

NUTRIENTS INTAKE PATTERN OF A MINANGKABAU ETHNIC GROUP

Ratna Djuwita¹, Purwastyastuti², Sudijanto Kamso³

¹Departemen Epidemiologi, Fakultas Kesehatan Masyarakat, Universitas Indonesia, Depok 16424, Indonesia

²Bagian Farmakologi, Fakultas Kedokteran, Universitas Indonesia, Jakarta 10430, Indonesia

³Departemen Kependudukan dan Biostatistik, Fakultas Kesehatan Masyarakat, Universitas Indonesia, Depok 16424, Indonesia

E-mail: drwita@pacific.net.id

Abstract

The high incidence of cardiovascular (CVD) risk factors among various ethnic groups in Indonesia is possibly closely related to the nutrients intake pattern of groups in Indonesia especially the Minangkabau ethnic group. Therefore, a cross sectional study was implemented to describe the nutrients intake pattern of a Minangkabau ethnic group. To achieve the objective the required sample size of 480 was selected. The studied population consisted of adults aged 18 years and older, living in the city of Padang. This study used sub-samples of a Body Mass Index Survey in provinces of Indonesia. Data of actual food intake, collected through a 24-hours dietary recall method were used to estimate the nutrient intake pattern. The nutrients intake data showed that the Minangkabau ethnic group had a poor quality of dietary fat pattern and a high risk toward cardiovascular risk factors, especially concerning dyslipidemia.

Keywords: nutrients intake pattern, safa, mufa, pufo, minangkabau ethnic

I. Introduction

The diet of choice is not always similar to the diet minimally necessary to maintain life and health. Diets are always changing in response to cultural, social and economic factors. Dietary pattern or nutrient intake patterns might be a consequence of cultural and ethnic heritage and of many environmental factors. Changes in dietary pattern towards the "affluent" diet had been followed by the increase in the incidence of various chronic diseases particularly coronary heart disease, cerebrovascular disease and various cancers of the middle and latter adult lives. The use of dietary or nutrient intake pattern should ultimately prove to be an informative and powerful means to augment our understanding of the role of diet in chronic diseases.

Indonesia is a multiethnic society with a population consisting of approximately 50 ethnic groups. There is an ethnic diversity with widely diverse food consumption patterns or nutrient intake patterns among those 50 ethnic groups. This diverse nutrient intake patterns among ethnics might influence their cardiovascular (CVD) risk factors. Ethnic differences in the incidence and prevalence of cvd has also been well documented. Available data showed that the proportion of inpatients with cardiovascular disease in

West Sumatera province was the highest ¹. Boedhi Darmodjo (1988) reported the prevalence of hypertension as a cardiovascular risk factors in several provinces in Indonesia. The highest prevalence of hypertension was found in two districts of West Sumatera, namely Silungkang and Talang i.e. 19.4% and 17.8% respectively ². Report from the MONICA (Monitoring Trends and Determinant in Cardiovascular Disease) study, which was conducted in Jakarta in 1993, differentiated cardiovascular risk factors among ethnics. This study also found that the proportion of hypertension among Minangkabau ethnic group was the highest i.e. 23.6% while among the Sundanese and Javanese ethnic group was around 14.4 - 14.6% ³. This survey also revealed that the proportion of overweight (body mass index greater than 25) among the Minangkabau ethnic group was 36% while among the Sundanese and Javanese ethnic group was around 25-26% ⁴. The Minangkabau ethnic group belongs to the ethnicity that mostly lives in West Sumatera Province. To study the differences of those cardiovascular risk factors of the Minangkabau ethnic group related to diet, we should take into consideration their traditional ethnic foods or nutrient intake patterns. This study observed the nutrient intake patterns of a Minangkabau ethnic group.

