

# Food taboo, dietary diversity and prevalence of chronic energy deficiency in pregnant women living in rural area Indonesia

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## Abstract

**Background:** Chronic energy deficiency is strongly associated with poor pregnancy outcomes. Food taboo and dietary diversity are suspected as main risk factors of those problems among pregnant women living in rural area. Limited studies have elaborated the inferential relationship of those factors in pregnancy, warranting further investigation.

**Purpose:** To describe food taboo and dietary diversity and to examine its association with chronic energy deficiency in pregnant women living in rural area.

**Methods:** This cross-sectional study involved 178 pregnant women aged 15–45 years. Food taboo and dietary diversity scores were drawn from single 24 hours food recall questionnaire while the perceived reason of food taboo was assessed by focus group discussion. Chronic energy deficiency was determined by mid-upper arm circumference by standard tape. Food taboo and dietary diversity score interaction was generated and binary logistic regression analysis with  $\alpha = 5\%$  and 95% confidence interval was performed to provide adjusted associations with maternal characteristics, including parity, gestational age, and socioeconomic status as potential confounders.

**Results:** Almost half of respondents had food taboo (43.8%) and low dietary diversity score (43%) while one of fifth (19.7%) of respondents were chronic energy deficient. Those with food taboo and low dietary diversity were two times more likely to suffer from chronic energy deficiency. However, only pregnancy related factor (parity) was associated significantly with the outcome.

**Conclusion:** Although the relationship between food taboo and chronic energy deficiency was not statistically significant, pregnant mothers with food taboo should be encouraged to have a cultural-specific health and nutrition education.

**Keywords:** chronic energy deficiency; dietary diversity; food taboo; pregnancy

## Introduction

In Southeast Sulawesi, one fifth (23%) of pregnant women suffer from chronic energy deficiency (CED) which is indicated by mid upper arm circumference (MUAC) <23.5 cm. This prevalence was close to the national figure (24.2%) (KEMENKES, 2013).

Established evidence reported that pregnant women with CED are at higher risk of poor pregnancy outcomes (Abraham et al., 2015; Miele et al., 2021; Najafi et al., 2019). Physiologically, pre-pregnancy's nutritional status may contribute to availability of nutrients in supporting the development and growth of fetal during pregnancy (Miele et al., 2021; Najafi et al., 2019).

Several risk factors underpin the development of CED during pregnancy

including high family size and low educational level (Wubie et al., 2020) but in rural areas food taboo and low dietary diversity are reported to be significant modifiable factors (Biza Zepro, 2015; Iradukunda, 2020; Tsegaye et al., 2021) to alleviate the adverse effect of CED.

Food taboo is a perceived belief in prohibiting certain food either according to cultural, health or individual beliefs (Meyer-Rochow, 2009). Study reported that food taboo may be associated with inadequate amount, frequency, and quality of nutrient (Martínez Pérez & Pascual García, 2013; Zerfu et al., 2016). On the other hand, dietary diversity, which is a useful tool to estimate the quality of diet, is also associated with CED. A number of studies reported that pregnant women in developing countries had poor dietary quality due to monotonous diet (Lander et al., 2019). Those pregnant women with higher dietary diversity were more likely to have a better intake of the macro- and micro-nutrient composition compared with their counterparts. Hereby it may contribute to birth outcome (Kemunto, 2013; Kheirouri & Alizadeh, 2021).

The current study is located in East Kolaka District, a new established district in Southeast Sulawesi Province. To our knowledge, there are no data of chronic energy deficiency prevalence and its risk factor in pregnant women in this rural area. There are available studies in other regions, for example, in Sundanese pregnant women it was also reported that one third of participants usually (often+very often) avoid some kind of fruits such as pineapple, avocado and eggplant as taboo (Koeryaman et al., 2019). However, globally no study has elaborated the inferential statistical relationship of food taboo and maternal nutritional status. Most studies observed the qualitative aspect of food taboo and descriptively explain the perception or reason to avoid those foods (Gadegbeku et al., 2013; Iradukunda, 2020; Ramulondi et al., 2021; Tsegaye et al., 2021; Vasilevski & Carolan-Olah, 2016; Zerfu et al., 2016). Available study in Indonesia only associated food taboo with the socioeconomic profile of Sundanese pregnant women (Koeryaman et al., 2019). Therefore in this study, we aimed at describing the local food taboo and dietary diversity score (DDS); and, finally, aimed at examining the association of those factors with CED in pregnant women in rural area of East Kolaka.

