

Food Security And Household Expenditure Impact On Nutritional Status On Pregnancy: A Cross Sectional Study In Rural Area

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ABSTRACT

Purpose: This study was aimed to analyze the correlation of food security status and household food expenditure to nutritional status on pregnant women.

Research Methodology: This study was an observational study with cross-sectional design, conducted in Puskesmas Wonosobo, Lampung Province, Indonesia on May 2020 - August 2020. All of pregnant women who get Antenatal Care (ANC) on Puskesmas were carried out as samples. Food security status and household food expenditure data were measure by anamnesis and questionnaire. Nutritional status was asses by mid-upper arm circumference (MUAC) of pregnant women. Data was collected and then analyzed using SPSS 21 application.

Results: A total of 53 pregnant women, with age distribution on range of <18 years & >35 years (20 women) and 20-35 years (33 women) were analyzed in this study. Statistical analysis (Chi-Square) show the pregnant womens in malnutrition status with food insecurity were 3 women (75%) while pregnant women in good nutrition status with food insecurity only 3 women (6.1%) ($p = 0.003$). Correlation between house hold expenditure to nutritional status was analyzed by chi-square test, the result show all of pregnant women in malnutrition status (4 women) have lower house hold expenditure ($p = 0.001$).

Conclusion: This study clearly shows that more food security and level of household food expenditure will affect on nutritional status of pregnant women.

KEYWORDS: food security, household expenditure, nutritional status, pregnancy, socioeconomic determinant

1. INTRODUCTION

Maternal mortality has become a serious health problems on the world, both in developing and developed countries. Base on the WHO report's on 2019, 94% of maternal mortality case were preventable. Maternal mortality is complex which can be caused due to various of

medical and non-medical factors. The identification of which factor to contribute maternal mortality was important efforts to reduce MMR(McCarthy & Maine, 1992; WHO, 2019).

Maternal health status is one of close/direct determinant to maternal death caused. One of good maternal health status indicator can be reflected by nutritional status among the pregnancy. Nutritional status on pregnancy was the indicator of fulfilling nutrition for pregnant women. Nutrition on pregnancy was important for maternal herself and the development of fetus. Food demands not only base on proportions but also should determined on the quality of the nutrients contained. Nutritional problems in pregnant women are one of the main focuses in efforts to reduce the Maternal Mortality Rate (MMR). The nutritional status of pregnant women can be influenced by the socioeconomic conditions and health conditions of the pregnant women during pregnancy.

Based on the Food and Agriculture Organization (FAO), food security is the result of food availability, food access, utilization and stability (FOA, 2006). Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO et al., 2020). In 2015, 195 nations agreed with the United Nation to achieve Sustainable Development Goals (SDGs) by 2030, one of them is zero hunger. However, the incidence of people who suffering from hunger was increased. It was estimated \pm 690 million people (8.9% of the world population) are hungry, with 381 million undernourished people are found in Asia. Current COVID-19 pandemic could increase the risk of people who suffering from acute hunger to 130 million people(United Nation, 2020).

