incidence of KEK is more common in multigravida mothers than in primigravida. This condition can be caused by repeated pregnancies that cause the mother's energy and nutrient reserves to decrease if not balanced with adequate nutritional intake and recovery period. The more often a mother experiences pregnancy and childbirth, the more energy and nutrient needs also increase, potentially increasing the risk of SEZs.

Based on pregnancy distance, in the group of mothers with a gestational distance of <2 years, there were 14 respondents (35.9%) who experienced KEK and 7 respondents (22.6%) who did not experience SEZ. Meanwhile, in the group of mothers with a gestational distance of ≥2 years, there were 25 respondents (64.1%) who experienced SEZs and 24 respondents (77.4%) who did not experience SEZs. These results show that the proportion of KEK is higher in mothers with short gestational intervals (<2 years). Too close a pregnancy distance can cause the mother's body to not fully recover from a previous pregnancy, especially in terms of nutrient reserves and physical condition. As a result, mothers are more prone to experiencing chronic energy deprivation in subsequent pregnancies.

Based on family income, in the low-income group, there were 25 respondents (64.1%) who experienced SEZs and 20 respondents (64.5%) who did not experience SEZs. Meanwhile, in the income group, there were 14 respondents (35.9%) who experienced SEZ and 11 respondents (35.5%) who did not experience SEZ. These results show that most respondents have low family incomes, both in the SEZ and non-SEZ groups. Family income is one of the factors that affect the family's ability to provide nutritious food and meet the health needs of

pregnant women. Economic limitations can lead to low quality and quantity of food consumption, increasing the risk of SEZs.

Based on exposure to family cigarette smoke, in the group exposed to cigarette smoke, there were 23 respondents (59%) who experienced KEK and 20 respondents (64.5%) who did not experience SEZ. Meanwhile, in the group that was not exposed to cigarette smoke, there were 16 respondents (41%) who experienced SEZs and 11 respondents (35.5%) who did not experience SEZs. These results show that most of the respondents live in family environments with exposure to cigarette smoke. Exposure to cigarette smoke during pregnancy can have a negative impact on the health of the mother and fetus, including interfering with the body's metabolism and nutrient absorption so that it can contribute to nutritional problems in pregnant women.

Overall, the results of the cross-tabulation showed that the incidence of KEK was more common in mothers with characteristics of high-risk age, low education, lack of work, multigravity, short pregnancy intervals, low family income, and family exposure to cigarette smoke. These factors can be interrelated in influencing the health condition and nutritional status of the mother during pregnancy. Therefore, efforts are needed to improve health education, routine pregnancy monitoring, and support for optimal nutrition fulfillment to prevent the occurrence of SEZs in pregnant women.

Table 3. Cross-Tabulation of Respondent Characteristics with ANC Compliance

Variabel	Category	ANC Compliance	
		Obedient	**Non-compliant**
Mother's Age	<20 years old	3 (10.7%)	5 (11.9%)
	20–35 years old	20 (71.4%)	28 (66.7%)
	>35 years old	5 (17.9%)	9 (21.4%)
Education	Low	28 (100%)	42 (100%)
	Medium	0 (0%)	0 (0%)
	Height	0 (0%)	0 (0%)
Jobs	Not working	22 (78.6%)	28 (66.7%)
	Work	6 (21.4%)	14 (33.3%)
Paritas	Primigravida	12 (42.9%)	12 (28.6%)
	Multigravity	16 (57.1%)	19 (71.4%)
Pregnancy Distance	<2 years	11 (39.3%)	10 (23.8%)
	≥2 years	17 (60.7%)	32 (76.2%)
Family Income	Low	16 (57.1%)	29 (69%)
	Enough	12 (42.9%)	13 (31%)
Family Cigarette Smoke Exposure	Ada	17 (60.7%)	26 (61.9%)
	None	11 (39.3%)	16 (38.1%)
Total		**28 (100%)**	**42 (100%)**

Based on Table 3 on cross-tabulation of respondent characteristics with ANC compliance, it is known that out of a total of 70 respondents, there are 28 respondents who comply with the antenatal care (ANC) examination and 42 respondents who do not comply. These results show that most of the pregnant women in the study have not complied with ANC visits according to the recommended standards. Non-compliance with ANC can have an impact

on the suboptimal monitoring of maternal and fetal health during pregnancy, potentially increasing the risk of pregnancy complications.

