



JOURNAL OF PUBLIC HEALTH FOR TROPICAL AND COASTAL REGION (JPHTCR)

Journal homepage: <http://ejournal2.undip.ac.id/index.php/jphtr/index>

ISSN : 2597-4378

Research Article

Description of Daily Nutritional Intake of Pregnant Women in Temanggung District, Central Java, Indonesia.

M. Zen Rahfiludin^a, Yudhy Dharmawan^b

^a Public Health Faculty, Diponegoro University, Indonesia. Corresponding author. Email : rahfiludinzen@gmail.com

^b Public Health Faculty, Diponegoro University, Indonesia

Abstract

Background: The nutritional status of pregnant women are affected by daily nutritional intake. Daily nutritional intake during pregnancy depends on total macronutrient intake and micronutrient intake. The aim of the study is to describe daily nutritional intake from pregnant women in Temanggung, Central Java, Indonesia.

Method: This study was conducted from September – December 2016 in Temanggung. This was a cross sectional study and the respondents were recruited using purposive sampling technique. Total sample of this study were 60 pregnant women. Intakes of macronutrients (Energy, and Protein), and micronutrients were calculated based on Food Frequency Questionnaire (FFQ) Semi Quantitative and using Nutrisoft software, Demographic data were obtained by interviewing.

Results : Of the total 60 pregnant women, 40 (66,7%) were unemployed. The majority of educational level of the respondents (48,3%) were Junior High School. The mean gestational age were $6,70 \pm 1,109$ months. The mean intake of energy in 60 pregnant women was $2153,9833 \pm 369$ kcal

Conclusion: The majority of pregnant women in this study have adequate intake of both macro and micronutrient besides iron and folic acid.

Keywords : Intake, Pregnant, Nutrition, Temanggung

Article History : Received : 17-01-2019 ; Revised : 12-04-2019 ; Accepted: 15-04-2019

Background

Indonesian Health Demographic Survey (IHDS) in 2012 shows that Maternal Mortality Rate (MMR) is increasing significantly from 228 to 259 deaths per 100.000 live births.¹ Infant Mortality Rate (IMR) is 32 per 1.000 live births¹. These numbers shows that mother and child health

should be considered. There are many reasons why the MMR is increasing. Pregnant women might having complications during and following pregnancy and childbirth. The major complications in maternal deaths are severe bleeding, infections, high blood pressure during pregnancy (pre-eclampsia and eclampsia),

complication from delivery, unsafe abortion and maternal nutritional status.²

The nutritional status of pregnant women are affected by daily nutritional intake.³ Nutrient intake during pregnancy is different with nutrient intake before pregnancy. Daily nutritional intake during pregnancy depends on total macronutrient intake and micronutrient intake such as iron, folic acid, cobalamin (B₁₂), vitamin D, iodine, calcium, vitamin A and zinc.^{4,5} Based on Indonesian Recommended Daily Intake (RDI) in 2013, pregnant woman need an additional 300 kcal/day of energy , additional 20 gr/day of Protein, 10 gr/day of fat and 40 gr/day of carbohydrate during pregnancy.⁶

During pregnancy, an additional of 80.000 kcal for 280 days are required. On first trimester energy requirement is increasing minimally. On the second and third trimester, it increase gradually until the end of pregnancy. Energy is use for fetal growth, development of maternal and fetal tissues, and accumulation of fat.⁷

Protein requirement is developing about 68% . Total protein requirement during pregnancy is 925 gr in maternal tissues, placenta and fetus.⁸ Protein in pregnant woman is use for fetal growth, uterine placental growth, and enhance blood volume.⁹ Source of protein is from animal protein and vegetable protein.¹⁰

Pregnant women need vitamin A for the health of themselves as well as for the health and development of the fetus. It is because vitamin A is important for cell division, fetal organ and skeletal growth and maturation, maintenance of the immune system to strengthen defences against

infection, and development of vision in the fetus as well as maintenance of maternal eye health and night vision.¹¹

Fiber is a nutrient that could not get digested by human tract. It absorbs water and helps bowel movements.¹² The daily recommended intake of fiber for women age 16-35 is 30-32 gr/day and for pregnant women additional intake of 3 gr/day fiber is needed in first trimester, 4 gr/day in second and third trimester.⁶ Proper fiber intake avoids constipation and hemorrhoids during pregnancy.¹³