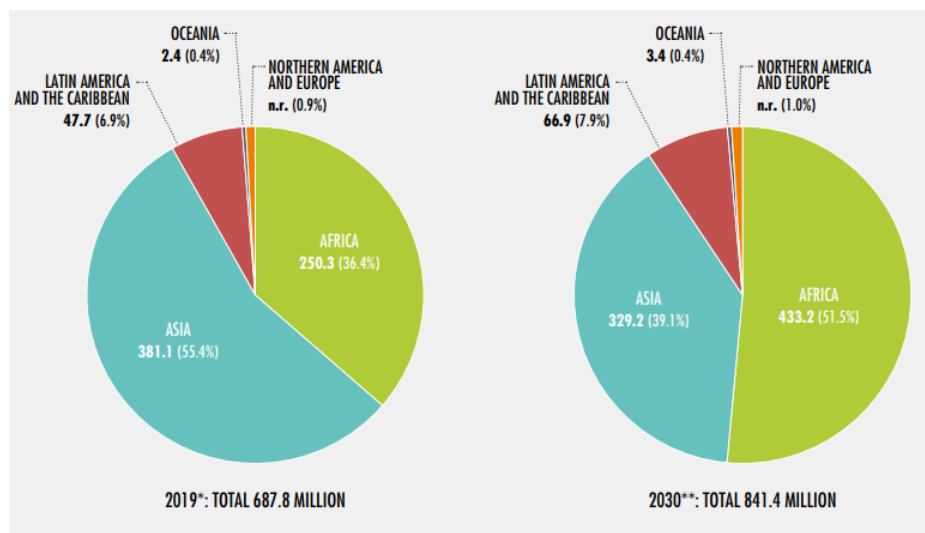


Figure 1: The Distribution of World Hunger in 2019 and its Prediction in 2030
 Source : FAO

Food security and nutritional status are closely related, most studies found a strong correlation between food insecurity and the risk of underweight in developing country (Ghattas, 2014). A research in India showed poor nutritional status on preconception women and anemia was more frequent in low-socioeconomic and food insecure population (Mastiholi et al., 2018). A study in Indonesia found most respondents experienced food insecurity has a higher risk of Chronic Energy Deficiency (CED) (Wulansari, 2020) and

another study by (Nurdini & Mahmudiono, 2020) also showed a significant correlation between food insecurity and the risk of anemia in pregnant women.

The quality of life of newborns depends on maternal nutritional status. During pregnancy, women need an adequate intake of energy, protein, vitamins and minerals. Most countries in Saharan Africa, South-Central and South-East Asia the prevalence of maternal undernutrition is relatively high (WHO Reproductive Health Library, 2016). Based on national data of Indonesia from Basic Health Research in 2018 the prevalence of pregnant women with CED is 17.3%, and the prevalence of pregnant women with CED in Lampung Province is 13.6% (Balitbangkes, 2019). This study was aimed to assess the food security status, household food expenditure and nutritional status among pregnant women of Tanggamus, Lampung Province, Indonesia.

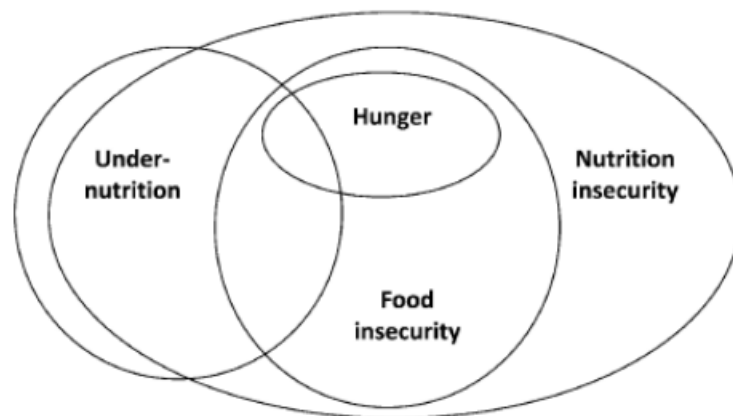


Figure 2: Distinctions and overlaps between hunger, food insecurity, nutrition insecurity and undernutrition

Source : Benson, 2005

2. RESEARCH METHODOLOGY

This study was an observational study with cross sectional design. The study was conducted on May 2020 - August 2020. The sample used in this study was collected with non probability sampling using total sampling technique. A total of 53 pregnant women in Puskesmas (public health center) Wonosobo, Lampung, Indonesia were analyzed. The data of food security status was obtained by questionnaires and classified by food secure and food insecure. Household food expenditure was obtained by questionnaires and classified as sufficient : < Rp. 556.899,00 and not sufficient \geq Rp. 556.899,00 based on Central Bureau of Statistics of Indonesia (BPS, 2019). Nutritional status was obtained by physical examination using Mid-Upper Arm Circumference (MUAC) based on ministry of health of Indonesia classified as underweight (MUAC = <23,5 cm) and normal (MUAC \geq 23,5 cm) (Depkes RI, 1994).

Respondents characteristic; household food expenditure, food security status and nutritional status were presented as descriptive statistics. Bivariate analysis used Chi-square tests to define the correlation between food security and household food expenditure to nutritional status with significance level of $p=0,05$. Data was being input in Microsoft Excel and analyzed by SPSS version 21.0.

