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Original Article

History of Chronic Energy Deficiency (CED) during Pregnancy and the Incidence of Stunting among Children Aged 0-59 Months in East Jakarta

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ABSTRACT

Based on SSGI data (2021), the prevalence of stunting among under-five children in DKI Jakarta Province was 16.8%. Meanwhile, based on the Ministry of Health Republic of Indonesia Performance Report for 2021, there were 3.1% of pregnant women with Chronic Energy Deficiency (CED) in DKI Jakarta Province. This study aims to determine the correlation between a history of Chronic Energy Deficiency (CED) during pregnancy and the incidence of stunting among children aged 0-59 months in East Jakarta. This study involved secondary data derived from the e-PPGBM application for the City of East Jakarta in 2021 with a sample size of 2,688 people and data were analyzed using Cox-regression. Based on the results of data analysis, it was found that the proportion of pregnant women with a history of CED was 3.7% and the proportion of under-five children with stunting was 21.1%. The multivariate analysis on the correlation between a history of CED during pregnancy and the incidence of stunting after being controlled by the potential confounder variable obtained a PR of 1.354 (95% CI: 0.922-1.988). It can be concluded that there was no significant correlation between a history of CED during pregnancy and the incidence of stunting in the East Jakarta area in 2021 after being controlled by the potential confounder variable. However, there are still possible confounder factors that should be analyzed further.

Keywords: Chronic Energy Deficiency, Pregnancy, Stunting.

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INTRODUCTION

The problem of stunting is still a priority in the global situation. One of the main points discussed in the Sustainable Development Goals (SDGs) is achieving food security including stunting, which is the second form of sustainable development through elimination of hunger and all forms of malnutrition by 2030. In 2025, the target set is to decrease the stunting rate to 40% [1].

The proportion of stunting globally was 22% or 149.2 million under-five children in 2020. The prevalence of stunting by sub-region (distribution made by WHO) in 2020 in Oceania was 41.4%, in Africa it was 30.7%, in Asia it was 21.8%, in Latin America-Caribbean it was 11.3%, in Europe it was 4.5 % and in Australia-New Zealand it was 2.3%. Meanwhile, South

Asia region showed the highest prevalence of stunting in the Asian continent by 30.7%, followed by Southeast Asia by 27.4%[2]. Based on the 2018 Basic Health Research, the prevalence of stunting among under-five children in Indonesia was 30.8%[3]. Furthermore, data derived from the 2019 Indonesian Child Nutritional Status Study (SSGBI) revealed that the proportion of stunting among under-five children in Indonesia was 27.7% and data derived from the 2021 Indonesian Nutritional Status Study (SSGI) revealed that the proportion of stunting among under-five children in Indonesia decreased to 24.4% and in the Province DKI Jakarta it decreased to 16.8%[4]. According to the 2018 Basic Health Research the proportion of stunting among under-five children in DKI Jakarta Province and East Jakarta was 17.7% and 18.4%, respectively.

Stunting has a major impact on the development of children in the future. In general, stunting will hinder the development of child motor and cognitive abilities which can further affect productivity and child may experience health problems in adulthood such as the emergence of non-communicable diseases which can also result in low economic productivity [5].

According to the WHO Conceptual Framework (2017), the causal factors of stunting involve family and household factors (maternal factors and home environment)[2]. To prevent stunting in umdsr-five children, it is necessary to determine a history of maternal nutritional problem during pregnancy. Problems during pregnancy may have an impact on the baby, one of the problems is pregnant women with chronic energy deficiency (CED)[6]. Based on the 2021 Ministry of Health Performance Report, the percentage of pregnant women with CED in Indonesia was 8.7% and in DKI Jakarta Province it was 3.1%[7]. In addition, there are many other factors that can cause stunting that must also be considered.

This study aims to determine the correlation between a history of Chronic Energy Deficiency (CED) in pregnancy and the incidence of stunting among children aged 0-59 months in East Jakarta area after controlling for covariate variables.