Based on the age of the mother, in the age group <20 years, there were 3 respondents (10.7%) who complied with ANC and 5 respondents (11.9%) who did not comply. In the age group of 20-35 years, there were 20 respondents (71.4%) who were compliant and 28 respondents (66.7%) who were non-compliant. Meanwhile, in the age group >35 years, there were 5 respondents (17.9%) who were compliant and 9 respondents (21.4%) who were not compliant. These results show that the majority of respondents, both ANC compliant and non-ANC-compliant, are at a healthy reproductive age, which is 20–35 years. Nevertheless, the proportion of ANC non-compliance in the high-risk age group (<20 years and >35 years) is still quite large. This shows that the mother's age can affect awareness and readiness to carry out routine pregnancy checkups. Mothers who are too young tend to lack sufficient experience and knowledge about the importance of ANC, while older mothers may have physical limitations or previous pregnancy experiences that cause ANC examinations to be considered less necessary.

Based on the level of education, all respondents, both those who are compliant and non-ANC-compliant, are in the category of low education, namely 28 respondents (100%) and 42 respondents (100%) respectively. There were no respondents with medium or higher education. This condition shows that the education level of the respondents tends to be homogeneous. Low education can affect the mother's level of understanding of the importance of ANC screening during pregnancy. Lack of knowledge about the benefits of ANC can cause mothers to be less motivated to make regular visits to health facilities.

Based on employment status, in the group of mothers who did not work, there were 22 respondents (78.6%) who were ANC compliant and 28 respondents (66.7%) who were not ANC compliant. Meanwhile, in the group of working mothers, there were 6 respondents (21.4%) who were compliant and 14 respondents (33.3%) who were not compliant. These results show that the majority of respondents, both obedient and non-ANC-compliant, are non-working mothers. However, the proportion of ANC non-compliance is greater in working mothers than in obedient mothers. This may be due to time constraints, busy work, and difficulty arranging pregnancy examination schedules so that ANC visits are not optimal.

Based on parity, in the primigravida group, there were 12 respondents (42.9%) who were ANC compliant and 12 respondents (28.6%) who were non-compliant. Meanwhile, in the multigravida group, there were 16 respondents (57.1%) who were compliant and 30 respondents (71.4%) who were not compliant. These results suggest that ANC non-compliance is more prevalent in multigravida mothers. Mothers who have had previous pregnancy experiences sometimes feel more confident and think that pregnancy checkups do not need to be done regularly because they feel that they have experience in dealing with previous pregnancies.

Based on pregnancy distance, in the group of mothers with a gestational distance of <2 years, there were 11 respondents (39.3%) who complied with ANC and 10 respondents (23.8%) who did not comply. Meanwhile, in the group of mothers with a gestational distance of ≥2 years, there were 17 respondents (60.7%) who were compliant and 32 respondents (76.2%) who were non-compliant. These results showed that most of the respondents had a gestational gap of ≥2 years in both the ANC-compliant and non-ANC compliant groups. Nevertheless, the proportion of ANC non-compliance was higher in the group with a gestational interval of ≥2

years. This can be caused by mothers who feel that their pregnancy conditions are safe because the pregnancy distance is considered sufficient so that ANC visits are not carried out regularly.

Based on family income, in the low-income group, there were 16 respondents (57.1%) who were ANC compliant and 29 respondents (69%) who were not ANC compliant. Meanwhile, in the income group, there were 12 respondents (42.9%) who were compliant and 13 respondents (31%) who were non-compliant. These results suggest that ANC non-compliance is more commonly found in mothers with low family incomes. Limited economic conditions can affect the ability of families to access health services, including transportation costs, additional check-ups, and other needs during pregnancy.

Based on exposure to family cigarette smoke, in the group exposed to cigarette smoke, there were 17 respondents (60.7%) who were ANC compliant and 26 respondents (61.9%) who were not ANC compliant. Meanwhile, in the group that was not exposed to cigarette smoke, there were 11 respondents (39.3%) who were compliant and 16 respondents (38.1%) who were non-compliant. These results show that most of the respondents, both ANC compliant and non-ANC-compliant, are in a family environment with exposure to cigarette smoke. Exposure to cigarette smoke can reflect the suboptimal family attention to the health of pregnant women so that it can affect health behaviors, including compliance in carrying out ANC.

Overall, the results of the cross-tabulation showed that ANC non-compliance was more common in mothers with characteristics of high-risk age, low education, work, multigravida, low family income, and family exposure to cigarette smoke. These factors can affect the access, knowledge, motivation, and support of mothers in conducting routine pregnancy checkups. Therefore, it is necessary to improve health education, family support, and ease of access to health services so that ANC compliance in pregnant women can increase.