3. RESULTS

The total sample were enrolled in this study were 53 pregnant women. The majority of respondents are between age ranged 20-35 years (62,3%). Based on education data, more than a half of respondents had low education level (Primary School (13.2%) and Junior High School (37.7%)), while 25% of pregnant women have graduated by Senior High School and only 1,9% was graduated from University. 41 of pregnant women (77.4%) were unemployment and 22.6% of respondents had a job, the majority of them worked as domesticworkers. Pregnant women which enrolled in this study were 2 pregnant women on first trimester (3.8%), 16 pregnant women on the second trimester (30.2%), and the others are on the third trimester. The majority of pregnant women in this study have food secure status (44 pregnant women ; 88,7%) while 81,1% of pregnant women had sufficient household food expenditure. The nutritional status of pregnant women majority have good nutritional status (92,5%) with 7,5% were underweight.

Table 1:
 Characteristic, food security, household food expenditure and mid-upper arm circumference of pregnant women

Variables	n	Percentage (%)
Age		
< 18 years & >35 years	20	37.7
20-35 years	33	62.3
Education		
Primary School	7	13.2
Junior High School	20	37.7
Senior High School	25	47.2
University/ College degree	1	1.9
Job Status		
Unemployment	41	77.4
Employee	12	22.6
Gestational Age		
First Trimester	2	3.8
Second Trimester	16	30.2
Third trimester	35	66.0
Food Security		
Food Insecure	6	11.3
Food Secure	47	88.7
Household Food Expenditure		
Not Sufficient	10	18.9
Sufficient	43	81.1
Nutritional Status (MUAC)		
Underweight (MUAC = <23,5)	4	7.5
Normal (MUAC = ≥23,5)	49	92.5

Table 2:
The correlation between food security and nutritional status of pregnant women

Food Security	Nutritional Status (MUAC)				P value
	Underweight (<23,5 cm)		Normal (≥23,5 cm)		
	n	%	n	%	
Food Insecure	3	75.0	3	6.1	0.003
Food Secure	1	25.0	46	93.9	
Total	4	100.0	49	100.0	

Table 3:
The correlation between household food expenditure and nutritional status of pregnantwomen

Household Food Expenditure	Nutritional Status (MUAC)				P value
	Underweight (<23,5 cm)		Normal (≥23,5 cm)		
	n	%	N	%	
No Sufficient	4	100.0	6	12.2	0.001
Sufficient	0	0	43	87.8	
Total	4	100.0	49	100.0	

Statistical analysis (Chi-Square) results show the pregnant womens in malnutrition status with food insecurity were 3 women (75%) while pregnant women in good nutrition status with food insecurity only 3 women (6.1%) (p = 0.003). Correlation between house hold expenditure to nutritional status was analyzed by chi-square test, the result show all of pregnant women in malnutrition status (4 women) have lower house hold expenditure (p = 0.001).

4. DISCUSSIONS

Nutritional status is an important aspect to determine whether a pregnant woman would through her pregnancy without any significant problems. Nutritional issues among pregnancy will have an impact to the health status for mothers and babies as well as the quality of the outcomes due to chronic energy deficiencies (CED) issues among pregnancy. Chronic Energy Deficiencies (CED) on pregnancy need more attention due to the outcomes of pregnant issues like low birth weight. The CDE case on pregnancy is an indicator for Indonesian Ministry of Health performance which annually evaluated, with expected to decrease the percentage of CDE on pregnant women by 1.5% every year (Directorate General of Public Health: Ministry of Health, 2018).

This study shows that percentage of pregnant women with underweight status at working area of Wonosobo Public Health Center is still quite high (7.5%) when compared to WHO which targets the CED incidence rate <5%, but the incidence rate in this study categorized at low when compared to the national target in 2019 by 18.2 % of total pregnancy. The CED on pregnant women is thought to be due to a deficit in energy consumption. In addition, the

activity of providing supplementary food (MT) for pregnant women with CED has also not reached the target.