METHOD

This was a cross-sectional study. Secondary data were collected from the electronic Community-Based Nutrition Recording and Reporting (e-PPGBM) application for the City of East Jakarta in 2021. The target population in this study was all children aged 0-59 months in the East Jakarta area by 140,513 people. The source population of the study was children aged 0-59 months in the East Jakarta area whose measurement data and determinant measures were recorded in the e-PPGBM application by 3,204 people. However, as many as 516 data were incomplete so that the eligible population that met the inclusion criteria was 2,688 people. The inclusion criteria were children aged 0-59 months in the East Jakarta area with complete measurement and determinant data on all variables. The eligible population was then assigned into 2 groups, namely the exposed group (under-five children who had a history of CED during pregnancy) and the unexposed group (under-five children who had no history of CED during pregnancy). The researchers involved all eligible respondents in the analysis process by 2,688 people. The collection of e-PPGBM data waa conducted in 2021. Interviews with respondents were conducted using a guide for filling out the e-PPGBM application in Integrated Sigizi and a field review was also conducted. Study using e-PPGBM secondary data was conducted from October to November 2022.

Chronic energy deficiency (CED) is a state of malnutrition experienced for a long time (several months/years). Such condition can be determined by measuring the upper arm circumference/UAC of <23.5 cm. This condition can occur in pregnant women8. Furthermore, stunting is a condition of growth and development disorder experienced by children resulting from chronic nutritional problem with undernourishment that lasts for a long time. Such condition can be identified based on measurement of height for age or the z-score of <-2 SD3.

Data analysis was performed using STATA software version 14.2 (Stata Corp). The variable of a history of CED during pregnancy and the covariate variable were described by frequency and percentage. Bivariate analysis applied bivariate Cox-regression to produce PR crude. In addition, multivariate analysis applied Cox-regression to produce PR adjusted. The significance level applied in this study was a 95% level of confidence.

RESULTS

Variable	n	%
Stunting		
Yes	567	21.1
No	2121	78.9
History of CED during Pregnancy		
Yes	98	3.7
No	2590	96.3
Health Insurance		
Didn't have	35	1.3
Had	2653	98.7
Access to Clean Water		
No	54	2
Yes	2634	98
Healthy Latrine		
No	31	1.2
Yes	2657	98.8
Worm Infection		
Yes	207	7.7
No	2481	92.3
Immunization		
No	112	4.2
Yes	2576	95.8
Smoking Family Member		
Yes	822	30.6
No	1866	69.4

Based on the results of univariate analysis among 2,688 respondents (Table 1), the proportion of stunting was 21.1%, the most common risk factor was the presence of smoking family member by 30.6% followed by worm infection by 7.7%, no immunization by 4.2%, history of CED during pregnancy by 3.7%, no access to clean water by 2%, no health insurance by 1.3% and no healthy latrine by 1.2%.

The results of bivariate analysis (Table 2) showed that 32.6% of respondents who had a history of CED during pregnancy had stunted children, while 20.7% of respondents did not have a history of CED during pregnancy. The statistical test results obtained a PR value of 1.581 (95% CI: 1.107-2.258) with a p-value of 0.012. Such findings indicated that there was a significant correlation between a history of CED during pregnancy and the incidence of stunting. Women who had a history of CED during pregnancy were 1.581 times more at risk of having stunted children compared to respondents who did not have a history of CED during pregnancy.

Statistical test results regarding other risk factors showed that no healthy latrine had a significant correlation with the incidence of stunting. Family who did not have healthy latrine were 2.489 times more at risk of having stunted children compared to those who had healthy latrine (PR of 2.489; 95% CI: 1.514-4.091; p-value of <0.001).