## Materials and Methods

### Design

This cross-sectional study utilized data from a community based project entitled Situational Analysis of Nutritional Status and Associated Factors in Infant age of 2 years and Pregnant Women in East Kolaka Region, Southeast Sulawesi Province.

### Sample and setting

Initial screening through registered book of Integrated Health Unit (Posyandu) and through

home visit with the help of local midwives and cadre in thirty villages found 204 population of pregnant women at first to third trimester. The pregnant women were included in this study if they were residing in East Kolaka, not suffering from serious illness (e.g. bedrest, hospitalized) and voluntarily willing to be a respondent. Pregnant women who moved to another area or died were excluded from data collection. Sample size was calculated based on the formula by Daniel (1999) with 95% confidence interval, precision of 5%, and expected CED proportion of 20% in East Kolaka District. Minimum sample size was 112 pregnant women. After adjusting for the design effect, the minimum final sample was 168. This study was carried out in 30 villages out of 122 available villages surrounded by cocoa plantation located at East Kolaka, Southeast Sulawesi, in Indonesia during April 2014. Generally, Southeast Sulawesi Province, particularly East Kolaka, has physical landforms features such as a chain of mountains and hills. Due to its fertile soil, the agricultural and plantation sector becomes the main economic driver to society, which mainly works as farmers while those located in coastal area work mostly as fishermen. This geographical relief creates isolated villages in most areas as common society settlements, which required strenuous effort to reach respondents. However, Kolaka district is one of most densely populated regions dominated by reproductive age with high literacy rate (93.91%). Resident dependency ratio was 58.58% while ratio of male and female residents was almost equal (1.0). In this study area, maternal mortality rate (MMR) is 238 per 100.000 and infant mortality rate (IMR) 11.6 per 1.000, both still below national level (MMR 359, IMR 32 per 1000).

### Variable

Main dependent variable

In this study, the main dependent variable is chronic energy deficiency (CED). CED was determined by measurement of middle upper arm circumference (MUAC). Those with MUAC measurement below 23.5 cm are classified as CED (KEMENKES, 2013).

### Main independent variables

#### Dietary diversity score

Dietary diversity score (DDS) was generated from single 24-hour food recall (24FR). The DDS was grouped into low diversity ( $\leq 4$  food group) or high ( $> 4$  food group) (Kennedy et al., 2011).

#### Food taboo

Food taboos (number of food items, frequency) were drawn from single 24FR and by focus group discussion (FGD). Those with one of more food item to be avoided by any reason were grouped as having food taboo (yes) otherwise not-having taboo (no).

#### Characteristic of pregnant women

Data on age, marital status, parity, number of

**Table 1. Food taboo based on food group during pregnancy (N=178)**

	Responds	n	%
Present of food taboo		78	43.8
Number of food taboo (>2 food items)		29	16.3
Food groups †			
Fruit		55	48.7
Vegetables		21	18.6
Animal protein		16	14.2
Beverages		8	7.1
Others		13	11.5

†n=113

**Table 2. Perception of food taboo during pregnancy from fruit and vegetables groups**

Fruits	n	Reason†
Pineapple	21	stillbirth, stomach burn, itchy, wounded baby, dry, baby feel hot, not good for baby
Young pineapple	8	
Banana	2	difficulties delivering baby, sticky and prohibited by family, stillbirth
Raw banana	1	
Jackfruit	4	stomach burn, difficulties delivering baby, sticky and prohibited by family, prohibited by family
Young jackfruit	1	
Thorny palm fruit	3	difficulties delivering baby, sticky
Papaya	3	sticky and prohibited by family, not good for baby's health, stomach burn
Durian	8	stomach burn, the smell, still birth, not good for baby's health
Mango	2	baby will have a pusillanimous face, stomach burn
Ripe mango	1	
Melon	1	slimy
Total	55	
Vegetables		
Moringa leaves	10	difficulties delivering baby, slimy, prohibited by family, no answer, don't know
Banana flower	7	small baby, stillbirth, custom, uncontrolled birth weight, cardiovascular impairment baby
Tuber leaves	1	big baby
Kela leaves	1	itchy
Pumpkin leaves	1	umbilical cord entangled
Eggplant	1	don't know
Total	21	