2. Methods

This study was a cross sectional study design. The study population consists of adult aged 18 years old and over at the time of contact and lived in Padang, and those who were Minangkabau ethnic. Ethnicity was defined according to the ethnicity of the parents. At least both mother and father of the respondent were from the same ethnicity with no mixed marriage. The information concerning to the ethnicity of the respondent and the parent was achieved through self-perceived definition. This study was the sub sample of Body Mass Index Survey cities in Indonesia. This study was conducted within the collaboration between The Nutrition Directorate Ministry of Health Republic of Indonesia and Faculty of Public Health University of Indonesia. Sub sample of Minangkabau ethnic was randomly selected from total sample respondents from Padang city, according to sample size requirement. Sample size was calculated using formula of one sample size for continuous variables for estimating the population mean. Because the sampling procedure of this study was carried out using multistage cluster sampling technique, design effect equal two (2) and 20% of non-response rate were taken into consideration for calculating the sample size. The required sample size was 480.

Data collection was conducted in October 1996 and was completed in April 1997. Data collection was carried out by trained supervisors from teaching staff of The Academy Nutrition or senior staff from the Nutrition Department of Ministry of Health and by trained enumerator from senior student of The Academy of Nutrition residing in Padang. Interview was used to collect personal identity, general information and socio-economic data of the respondents. One day 24-hour dietary recall method was applied to estimate the actual food intake of the respondents for the immediate past 24 hours. The amount of foods and beverages were assessed by using daily household measurements. Food model was used to help the respondent memorize the amount of foods and beverages they had consumed in the last 24 hours. Data of actual food intake were used to estimate the nutrient intake such as the total calorie, protein and fat intake, saturated fatty acid (safa), monounsaturated fatty acid (mufa) and polyunsaturated fatty acid (pufa) intake and cholesterol intake. Estimation of these nutrients were calculated and analyzed by using World Food dietary assessment version 2 software program. Data entry, processing and analyses were performed using EPI-INFO program (version 6), Statistical Package for Social Science (SPSS) for Windows version 10.0.

3. Results and Discussion

The mean energy intake of Minangkabau ethnic was 1556.9 kcal (Table 1). This mean energy intakes of

Minangkabau ethnic was lower (72.4%) than what was expected based on the Indonesian's Recommended Dietary Allowances (RDA, 2150 kcal)⁵. Singaporean's food consumption study, showed the mean total energy intake among women, of three ethnic groups; Indian, Malay and Chinese. The Indian's ethnic women had the highest energy intake (1718 kcal/day). While among men, Chinese had the highest mean total energy intake (2322 kcal/day), and the Malaysian's ethnic had the lowest mean total energy intake among men (2130 kcal/day) as well as among women (1647 kcal/day)⁶. The mean total energy intake of the Minangkabau and, were more or less similar with the means total energy intake of those Asian's ethnic groups.

Dietary guidelines advocated by the American Heart Association and National Cholesterol Education Program recommended a diet should contained; less than 30% of energy from fat⁷. The mean of the contribution of total fat to total energy intake of Minangkabu ethnic was 30.2% (Table 2). We could considered that these values were quite high, approximately 30% from the total energy. In other Asian countries such as in Japan, the contribution of fat to energy intake was lower than 25% and in Malaysia it was 28%. The percent contribution of fat to total energy intake among the three ethnic groups, in Singapore were also quite high; 30% among the Chinese, 29% among the Malay and 28% among the Indians.

Different fatty acids had been shown to affect the risk of several chronic diseases such as hypercholesterolemia. The American Heart Association dietary guidelines had published recommendation to achieve and maintain desirable plasma total cholesterol and LDL (Low Density Lipoprotein) cholesterol by reducing dietary saturated fatty acid to less than 10% of energy intake⁷. Reduction of dietary fat intake from 37% to 30% of calories did not lower plasma total and ldl cholesterol concentrations unless the reduction in total fat was achieved by decreasing in saturated fatty acids⁸. Like the percentage of fat to total energy intake, the percentage of saturated fatty acid (safa) to total energy intake among the Minangkabau ethnic groups, were also high, approximately 20.7% (Table 2).