The multivariate analysis carried out was regarding selection of multivariate candidates and modeling. Before making multivariate modeling, the independent and covariate variables were tested with the dependent variable in a bivariate manner. Variables with p-value of <0.25 became candidates to be included in multivariate modeling. Table 3 shows a confounder variable, namely healthy latrine. The final model (Table 4) revealed hi no significant correlation between a history of CED during pregnancy and the incidence of stunting in the East Jakarta area in 2021 after being controlled by the healthy latrine variable.

Table 2. Bivariate Analysis on the History of CED in Pregnancy and Risk Factors for Stunting among Children Aged 0-59 Months in the East Jakarta Region in 2021.

Variable	Stunting Status				PR	95%CI	p-value
	Stunting		No Stunting				
	n	%	n	%			
History of CED during Pregnancy							
Yes	32	32.6	66	67.4	1.581	1.107 – 2.258	0.012*
No	535	20.7	2055	79.3			
Health Insurance							
Didn't have	10	28.6	25	71.4	1,361	0.728 – 2.543	0 .334
Had	557	21	2096	79			

Variable	Stunting Status				PR	95%CI	p value
	Stunting		No Stunting				
	n	%	n	%			
Access to Clean Water							
Didn't have	14	25.9	40	74.1	1.235	0.726 – 2.099	0.436
Had	553	21	2081	79			
Healthy Latrine							
Yes	16	51.6	15	48.4	2.489	1.514 – 4.091	0.000*
No	551	20.7	2106	79.3			
Worm Infection							
Yes	31	15	176	85	0.693	0.483 – 0.996	0.047*
No	536	21.6	1945	78.4			
Immunization							
Yes	31	27.7	81	72.3	1.330	0.926 – 1.911	0.122*
No	536	20.8	2040	79.2			
Smoking Family Member							
Yes	184	22.4	638	77.6	1.091	0.915 – 1.300	0.334
No	383	20.5	1483	79.5			

Table 3. Multivariate Analysis Model.

Variable	PR adjusted	95%CI	p value
History of CED during Pregnancy			
Yes	1.342	0.913 – 1.974	0.135
No			
Healthy Latrine			
Yes	2.123	1.243 – 3.626	0.006
No			
Worm Infection			
Yes	0.693	0.482 – 0.995	0.047
No			
Immunization			
Yes	1.262	0.877 – 1.816	0.211
No			

Table 4. Multivariate Analysis Final Model.

Variable	PR adjusted	95%CI	p value
History of CED during Pregnancy			
Yes	1.354	0.922 – 1.988	0.122
No			
Healthy Latrine			
Yes	2.148	1.258 – 3.669	0.005
No			

DISCUSSION

The prevalence of stunting obtained in this study was 21.1%. Such finding was higher when compared to the 2018 Basic Health Research result regarding the prevalence of stunting in DKI Jakarta Province of 17.7%. Meanwhile, according to SSGI data for 2021, the prevalence of stunting among under-five children in Indonesia and East Jakarta were 16.8% and 13.4%, respectively[9]. Such rates were still classified as high based on the WHO standard threshold of 20%. Furthermore, by referring to the 2020-2024

RPJMN strategy, the targeted prevalence in 2024 is 14%[3]. This target can be achieved through the right preventive efforts.

Based on the results of multivariate analysis, it was shown that there was no significant relationship between a history of CED during pregnancy and the incidence of stunting in the East Jakarta area in 2021 after being controlled by potential confounder variable, namely healthy latrine. The absence of a significant relationship between a history of CED during pregnancy and the incidence of stunting might be due to the fact that a history of CED during pregnancy is not a direct risk factor for stunting among under-five children in the East Jakarta area in 2021 based on the e-PPGBM application data. Another possibility related to the study finding of no relationship between a history of CED during pregnancy and the incidence of stunting after being controlled by a potential confounder variable of healthy latrine was due to the awareness of pregnant women who routinely visited heatlh facilities for pregnancy check up (ANC/Antenatal Care). In addition, the women also received health education so that CED could be immediately followed up and managed by healthcare workers.