†reasons are ordered from the most frequent comment, n=78

children, religion, ethnicity, educational level, occupation, households expenditure and gestational age were collected using a structured questionnaire referring to the categories determined by the National Basic Health Survey (KEMENKES, 2013). Maternal age was grouped into High Risk group (Age <20 and >35 y) and No-High Risk (Age 20-35 y), Parity was grouped into High Risk ( $\geq 2$  times) and Non-High Risk (<2 times), Birth spacing was grouped into High Risk (<2 year) and Non-High Risk ( $\geq 2$  year). Household total expenditure was grouped

into below regional minimum salary (RMS)  $\leq$  Rp. 1.400.000 and above RMS  $>$  Rp. 1.400.000

### Instruments

Chronic energy deficiency is determined by the MUAC standard tape (SECA® tape, SECA 201, UK) to nearest 0.1 cm. Dietary diversity score was generated from individual dietary diversity questionnaire (IDDQ) which consisted of nine food groups. This questionnaire was drawn from 24-hour food recall (24 FR) in which food intakes data

**Table 3. Perception of food taboo during pregnancy from animal protein groups**

Animal Protein	n	Reason *
Shrimp	4	come in come out fetus, difficulties delivering baby, custom
Crab	4	Stillbirth, custom, prohibited by family, difficulties delivering baby
Squid	2	difficulties delivering baby, prohibited by family
Fish		
Snakehead fish	1	don't know
Tilapia fish	1	stripped face
Stringray fish	1	custom
Milk fish	1	nausea after eating
Pork	1	dizzy
Meat	1	stomach burn
Total	16	

\*reasons are ordered from the most frequent comment, n=78

**Table 4. Perception of food taboo during pregnancy from animal protein groups**

Food groups	n	%	CED Status			
			CED		Non CED	
			n	%	n	%
Legumes and tubers	173	(97.2)	34	(19.7)	139	(80.3)
Green leafes	100	(56.2)	23	(23.0)	77	(77.0)
Vegetable and source of vitamin A/rich of Vitamin A	38	(21.3)	5	(13.2)	33	(86.8)
Other vegetables and fruits	98	(55.1)	17	(17.3)	81	(82.7)
Animal's organ	0	(0)	0	(0)	0	(0)
Meat and fish	146	(82.0)	27	(18.5)	119	(81.5)
Egg	46	(25.8)	9	(19.6)	37	(80.4)
Seeds	48	(27.0)	10	(20.8)	38	(79.2)
Milk and other products from the milk	38	(21.3)	5	(13.2)	33	(86.8)
Total score of DD (min-max)	4 (1-8)		4(2-6)		4 (1-8)	

were sorted based on nine given food items in the IDDQ (Kennedy et al., 2011). Food taboo items were collected via 24FR questionnaire by adding extra questions regarding food being avoided. Reasons for food taboo were also generated from FGD (focus groups discussion) (Gadegbeku et al., 2013).

### Intervention

No intervention was performed prior data collection.

### Data collection

#### Dietary diversity

Participants were asked to freely recall all foods (including snacks) and drinks consumed during the previous 24 hours (single 24FR). The trained personnel circled the foods in the appropriate food groupings and used standardized probes to collect more detail. If a food was listed by an interviewer but not on the original IDDQ, the interviewer consulted with the researcher and added the food name under the appropriate food group, allowing for further adaptation of the tool if required. Dietary Diversity

Score was grouped into low diversity ( $\leq 4$  food group) or high ( $> 4$  food group) (Kennedy et al., 2011).

#### Food taboo

Taboos and opinions on preferred food/diet during pregnancy were asked after the recall (24FR). All taboos and opinions on preferred food were tabulated into groups based on findings. In addition, FGDs were conducted in six pregnant women (excluded from sample) for digging up pregnant women's perceptions about food taboo and any kind of food taboo they experienced. Verbatim record was conducted, and a team consisting of one moderator, and two note takers conducted the FGD among a homogeny socio-demographic background. FGDs were conducted in one of the respondents' houses in the community. Food taboo was analyzed descriptively related to frequency of the food items and food group as well as the reasons of avoiding the foods (Gadegbeku et al., 2013).