Pufa (polyunsaturated fatty acid) specifically linoleic acid tend to lower plasma total cholesterol and ldl, but their effect was only half strong as the raising effect of saturated fatty acid. Mufa (monounsaturated fatty acid) specifically oleic acid had a smaller cholesterol lowering effect⁹. Pufa include the essential fatty acids required for human health. The WHO Study Group on Diet, Nutrition and Prevention of Non-communicable Diseases, suggested that diets that provided at least 3% of energy as pufa, would be adequate to achieve this requirement¹⁰. The percentage of pufa to the total energy intake was a little bit less than 3%, 2.6% among

Table 1. Mean macro nutrients, fatty acid, total cholesterol and P/S ratio intakes of Minangkabau ethnic.

<i>Macronutrients</i>	
Energy (kcal/day)	1556.9 (1530.4 – 1583.4)
Total carbohydrate(g/day)	218.9 (214.1- 223.7)
Total protein (g/day)	54.2 (52.7 – 55.8)
Total fats (g/day)	52.0 (50.4 – 53.6)
<i>Individual fatty acid & total cholesterol & P/S ratio</i>	
Safa (g/day)	35.3 (34.2 – 36.3)
Mufa (g/day)	8.5 (8.0 – 9.1)
Pufa (g/day)	4.7 (4.4 – 4.9)
Total cholesterol(mg/day)	165.1 (150.5 – 179.6)
P/S ratio	0.15 (0.14 – 0.16)

Values in brackets are 95% CI (confidence interval)

Table 2. Mean percentage of carbohydrate, protein, total fat, safa,mufa and pufa to total energy intake of the Minangkabau ethnic.

Carbohydrates	56.2% (55.4 – 56.9)
Protein	13.9% (13.6 – 14.2)
Fat	30.2% (29.4 – 30.9)
Safa (saturated fatty acid)	20.7% (20.1 – 21.3)
Mufa (monounsaturated fatty acid)	4.8% (4.6 – 5.0)
Pufa (polyunsaturated fatty acid)	2.6% (2.6 – 3.0)

Values in brackets are 95% CI (confidence interval)

Minangkabau ethnic group (Table 2). Among the three ethnic groups in Singapore, Indians had the highest percentage of pufa to the energy (6.2%) and the lowest were among the Malays 11. According to the WHO Study Group the upper limit of the percentage pufa to total energy was 7%. When saturated fatty acid in the diet was replaced by pufa specifically linoleic acid there was a decreased in ldl cholesterol. However a high intake (above 10% of energy), might decrease HDL (high density lipoprotein) cholesterol as well^{12,13}. Since HDL cholesterol had a protective effect toward CHD

(Coronary Heart Disease), high intake of pufa were not recommended.

The current recommended of percentage of mufa to total energy was 10 %⁷. The percentage of Mufa among the Minangkabau ethnic groups were low, approximately 2.6% (Table 2). We could consider, that the percentage of mufa of the Minangkabau ethnic groups was still not adequate based on the recommended value.

Dietary cholesterol had a relatively weak effect toward plasma total and LDL cholesterol^{7,14,15}. Mean dietary cholesterol of the Minangkabau ethnic group was 165 mg/day (Table 1). This value was still much lower than 300 mg, which was the value from the dietary guidelines of the American Dietary Association. Foods, which were rich in cholesterol, often also contained much of safa. A reduction in intake of safa would be expected also to reduce the dietary cholesterol.

Dietary food with a low P/S (polyunsaturated to saturated fatty acid) ratio approximately 0.2 was considered as a diet that might increase plasma cholesterol level and considered as more atherogenic. While higher P/S ratio around 0.8 was considered as less atherogenic and might reduced plasma cholesterol level^{16,17}. The mean P/S ratio of the Minangkabau ethnic groups was less than 0.2, it was low approximately 0.15 (Table 1). If we used 0.2 as a cut off point of this P/S ratio, than we could consider that the dietary fat pattern of all the Minangkabau ethnic groups might be associated as having the risk of dyslipidemia or hypercholesterolemia.

For those who were concerned about their risk of heart disease, they should consume generally healthy diet and reduced their fat intake, limit the total fat intake to 30% or less of total energy. And out of this 30%, about one third should come from safa, one third from pufa and one third from mufa. it was recommended that the ratio of pufa: mufa: safa should be 1: 1: 1. The fatty acid ratios to relative saturated fatty acid intakes (pufa: mufa: safa) of the Minangkabau ethnic groups were 0.15: 0.26: 1. Based on the ratio of pufa: mufa: safa, we could consider that Minangkabau had poor quality of dietary fat pattern.