Table 3. The Relationship of ANC Compliance with the SEZ Incident

ANC Compliance	SEZ Incident				Total		P Value	OR (95% CI)
	KEK		No SEZs					
	n	%	n	%	n	%		
Obedient	9	12.9	19	27.1	28	40	0.001	0.189 (0.067 – 0.535)
Non-compliant	30	42.9	12	17.1	42	60		

Based on the results of the bivariate analysis, more respondents who complied with ANC did not experience SEZs, namely 19 people (27.1%), compared to 9 people (12.9%) who experienced SEZs. On the other hand, in the group that did not comply with the ANC, most experienced SEZs, namely 30 people (42.9%), while 12 people (17.1%) did not experience SEZs. Chi-Square test results show p = 0,001, so there is a significant relationship between ANC compliance and the incidence of KEK in pregnant women. Respondents who complied with ANC did not experience SEZs more, while respondents who did not comply more experienced SEZs. These findings are in line with the concept that ANC is not only a routine pregnancy check-up, but also a main gateway for nutritional status screening, LiLA/MUAC measurements, nutritional counseling, supplementation, and early identification of maternal risk factors. WHO emphasizes that ANC services include nutritional interventions, maternal-fetal assessments, and preventive efforts to improve pregnancy outcomes (World Health Organization, 2018).

Value Odds Ratio (OR) = 0,189 with 95% CI: 0.067–0.535 shows that ANC compliance plays a protective factor against SEZ occurrences (Table 2). In other words, pregnant women who comply with ANC have a lower chance of experiencing KEK than pregnant women who do not comply. Epidemiologically, pregnant women who comply with ANC have a lower chance of experiencing KEK than pregnant women who do not comply. On the other hand, when calculated in terms of non-compliance, pregnant women who do not comply with the ANC have a higher risk of experiencing KEK. This is consistent with the literature that states that *undernutrition* In pregnancy, it is influenced by health service factors, dietary diversity, socioeconomic status, comorbidities, and access to nutritional interventions during pregnancy (Zewude et al., 2024).

The high proportion of KEK in this study also needs to be considered because KEK in pregnancy is related to poor obstetric and neonatal outcomes, including low birth weight, prematurity, fetal growth disorders, and increased risk of maternal and infant morbidity. Recent studies show that maternal undernutrition is still a public health problem in low- and middle-income countries, including Asia, so detection and intervention through ANC services is an important strategy to break the cycle of maternal and child malnutrition (Figa et al., 2024).

In addition to ANC compliance, the results of this study also show that all respondents have a low level of education. This condition is important because education can affect the ability of pregnant women to understand health information, assess the urgency of pregnancy checks, follow the recommendations of health professionals, and make decisions related to nutritional fulfillment during pregnancy. Low education can contribute to low health literacy, delays in seeking services, and less optimal application of nutrition messages in daily life. However, because all respondents had a low level of education, the education variable could not be analyzed as a distinguishing factor in this study. Thus, education is more accurately understood as a population characteristic that describes social vulnerability, rather than as a statistically comparable variable in this study.

In the interpretation of the results, the context of the research area as an area with a high prevalence of intellectual disabilities also needs to be considered. Areas with high social and health vulnerabilities can have additional challenges, such as limited family health literacy, barriers to access to services, dependence on social support, and low household capacity to implement nutrition recommendations. Therefore, ANC compliance improvement strategies in areas like this should not only focus on pregnant women individually, but also involve families, health cadres, village midwives, and primary care networks. A community-based approach can help ensure that pregnant women arrive on ANC schedule, obtain easy-to-understand nutrition education, and get regular LiLA monitoring.

Although the results show a significant relationship between ANC compliance and SEZ incidence, there are several things that need to be considered. Design *cross-sectional* only describes the relationship at one time, so it cannot be sure that the ANC's non-compliance leads to the SEZ directly. In addition, other factors such as energy-protein intake, economic status, parity, pregnancy distance, maternal age, infectious diseases, anemia, family support, and household food security also have the potential to affect the incidence of SEZs. Therefore, follow-up studies with longitudinal design or multivariate analysis are needed to assess the independent contribution of ANC compliance to SEZs after controlling for such confounding factors.

Overall, the results of this study reinforce the importance of ANC compliance as part of efforts to prevent KEK in pregnant women. ANC that is carried out regularly allows for continuous monitoring of nutritional status, more consistent education, and early intervention for pregnant women at risk of KEK. In areas with vulnerable social characteristics, increasing ANC compliance needs to be supported by simple nutrition education, strengthening the role of cadres, family involvement, periodic LiLA monitoring, and an active follow-up system for pregnant women who do not attend according to the visit schedule.

CONCLUSION

This study shows that there is a significant relationship between ANC compliance and the incidence of SEZ in pregnant women in Karangpatihan Village, Balong District, Ponorogo Regency. Pregnant women who comply with ANC visits tend to not experience KEK more, while pregnant women who do not comply are more likely to experience SEZs. The OR value shows that ANC compliance plays a protective factor against SEZ incidents. These findings confirm the importance of improving ANC compliance as part of efforts to detect early detection, monitoring nutritional status, and prevention of SEZs in pregnant women, especially in areas with vulnerable social characteristics.

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