#### Chronic energy deficiency

Trained personal asked the respondent if they

**Table 5. Characteristic of pregnant women in study area (N=178)**

Variables	CED status				Crude OR	95%CI	P-value*
	CED (n=35)		Non CED (n=143)				
	n	†(%)	n	†(%)			
<b>Working status</b>							
Working	7	(3.9)	48	(27.0)	0.495	0.227-1.079	0.071§
Not working	28	(15.7)	95	(53.4)			
<b>Gestational Age</b>							
Trimester II&III	31	(17.4)	127	(71.3)	0.976	0.305-3.127	0.584‡
Trimester I	4	(2.2)	16	(9.0)			
<b>Number of HH member</b>							
>4 member	25	(14.0)	86	(48.3)	0.604	0.245-1.485	0.257
≤4 member	10	(5.60)	57	(32.0)			
<b>Age of PW</b>							
<27 y	23	(12.9)	63	(35.4)	2.434	1.125-5.268	0.042‡§
≥27 y	12	(6.7)	80	(44.9)			
<b>Educational level</b>							
≤6 y school	13	(7.3)	66	(37.1)	0.689	0.266-1.784	0.428
>6 y school	22	(12.4)	77	(43.3)			
<b>Parity</b>							
≥2 times	13	(7.3)	103	(57.9)	0.229	0.101-0.520	0.001§
<2 times	22	(12.4)	40	(22.5)			
<b>Household economic status</b>							
≤RMS	18	(10.1)	51	(28.7)	1.910	1.049-3.479	0.034§
>RMS	17	(9.6)	92	(51.7)			
<b>Dietary Diversity (DD)</b>							
≤4 group (Low DD)	28	(15.7)	95	(53.4)	2.021	0.892-4.579	0.085§
>4 group (High DD)	7	(3.9)	48	(27.0)			
<b>Food Taboo</b>							
Yes	18	(10.1)	60	(33.7)	1.465	0.692-3.099	0.304
No	17	(9.6)	83	(46.6)			
<b>Number of Food Taboo</b>							
> 1 food	9	(5.1)	20	(11.2)	2.129	0.806-5.622	0.117§
≤ 1 food	26	(14.6)	123	(69.1)			

†percentage are presented by table, ‡fisher exact test, §included in binary logistic for  $P \leq 0.250$ , OR (odd ratio) only applicable for 2x2 table. All statistical ran by complex sample analysis except fisher exact test, \*significant at level 0.05 (2-tailed)

were usually right-handed or not. Pregnant women were kindly asked to fold their clothes on the mid-upper arm. Respondents were asked to pose ninety degrees on the arm so the personnel; were able to put a mark in the middle of the mid-upper arm. Upon being marked, the respondent's arm was gently requested to be in a relaxed straight position (KEMENKES, 2013). A WHO standard MUAC (mid-upper arm circumference) tape was used to measure the circumferences. Two measurements were performed and the average of the measurements was inputted for further statistical analysis.

### Data analysis

Pilot study was performed to pretest questionnaire for data collection. Thirty samples with similar characteristics, out of the main sample, were questioned to ensure similar understand-ability (wording, the sentencing, the meaning) to cover local language barriers. All data were collected by trained enumerators. Data quality was assured by daily check by supervisors on each occasion of data collection. Upon analysis, double entry was conducted for 30% of questionnaires.

SPSS 20.0 software was used to perform

**Table 6. Multivariate analysis of CED status and its factors**

Variables	B	S.E	p-value	OR	95% CI
Constant	-2.310	0.751	0.002	0.099	-
Working Status, yes	0.882	0.505	0.081	2.416	0.897-6.504
PW age, <27 y.o	0.030	0.506	0.953	1.031	0.382-2.780
Parity, ≥ 2 times	1.683	0.526	0.001	5.379	1.921-15.067
Household economic status, ≤ RMS	-0.396	0.417	0.342	0.673	0.297-1.523
DDS, <4 food groups	-1.066	0.717	0.137	0.344	0.085-1.404
Food Taboo, yes	-0.240	0.486	0.621	0.786	0.303-2.039
Food Taboo x DDS	0.820	0.980	0.402	2.271	0.333-15.488

n=178, Nagelkerke R-square = 0.195

all statistical analyses. Demographic data are presented as frequency distribution and percentage. Differences in proportions of categorical variables were compared using a chi-square test. In case the assumption is not achieved, Fisher exact test was used. Complex sample was used to analyze all data. A multivariable logistical regression was used to evaluate the association between CED category and risk factors. All potential factors that substantially associated with CED and or had p-value below 0.250 were included in the binary logistic analysis. An interaction between food taboo and DDS (food taboo x DDS) was generated to reveal combined effect of the variables with CED. Significance level of 0.05 was used for all statistical tests, and ORs are presented with the 95% confidence intervals (CIs).