Folic acid requirements are increased in pregnancy because of the rapidly dividing cells in the fetus and elevated urinary losses. During pregnancy, women need additional of 200 mcg folate per day⁶. Folic acid (FA) has been shown to reduce the risk of neural tube defects (NTD).¹⁴

Vitamin B₁₂ maintains normal folate metabolism which is essential for cell multiplication, specifically in the rapidly dividing placental and fetal tissues. Deficiency of Vitamin B₁₂ can affect the pregnancy outcome for both mother and the offspring. When vitamin B₁₂ intake is below the daily recommended intake it will increase the risk of developing preeclampsia, intra-uterine growth retardation, and preterm labor.^{15,16} The recommended daily intake of vitamin B₁₂ in women age 16-35 is 2,4 mcg per day with additional intake of 0,2 mcg vitamin B₁₂ per day is needed during pregnancy.⁶

Calcium is essential for muscle contraction, bone formation, and enzyme and hormone functioning. Calcium absorption increases during pregnancy. WHO

recommend the daily intake of calcium in pregnant women is 1200 mg/day.¹⁷

Women need to have adequate storage of iron to meet the high requirements of this mineral during the pregnancy. The total iron required during pregnancy is about 1000 mg¹⁸. Iron deficiency leads to anemia during pregnancy. It is harmful for both woman and child health.¹⁹

Zinc during pregnancy is essential for tissue growth, cell division, fetal growth and development, and also mammary gland function for milk synthesis.²⁰ Zinc deficiency in pregnant woman often lead to zinc malabsorption which resulted in fetus with several skin disorders and prone to die young of viral or fungal infections.²¹ Recommended daily intake of zinc in women age 16-35 is 10 mg/day and additional of 2 mg zinc per day is needed during the first trimester, 4 mg/day in second trimester and 10 mg/day during third trimester in pregnant women.⁶ The aim of the study is to describe daily nutritional intake from pregnant women in Temanggung District, Central Java, Indonesia.

Methods

This study was conducted from September – December 2016 in Temanggung. It is located in Central Java, Indonesia. This was a cross sectional study and the respondents were recruited using purposive sampling technique.

The population of this study were 114 pregnant women. Inclusion criteria were pregnant women who were at 5-8 months of gestation and agreed to participate in the study.

Total sample of this study were 60 pregnant women. Intakes of macronutrients (Energy, and Protein), and micronutrients (vitamin A, iron, vitamin B₁₂, zinc, calcium, folic acid, fiber) were calculated based on Food Frequency Questionnaire (FFQ) Semi Quantitative and using Nutrisoft software, Demographic data were obtained by interview including level of education, occupation, age, and gestational age. Ethical clearance was approved by the Commission on Health Research Ethics Faculty of Public Health, Diponegoro University Semarang No: 252/EC/FKM/2016.

Results

Tabel 1 shows that the majority of educational level of the respondents (48,3%) were Junior High School. It means that educational level of the respondents were low. Of the total 60 pregnant women, 40 (66,7%) were unemployed while other 20 (33,3%) were working. The mean age of pregnant women in this study were $26,02 \pm 5,637$ years old. The mean gestational age were $6,70 \pm 1,109$ months. Further level of education, maternal occupation, age and gestational age can be seen in table 1. The mean intake of energy in 60 pregnant women was $2153,9833 \pm 369$ kcal . The details of daily nutritional intakes of both macro and micronutrients are summarized in table 2.

Table 1. Characteristics of Respondents

Characteristic	Frequency	(%)	Mean	±	SD
Age	-	-	26,02	±	5,637
Gestational Age	-	-	6,70	±	1,109
Occupation:					
Unemployed	40	66,7	-		-
Work	20	33,3	-		-
Level Of Education:					
Primary School	15	25	-		-
Junior High School	29	48,3	-		-
Senior High School	14	23,3	-		-
College/University	2	3,3	-		-