Nutritional status on pregnancy can be measure by the value of Mid – Upper Arms Circumference (MUAC) pregnant woman's. The criteria of nutrition status by MUAC value were determined by underweight(<23.5 cm) and normal (≥ 23.5 cm). This study used 53 pregnant women as a sample with various characteristics of age and socioeconomic status. Bivariate analysis (Chi-Square test) shows pregnant women at underweight status (MUAC<23.5 cm) with insufficient household food expenditure were 4 people (100%) and pregnant women at normal nutritional status (MUAC ≥ 23.5 cm) with sufficient household food expenditure were 43 people (87.8%). The results of statistical analysis showed that there was a significant correlation between household food expenditure and nutritional status on pregnant women ($p = 0.001$).

The other study to analyze economic determinant to impact the CED on pregnancy in West Papua, Indonesia was show same results ($p = 0.029$). The study guessed low economic status affect the choice of food intake in pregnant womenso the essential nutrients during the pregnancy process cannot be fulfilled(Auliana et al., 2016). Another research with larger sample (670 samples) in Madagascar shows the socioeconomic (household size equal to or greater than 6) have significantly associated with malnutrition (AOR = 1.59 [1.04–3.42], $p = 0.029$)(Ravaoarisoa et al., 2018). How economic determinant impact nutrition status on pregnant women not only by houshold expenditure but it can rolled out by high the additional burden of pregnancy cost. (Gunarathne et al., 2020) in their study prove that here was a significant difference in monthly food cost between underweight and normal mothers ($t = -1.774$, $P = 0.076$).

The analysis of food security status to nutritional status were using Chi-Square test, the results show the pregnant womens in underweight status with food insecurity were 3 women (75%) while pregnant women in normal nutrition status with food insecurity only 3 women (6.1%) ($p = 0.003$).Pregnancy is a critical period during which maternal nutrient intake and nutritional status impact both the mother and the infant. A healthy diet has an important role in the birthweight and well-being of both the mother and the child(Napier et al., 2019).

Various factors play a role in a healthy pregnancy outcome, including good nutrition, appropriate supplementation, smoking habits, drug use, alcohol use and activity levels (Berthelsen et al., 2014). Foodinsecurityis an intractable problem in many countries, especially developed country. While social grants have brought a measure of poverty relief at household level, unaffordable diets were the root cause of food insecurity. The increasing consumption of cheaper, more available and preferred 'globalised' foods with high energy content and low nutritional content lead to malnutrition issues (Misselhorn & Hendriks, 2017). The correlation of food insecurity to poor nutrition status on pregnancy have been analyze in some studies. (Mastiholi et al., 2018) show there is dignificant correlation between food insecurity and anemia ($p = 0.0001$). Evaluation on the studies show the recommended daily allowance and the actual intake of various macro and micronutrients showed that the diet was rich in carbohydrates and fats.However, the total protein, fibre and essential micronutrient intake was low.

5. CONCLUSION

This study clearly shows that more food security and level of household food expenditure will affect on nutritional status of pregnant women.