### Ethical consideration

The current study obtained ethical approval from Ethics Committee of the Faculty of Medicine, Universitas Indonesia 210/H2/F1/ETIK/2014. All participants agreed to be voluntarily involved and had signed a written informed consent.

### Results

Almost half of pregnant women had food taboo in which fruit and vegetables groups were frequently reported (Table 1). Some fruits, such as pineapple, banana, and jackfruit, were perceived to cause stillbirth, stomach burn and made the delivery become difficult (Table 2). Animal protein, particularly from fish, was also reported to be prohibited by family and perceived to cause some pregnancy problems (Table 3).

The majority (69.1%) of the mothers had low dietary diversity (Table 5) though total dietary diversity score between CED and normal pregnant women was comparable (Table 4). Legumes-tuber and meat-fish were commonly consumed while vegetables, eggs and milk were the least. Food taboo and dietary diversity did not associate with prevalence of CED. Only parity, household economic status and pregnant women's age associated with CED in unadjusted analysis (Table 5). However,

after adjustment, those mothers with food taboo and DDS <4 were two times (odd risk (OR)=2.27, 95%CI = 0.33-15.48) more likely to have higher risk of CED than their counterpart. Parity (OR=5.38, CI=1.92-15.06, p=0.001) was a significant risk factor of CED (Table 6). Those with multiparity (more than 2) had five times greater risk of getting CED than their counterpart.

### Discussion

Our findings have identified a number of food taboos in pregnant women with mostly not working (housewife) and at second phase of pregnancy, which were dominated from fruits and vegetables food groups. We also found a majority of pregnant women were at low DD and their dietary pattern mainly consisted of staple food, meat and fish and lack of fruit and vegetables food groups. Numerous studies showed vegetable and fruits groups mostly reported as being tabooed (Sharifah Zahhura et al., 2012; Zerfu et al., 2016) with almost similar reasons.

In other region of Indonesia, Sundanese pregnant women also reported avoiding some kind of fruits such as pineapple, avocado and eggplant (Koeryaman et al., 2019). Study in Malaysia also reported some fruit such as jackfruit to cause sticky delivery problems (Sharifah Zahhura et al., 2012). Green leafy vegetables were also reported as dominant food to be prohibited during pregnancy in a rural area of Arsi, Central Ethiopia (Zerfu et al., 2016) and in a rural area province of South Africa (Ramulondi et al., 2021). Although diet based on staple and animal protein food may supply adequate protein and improve pregnancy outcome (Maslova et al., 2014) this diet is low in micro-nutrients such vitamins and minerals that mainly come from vegetables and fruits. Lack of micro-nutrients is associated significantly with poor pregnancy outcome (Blumfield et al., 2013).

There were many reasons for pregnant women in the study area to avoid this kind of food. However, most reasons were related to health and cultural consent. When mothers avoided the food to prevent pregnancy problem and infant malformation, this

reason can be perceived as health consent though perceived taboo is clinically not associated with those perceived impacts, while cultural consent generally comes from family and shaman with unclear explanation. In contrast, a study in South Africa reported that more than half of women aged 18-90 years old (n=140) recommended specific leafy vegetables to be consumed during pregnancy due to health reasons. They mentioned that the vegetables may provide vitamins, build bone and improve growth of the fetus (Ramulondi et al., 2021).

The reason of food taboo may vary from cultural, religious, health, magical thinking, ethics, sympathy and comparison (logical thinking) (Gadegbeku et al., 2013). Nevertheless, in contrast to most of the adverse impacts of food taboo to mother and infant health and nutrition status, food taboo also can lead to protection of indigenous resources and to maintain the identity of those people residing in the area and protection toward unhealthy diet (Iradukunda, 2020). However, if food taboo is not only perceived by the mother but also their husband or spouses and the grandparent (mother in-law), this condition can also be a clue of poor nutrition or health promotion in the study area (Tsegaye et al., 2021) and needs a more cultural-based nutrition education program (Iradukunda, 2020).