Table 2. Daily Nutritional Intake

Nutrient	Mean	±	SD
Energy (kcal)	2153,9833	±	369,32648
Protein (gr)	66,4168	±	25,59880
Fiber (gr)	20,1030	±	41,86022
Vitamin A (IU)	2036,9783	±	1014,99409
Folic Acid (mcg)	238,2500	±	94,27810
Vitamin B ₁₂ (mcg)	2,4023	±	2,50183
Calcium (mg)	791,1012	±	718,28719
Iron (mg)	19,3452	±	65,13389
Zinc (mg)	12,9697	±	39,64525

Table 3. Recommended Daily Intake for Pregnant Women

Nutrient	RDI, Indonesia (2013)
Energy (kcal)	2550
Protein (gr)	76
Fiber (gr)	36
Vitamin A (IU)	2833,3
Folic Acid (mcg)	600
Vitamin B ₁₂ (mcg)	2,6
Calcium (mg)	1300
Iron (mg)	39
Zinc (mg)	20

Discussion

The study showed that energy intake of pregnant women was adequate compared

to the recommended daily intake (RDI) for pregnant women in Indonesia. This results are in line with other study conducted in

Malaysia. Mean energy intake (> 2189.63 kcal/day) was adequate as compared with the Recommended Nutrient Intake (RNI) for Malaysian pregnant women.²² Another study in Pakistan shows different results. Their results point out low energy consumption of mothers in early as well as in late gestation compared to recommended dietary allowance for pregnant mothers in Pakistan.²³

Other studies in Thailand indicate that more than half of the women in that study were found to have nutrient intake inadequacy for all macronutrients plus calcium and thiamine. Almost half of the women had a lower iron and niacin intake compared to the Thai RDA.²⁴

Intakes of Protein, fiber, vitamin B₁₂, calcium, zinc and vitamin A were also adequate compared to the Indonesian RDI for pregnant women. On the contrary, folic acid and iron consumptions were low while these substances are essential during pregnancy.

Low intake of iron during pregnancy could affect both maternal and infant outcomes. Iron deficiency in pregnant women increases the risk of becoming anemic during pregnancy.²⁵ The outcomes of anemic during pregnancy are bleeding during childbirth, increase the risk of low birth weight baby, and even maternal mortality.²⁶

Folic acid is increasing during pregnancy to form RBC (Red Blood Cells), DNA synthesis, and for development of placenta and fetus.²⁷ When the consumption of folic acid in pregnant women is low it could increase the risk of NTD (Neural Tube Defects) and megaloblastic anemia.²⁸

It is very important for pregnant women to maintain their health and consume

high macro and micronutrient food. In this case food that contains folic acid such as orange, carrot, broccoli, spinach, potatoes, liver and also food that contains high iron for examples oysters, beans, spinach, etc should consume more often to prevent anemia during pregnancy.

Conclusions

Based on the result, the majority of pregnant women in this study have adequate intake of both macro and micronutrient besides iron and folic acid.

Acknowledgement

Our grateful thank to Sugiarti as the head of Tocologist at Puskesmas Bulu, Temanggung. Indonesia and to all the district's tocologists in Bulu District, Temanggung and also to all of the pregnant women in Bulu District who had been willing to participate in this study.

Ethics approval and consent

Ethical clearance was approved by the Commission on Health Research Ethics Faculty of Public Health, Diponegoro University Semarang No: 252/EC/FKM/2016.

Competing interest

The authors declare that they have no competing interests

Funding

This study was funded by Direktorat General of Public Health, Ministry of Health Republic of Indonesia.