The study finding is in line with the results of a cohort study conducted by Nurfatimah, et al (2021) and a cross-sectional study conducted by Sartika et al, (2021) which showed no correlation between chronic energy deficiency and stunting[10-11]. Furthermore, a correlative descriptive study with a retrospective design conducted by Qoyyimah, et al (2021) also showed that there was no relationship between a history of chronic energy deficiency among pregnant women and the incidence of stunting among children 3-5 years old in the work area of Jatinom Community Health Center[12]. The study finding is also in line with the result of a correlational analytic study with a retrospective approach conducted by Faradisy and Nurhasanah (2022) which showed that there was no relationship between a history of chronic energy deficiency among pregnant women and stunting risk in Four Locus Stunting Villages, the Work Area of Tambelangan CHC, Tambelangan Sub-District, Sampang District[13]. However, the analysis of the study was only conducted in the bivariate analysis stage. A case-control study conducted by Warsini, et al (2016) further showed the result of multivariate analysis that there was no relationship between maternal history of CED during pregnancy and the incidence of stunting in Sedayu District, Bantul, Yogyakarta[14].

In contrast to a cross-sectional study conducted by Muliadi, et al (2023), the result of the analysis showed that among the 20 indicators that had a significant correlation with stunting, they included complementary food for pregnant women with CED, zinc supplementation for children and participation in parenting[15]. The results of a cross-sectional study conducted by Dewi, et al (2020) similarly showed that there was a relationship between a history of maternal CED during pregnancy and the incidence of stunting among children aged 1-3 years in the Work Area of Kalirejo CHC, Pesawaran[16]. Furthermore, in a case-control study conducted by Agustina and Fathurrahman (2022) also showed that there was a significant relationship between maternal history of CED and the incidence of stunting in the work area of Tatah Makmur CHC, Banjar District[17]. However, the analysis of this study was only conducted in the bivariate analysis stage. The results of a case-control study conducted by Karjono and Erna (2021) showed the result of a multivariate analysis that there was a significant relationship between CED and the incidence of stunting in the work area of Senaru CHC unit, North Lombok District[18]. Also in the case-control study conducted by Sari et al (2022) showed the results of the multivariate analysis that there was a significant relationship between the incidence of CED during pregnancy and the incidence of stunting among under-five

children in the work area of Bontobahari CHC[19].

According to the Indonesian Ministry of Health (2015), Chronic Energy Deficiency (CED) can occur as a result of a lack of balanced intake of macro and micro nutrients from adolescence to pregnancy. As is known, to support the growth and development of the fetus, pregnant women should concern about nutritional needs during pregnancy. If a pregnant woman is malnourished, the fetus will get inappropriate nutrition since the nutritional intake consumed by the mother is used to supplement the maternal nutritional deficiencies, so that the baby will be at risk of being born with low birth weight which further fave the risk of stunting[12, 20].

CONCLUSION

The results of this study indicated the prevalence of stunting and history of CED during pregnancy by 21.1% and 3.7%, respectively. There was no significant relationship between a history of CED during pregnancy and the incidence of stunting among under-five children after being controlled by a potential confounder variable, namely healthy latrine in the East Jakarta area in 2021. Based on the results of the study, the researchers recommend that the causal factors of stunting, both regarding nutritional and non-nutritional factors, still need to be considered so as to prevent stunting in the future. On the other hand, researchers further recommend the DKI Jakarta Provincial Health Office to improve data quality to prevent incompleteness so that the quality of future research can also be improved. In addition, it is necessary to increase the filling of determinants in the e-PPGBM application routinely as an effort to prevent stunting. Future researchers are expected to conduct further research related to stunting using the same or different data sources and to pay attention to other factors related to stunting such as a history of LBW, EIB, exclusive breastfeeding, balanced nutritional intake and active visits to Integrated Healthcare Post.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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