6. REFERENCES

- [1] Auliana, U., Iskari, N., & Tiurma, H. (2016). Hubungan Usia, Tingkat Pendidikan, Status Ekonomi, Pekerjaan, Dan Asupan Zat Gizi Makro Dengan Status Gizi Ibu Hamil Di Provinsi Papua Dan Papua Barat. *Nutrire Diaita*, 8(April), 9–17.
- [2] Balitbangkes. (2019). *Hasil utama RISKESDAS 2018*.
- [3] Benson, T. (2005). Africa's food and nutrition security situation: where are we and how did we get here? *International Food Policy Research Institute*.
- [4] Berthelsen, R. M., Barkley, W. C., Oliver, P. M., McLymont, V., & Puckett, R. (2014). Academy of nutrition and dietetics: Revised 2014 standards of professional performance for registered dietitian nutritionists in management of food and nutrition systems. *Journal of the Academy of Nutrition and Dietetics*, 114(7). <https://doi.org/10.1016/j.jand.2014.03.017>
- [5] BPS. (2019). *Rata-Rata Pengeluaran per Kapita Sebulan Menurut Kelompok Barang (rupiah), 2013-2018*. Badan Pusat Statistik. <https://www.bps.go.id/statictable/2014/12/18/966/rata-rata-pengeluaran-per-kapita-sebulan-menurut-kelompok-barang-rupiah-2013-2018.html>
- [6] Depkes RI. (1994). *Pedomam Penggunaan Alat Ukur Lingkar Lengan Atas (LILA) pada Wanita Usia Subur*. Kementerian Kesehatan RI.
- [7] Directorate General of Public Health: Ministry of Health. (2018). *Laporan Kinerja Ditjen Kesehatan Masyarakat Tahun 2017*.
- [8] FAO, IFAD, UNICEF, WFP, & WHO. (2020). The State of Food Security and Nutrition in the World 2020. In *Transforming food systems for affordable healthy diets*. <https://doi.org/https://doi.org/10.4060/ca9692en>
- [9] FOA. (2006). *Food Security*.
- [10] Ghattas, H. (2014). *Food security and nutrition in the context of the nutrition transition*. FAO.
- [11] Gunarathne, S., Wickramasinghe, N., Agampodi, T., Prasanna, R., & Agampodi, S. (2020). Economic Status, Nutrition and Pregnancy Cost; A Vicious Cycle in Pregnancy. *Current Developments in Nutrition*, 4(Supplement_2), 996–996. https://doi.org/10.1093/cdn/nzaa054_068
- [12] Mastiholi, S. C., Somannavar, M. S., Vernekar, S. S., Yogesh Kumar, S., Dhaded, S. M., Herekar, V. R., Lander, R. L., Hambidge, M. K., Krebs, N. F., & Goudar, S. S. (2018). Food insecurity and nutritional status of preconception women in a rural population of North Karnataka, India. *Reproductive Health*, 15(Suppl 1). <https://doi.org/10.1186/s12978-018-0535-2>
- [13] McCarthy, J., & Maine, D. (1992). A Framework for Analyzing the Determinants of Maternal Mortality. *Studies in Family Planning*, 23(1), 23. <https://doi.org/10.2307/1966825>
- [14] Misselhorn, A., & Hendriks, S. L. (2017). A systematic review of sub-national food insecurity research in South Africa: Missed opportunities for policy insights. *PLOS ONE*, 12(8), e0182399. <https://doi.org/10.1371/journal.pone.0182399>
- [15] Napier, C., Warriner, K., Sibiyi, M. N., & Reddy, P. (2019). Nutritional status and dietary diversity of pregnant women in rural kwazulu-natal, south africa. *Health SA Gesondheid*, 24. <https://doi.org/10.4102/hsag.v24i0.1114>
- [16] Nurdini, E. D., & Mahmudiono, T. (2020). Hubungan status ketahanan pangan rumah tangga dengan anemia pada ibu hamil (Studi di Desa Bektiharjo Kecamatan

- Semanding Kabupaten Tuban). *Media Gizi Dan Kesehatan MAsyarakat*, 2(1), 17–22.
- [17] Ravaoarisoa, L., Raherimandimby, H., Rakotonirina, J., Rakotomanga, J. de D. M., Dramaix, M. W., & Donnen, P. (2018). Mothers' dietary practices in the amoron'i mania region Madagascar. *Pan African Medical Journal*, 30. <https://doi.org/10.11604/pamj.2018.30.76.15140>
- [18] United Nation. (2020). *Goal 2: Zero Hunger*. Sustainable Development Goals. <https://www.un.org/sustainabledevelopment/hunger/>
- [19] WHO. (2019). *Trends in maternal mortality: 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division*. Geneva. <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>.
- [20] WHO Reproductive Health Library. (2016). *WHO recommendation on nutrition education on energy and protein intake during pregnancy*. World Health Organization.
- [21] Wulansari, A. (2020). Ketahan pangan rumah tangga dan kejadian Kurang Energi Kronis (KEK) pada ibu hamil suku anak dalam Desa Bungku Kabupaten Batanghari. *Jurnal Akademika Baiturrahim Jambi*, 9(1), 92–87. <https://doi.org/10.36565/jab.v9i1.190>