References

1. Kemenkes RI. Profil Kesehatan Indonesia tahun 2014. Kemenkes RI. 2014.
2. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels JD, et al. Global Causes of Maternal Death: A WHO Systematic Analysis. *Lancet Global Health*. 2014;2(6): e323-e333.
3. Syari, M. Peran Asupan Zat Gizi Makronutrien Ibu Hamil terhadap Berat Badan Lahir Bayi di Kota Padang. *Jurnal Kesehatan Andalas*. 2015; 4(3)
4. Arisman. Gizi dalam Daur Kehidupan. Jakarta: EGC. 2007
5. Rusilanti. Menu Bergizi untuk Ibu Hamil. Jakarta: Kawan Pustaka. 2006
6. Peraturan Menteri Kesehatan Republik Indonesia Nomor 75 Tahun 2013. Angka Kecukupan Gizi yang Dianjurkan Bagi Bangsa Indonesia. Jakarta: Kementerian Kesehatan RI. 2013
7. Lubis, Z. Status Gizi Ibu Hamil Serta Pengaruhnya Terhadap Bayi Yang dilahirkan. Pengantar Falsafah Sains (PPS 702) Program Pasca Sarjana S3 IPB Bogor. 2003
8. Mulya, F.M. Hubungan Asupan Suplemen Kalsium pada Ibu Hamil dengan Panjang Bayi Saat Lahir di Wilayah Cengkareng Jakarta Barat. Jakarta:Fakultas Ilmu-ilmu Kesehatan Program Studi Ilmu Gizi Universitas Esa Unggul. 2014
9. Cunningham, FG. *Obstetri Williams*. Jakarta: EGC. Edis: 21. 2005
10. Almatier, S. Prinsip Dasar Ilmu Gizi. Jakarta:Gramedia. 2009
11. WHO. Guideline:Vitamin A in Pregnant Women. Geneva: World Health Organization. 2011
12. Hajhoseini, L. Importance of Optimal Fiber Consumption During Pregnancy. *Int J Women's Health Reproduction Sci* Vol. 1, No. 3, Autumn 2013
13. Bradley CS, Kennedy CM, Turcea AM, Rao SS, Nygaard IE..Constipation in pregnancy: prevalence, symptoms, and risk factors. *Obstet Gynecol*. 2007; 110(6):1351-7.
14. Czeizel AE, Dudas I. Prevention of the first occurrence of neural-tube defects by periconceptional vitamin supplementation. *N Engl J Med* 1992;327:1832-5.
15. Krishnaveni, G.V., Hill, J.C. and Veena, S.R., et al. (2009) Low plasma vitamin B12 in pregnancy is associated with gestational “diabetes” and later diabetes. *Diabetologia*, 52, 2350-2358. doi:10.1007/s00125-009-1499-0
16. Hübner, U., Alwan, A., Jouma, M., Tabbaa, M., Schorr, H. and Hermann, W. (2008) Low serum vitamin B12 is associated with recurrent pregnancy loss in Syrian women. *Clinical Chemistry and Laboratory Medicine*, 46, 1265-1269. doi:10.1515/CCLM.2008.247
17. WHO. Guideline: Calcium Supplementation in Pregnant Women. Geneva. World Health Organization. 2013
18. Bothwell TH. Iron requirements in pregnancy and strategies to meet them. *Am J Clin Nutr* 2000 July; 72(1):257-64.
19. Sato, APS. *Food Consumption and Iron Intake of Pregnant and Reproductive Aged Women*. Rev. Latino-Am. Enfermagem Mar-Apr 2010; 18(2):247-54
20. Donangelo, C.M. *Maternal Zinc Intakes and Homeostatic Adjustments During Pregnancy and Lactation*. *Nutrients* 2012, 4, 782-798; doi:10.3390/nu407078
21. Raimi,OG. Zinc and Iron Levels in Pregnancy: A Review. *PAK. J. FOOD SCI.*, 22(2), 2012:53-60 ISSN: 2226-5899. 2012
22. Loy, S.L. Association between Maternal Food Group Intake and Birth Size. *Sains Malaysiana* 42(11)(2013): 1633-1640
23. Shaikh, F. Maternal Dietary Intake and Anthropometric Measurements of Newborn at Birth. *The Open Diabetes Journal*, 2014, 7, 14-19
24. Sukchan, P. Inadequacy of Nutrients Intake Among Pregnant Women in the Deep South of Thailand. *BMC Public Health* 2010, 10:572
25. Gluckman, P. *Nutrition and Lifestyle for Pregnancy and Breastfeeding*. Oxford University Press. United Kingdom. 2015
26. Sinsin, I. *Seri Kesehatan Ibu dan Anak Masa Kehamilan dan Persalinan*. Jakarta: Elex Media Komputindo. 2008
27. Yulaikhah, L. *Kehamilan: Seri Asuhan Kebidanan*. EGC :Jakarta. 2006
28. Wibisono, H. *Solusi Sehat Seputar Kehamilan*. Agromedia Pustaka: Jakarta. 2009