Correlation between Folate Intake during Pregnancy and Preterm Labor in Mothers with 0-9 Months Old Babies

Gufi George Stefanus[1], Siti Nur Fatimah[2], Eppy Darmadi Achmad[3]
[1]Faculty of Medicine, Universitas Padjadjaran, [2]Department of Medical Nutrition, Faculty of Medicine, Universitas Padjadjaran [3]Department of Obstetri&Gynecology , Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung

Abstract

Background: Nutritional factors such as folate intake are important during pregnancy. Satisfying nutritional needs of pregnant mothers is necessary to avoid complications during pregnancy such as preterm labor, High infant mortality rate in Indonesia is still high. This study aimed to study the relationship between folate intake during pregnancy and preterm labor.
Methods: This study used a cross-sectional analytic approach by using semi-quantitative Food Frequency Questionnaire, as an instrument on mothers with 0–9 months old babies living in the villages of Sayang and Hegarmanah, Jatinangor, Sumedang, Indonesia.
Results: Ninety mothers participated in this study. The result indicated that 25.55% respondents had low folate intake and high incidence of preterm labor (16.67%). Significant association was found between folate intake during pregnancy and preterm labor (p=0.019). Maternal age was not a confounding factor in this study.
Conclusions: There is an association between folate intake during pregnancy and preterm labor in mothers living in the villages of Sayang and Hegarmanah, Jatinangor, Sumedang, Indonesia.

Key words: Babies 0–9 months, folate, preterm labor

Introduction

Prematurity cases in Indonesia are considered high at 600,000 out of 4.3 million births each year. Among these cases, 5% of the cases course are death causing increase of Infant Mortality Rate (IMR) in Indonesia.[1] In the year 2007, Indonesian IMR is at 34:1000 live birth and the highest in ASEAN.[2] These lead for a need in an integrated effort to reduce IMR in Indonesia especially to achieve the target for Millennium Development Goals (MDG) at 23:1000 live births in 2015. Such method can be achieved by satisfying the nutritional need of the pregnant mother.[3]

Nutritional requirement of a pregnant woman will increase according to the need of cellular proliferation to support fetal growth and plasenta.[4] One of the important nutrients for pregnant women is folate. Folate is a vitamin B that plays a role in DNA synthesis and maturation of cells to support the growth and fetus development.[5]

Folate cannot be formed inside the body, thus it is important for each individual to fulfill the folate requirement by consuming food which contains folate. Sources of folate are liver, green vegetable, nuts, and fruits. Supplements and fortified food such as wheat product can also contribute to folate content of the body.[5,6]

In Jatinangor, the number of high risk pregnancy women who were referred to a hospital was quite large and mostly happened in the villages of Sayang and Hegarmanah (unpublished data). Based on this reason, this study was conducted to study on the association between folate intake during pregnancy and preterm labor in the villages of Sayang and Hegarmanah.

Methods

This was an analytical cross-sectional study during the period of October to November 2012 in the Posyandu of Sayang and Hegarmanah village. Subjects were recruited with consecutive sampling. All mothers with 0–9

Correspondence: Gufi George Stefanus, Faculty of Medicine, Universitas Padjadjaran, Jalan Raya Bandung-Sumedang Km.21, Jatinangor, Sumedang, Indonesia, Phone: +6285692448500 Email: gufi.george.s@gmail.com

Table 1 Characteristics of Subject

Characteristics	N	N(%)	Median (min-max)
Age (year)*			27 (16-43)
<18	2	2.2%	
18–35	76	84.5%	
>35	12	13.3%	
Folate Intake During Pregnancy*			817 (229-4240)
Low (<600µg)	23	25.5%	
Normal (600–1000µg)	34	37.8%	
High (>1000µg)	33	36.7%	
Pregnancy Age*			38,86 (30-45)
Preterm	15	16.7%	
Term	72	80%	
Post-Term	3	3.3%	

data distributionbased on Kolmogorov-Smirnov is not normal

months old babies in Sayang and Hegarmanah villages who filled the informed consent form and brought Mother and Child Health book (KIA) fulfilled the inclusion criteria. If KIA book was not filled completely then the subject would be excluded. Data collection was conducted with permission by Sumedang Regional Development Planning Board, Sumedang District Health Office, Jatinangor Health Centre and Health Research Ethics Committee of Faculty of Medicine Universitas Padjadjaran.

Semi quantitative Food Frequency Questionnare (SFFQ) was used as an instrument for interview to give insight on the mothers' pattern of folate intake during pregnancy. Questionnaires were filled with list of food types and frequency and also amount of intake in portion.

Data from SFFQ were converted from household measurement to Dietary Folate Equivalent (DFE).[6] Folate content of each food was analyzed using USDA National Nutrient Database for Standard Reference.[8] The calculation determined total daily folate intake and then the concentration would then be compared to the Recommendation Dietary Allowance (RDA).[9] Date of birth and the first day of last menstrual period data from KIA book would then be analyzed using Excel 2007 program so that accurate gestational age at birth could be retrieved. The analytical method used in this study was comparative categorical hypothesis testing with unpaired fisher test by cellular union using computer.

Results

The study was conducted on 90 mothers who 31 of them live in the village of Sayang, while 59 were in the village of Hegarmanah. The subjects characteristics were presented as mother's age, folate intake during pregnancy, and time of birth (Table 1).

Age group was determined from literature which explained that maternal age of below 18 years old and over 35 years old were one of the risk factors for preterm labor.[10] From table 1,

Table 2 Association between Folate Intake During Pregnancy and Preterm Labor

		Prematurity		Total	p value
		Term+Post-Term (%)	Preterm (%)		
Folat	Normal+ High	60 (66.7%)	7 (7.8%)	67 (74.4%)	0.019
	Low	15 (16.7%)	8 (8.8%)	23 (25.6%)	
Total	(%)	75 (83.4%)	15 (16.6%)	90 (100%)	

Table 3 Association between Maternal Age and Preterm Labor

		Prematurity		Total	p value
		Term+Post-Term (%)	Preterm (%)		
Maternal age	No risk	64 (71.1%)	12 (13.3%)	76 (84.4%)	0.697
	Risk	11 (12.2%)	3 (3.4%)	14 (15.6%)	
Total	(%)	75 (83.3%)	15 (16.7%)	90 (100%)	

it can be seen that respondents who had risk factors for preterm labor amounted to 15.5%.

Data of folate intake can be classified into three categories, which are low, normal, and high. Table 1 indicated that 25.5 % of respondents had low quality folate intake. This study also showed that 16.7% had pretermlabours. This number approaches the epidemiologic number of WHO on prematurity in Indonesia which is 15.45%.[3]

The alternative chi square test was performed to study the association between folate intake during pregnancy and preterm labor. A p-value of <0.05, indicated that there was an association between folate intake during pregnancy and preterm labor.

One confounder factor was analyzed, which was the age of the mother. A p value> 0.05 indicated that age of mother did not affect preterm labor frequencies which also concluded not as a confounder of this study.

Discussions

There are several similar studies in the association between serum folate level during pregnancy and risk of preterm labor conducted. From previous study conducted by Bodnaret al.[11] and Hiroshi et al.[12] there is an association between serum folate and risk of preterm labor.

Folate intake data collection was conducted after labor, that may cause a recall bias. Yet, nature of events that relies on questionnaire can be applicable up to a year.[6] Confounder which can affect preterm labor such as age of mother has been identified and is excluded as a confounder in this study.

According to this study, there is an association between folate intake during pregnancy and preterm labor of mothers with 0–9 months old babies in the villages of Sayang and Hegarmanah.

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