In inferential analysis, our study found that food taboo and DDS alone did not associate with prevalence of CED. Interestingly, when food taboo and DDS are combined (Food taboo \* DDS), we found that those mothers with food taboo and DDS <4 were two times more likely to have higher risk of CED than their counterpart. To our knowledge, no study has observed the inferential statistical relationship of food taboo and maternal nutritional status. Most studies observed the qualitative aspect of food taboo and descriptively explain the perception or reason to avoid those foods (Gadegbeku et al., 2013; Iradukunda, 2020; Ramulondi et al., 2021; Tsegaye et al., 2021; Vasilevski & Carolan-Olah, 2016; Zerfu et al., 2016). Definition and type of food differed across cultural and sites so that the association may be interpreted specifically to the study area (Iradukunda, 2020; Meyer-Rochow, 2009), making this kind of study limited. Moreover, our study pinned its novelty by interacting food taboo and DDS. It is plausible to note that those pregnant women's food taboos had low DDS. Our finding confirms the notion although is not statistically significant.

Most studies associated DDS with CED, such as a study in Ethiopia that found that DDS is a significant risk factor of CED in which mothers with low DDS are five times (95%CI: 2.89, 10.52) more likely to become CED (Legesse et al., 2019). Other study that involved pregnant women in four low-middle income countries found that most pregnant women are at inadequate dietary diversity. Those with inadequacy were at poor micro-nutrients such as folate, vitamin Bs (B1, B2, B6, B12), and choline (Lander et al., 2019).

Another interesting finding was that we found parity that associated with CED prevalence. Pregnant mothers with parity more than two times are at higher risk of CED. Pregnant women with CED were more likely to have LBW than their counterpart (Wubie et al., 2020) while LBW is the determinant of stunting and poor health in adulthood.

Most studies supported that multipara or high parity is the risk factor of CED and poor pregnancy. Multipara is associated with two-fold higher risk of poor pregnancy than nulliparous (Sintia et al., 2021). Other study also showed that the greater parity will associate with being 2.7 times more likely of becoming CED (Lipoeto et al., 2020) and higher risk of neonatal adiposity (Gaillard et al., 2014). Biologically, multipara mothers may be associated with poor nutrients pools and high inflammatory markers (Wessells et al., 2017). Existence of food taboos may worsen this situation in which pregnant women would have low food choice to consume during pregnancy (Zerfu et al., 2016) and this may cause anemia (Vasilevski & Carolan-Olah, 2016) thereby resulting in poor pregnancy outcome such as LBW infant.

Our study also indicated that working pregnant mothers are at higher risk of CED. Similar to our finding, a study in women of reproductive age in Ethiopia found that number of times to fetch the water was associated with more than two times higher risk of CED, defined by using BMI (Abraham et al., 2015). Working during pregnancy particularly those with high physical activity or bringing weights (take water, harvesting) may cause mothers to expend more energy for their daily physical routine and minimize nutrients shared to the fetus. Consequently, it may induce various poor pregnancy outcome such as small gestational age (SGA), miscarriage and preterm birth delivery (PTD) (Suzumori et al., 2020).

There were many reasons of mothers to continue work during pregnancy. Some may work to contribute to family income while others work to gain self-actualization (Neupane et al., 2016). Pregnant women, particularly in rural area, and those mothers with more than two children were more likely to continue to work during pregnancy (Neupane et al., 2014) to contribute to familial income.

However, the Centers for Disease Control and Prevention (CDC) and The American College of Obstetricians and Gynecologist (ACOG) recommended that those pregnant women without any obstetric or medical problems to do moderate-intensity aerobic physical activity (ACOG, 2020; Piercy et al., 2018). This physical activity would be like brisk walking and recreational physical activity that may help to improve mother's mood and reduce depression (Kołomańska et al., 2019).

## Conclusion

The current study found that pregnant women in the study area were at low diet quality score (low DDS)

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and had perceived food taboos that related to health and cultural consent. Although DD and food taboo did not associate with prevalence of CED, birth history factor significantly becomes a risk factor of CED prevalence. Health workers are encouraged to provide an intensive and cultural-specific health and nutrition education that promotes healthy lifestyle and tackles food taboo during pregnancy. In addition, community health workers should encourage routine prenatal care for those working pregnant women. Health workers are encouraged to provide an intensive and cultural-specific health and nutrition education that promotes healthy lifestyle and tackles food taboo during pregnancy.

### Declaration of Interest

All authors declare have none conflict of interest.

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### Data Availability

Upon reasonable request, data can be provided by writing to corresponding author.

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