4. Conclusions

Having the poor quality of the dietary fat pattern and high fat intake, we might take into consideration that this Minangkabau ethnic group, had a high risk toward dyslipidemia. Dietary advice to achieve healthy eating patterns for cardiovascular disease prevention should maintain favorable traditional ethnic foods or local foods commonly consumed by the mainstream ethnic group concerned. To achieve better fatty acid intake profiles, protective foods against CHD risks should be

advised to be added to the daily diet. The conventional method by providing a list of food to be eaten or avoided is not sufficient to change ethnic's food choices. On the other hand, actions should be taken by empowering people to make and practice food choices for example: to increase sources of pufa in Minangkabau ethnic, the consumption of nuts and legumes can be recommended to compensate the lower intake of pufa and higher intake of safa rich foods. The availability of information about food sources of safa, pufa and mufa among diverse ethnicities that are considered as protective or non-protective foods against CHD risk factors is not sufficient to lead to dietary change as an overall healthy dietary pattern. People need to be educated about how to effectively use all the available information. Successful nutrition education and promotion programs that are considered as the common strategy used to combat barriers of dietary changes should be implemented. Proper dietary guidelines should be food-based rather than nutrient-based. Proper food-based dietary guidelines should take into consideration the variety of specific food choice strategies to reduce hyperlipidemic foods; like avoiding or reducing animal protein intake, modifying particular food sources of total fat or safa, restricting certain types of safa rich foods or restricting the quantities, or substituting similar foods for high fat foods and replacing higher safa foods with lower safa food sources.

References

1. Pusat Data Kesehatan Depkes RI, *Profil Kesehatan Indonesia 1995*. Jakarta, Departemen Kesehatan RI, 1995.
2. Boedhi-Darmojo R. The epidemiology of hypertension in Indonesia. *Medika* 1988;14.
3. Soenarta., Arieska, Kalim H, et.al. Hipertensi sebagai masalah kesehatan masyarakat. Aspek klinik dan epidemiologi di RS Jantung Harapan Kita. *Majalah Kesehatan Masyarakat Indonesia*, 1994; Tahun XXII (2)
4. Sutejo, Setianto B, Boedhi-Darmojo R. Presentasi dan Diskusi Survey II MONICA-Jakarta 1993. Jakarta: Badan Penelitian dan Pengembangan Departemen Kesehatan RI Jakarta dan Pusat Kesehatan Jantung Nasional Rumah Sakit Jantung Harapan Kita, 1994.
5. Muhilal, Jalal F, Hardinsyah. *Angka Kecukupan Gizi yang Dianjurkan*. Prosiding Widyakarya Nasional Pangan dan Gizi VI, Winarno FG, Tsauri S, Soekirman, Sastrapradja DS, Wirakartakusumah MA, Rifai, MA, Jalal F, Suryana A, Husaini MA, Atmowidjojo M, Koswara, S, editors. Jakarta: Lembaga Ilmu Pengetahuan Indonesia, 1998: 843-879.
6. Ministry of Health (MOH). *Food Consumption Study 1993*. Singapore: Food and Nutrition Department, 1994.
7. Krauss RM, Eckel RH, Howard B, Appel LJ, Daniels SR, Deckelbaum RJ, et al. AHA Dietary Guidelines: revision 2000: A statement for healthcare professionals from the Nutrition Committee of the American Heart Association. *Circulation* 2000; 102: 2284-2299.
8. Barr SL, Ramakrishnan R, Johnson C, Holleran S, Dell RB, Ginsberg HN. Reducing total dietary fat without reducing saturated fatty acids does not significantly lower total plasma cholesterol concentrations in normal males. *Am J Clin Nutr* 1992; 55: 675-681.
9. Yu S, Derr J, Etherton TD, Kris-Etherton PM. Plasma cholesterol-predictive equations demonstrate that stearic acid is neutral and monounsaturated fatty acids are hypocholesterolemic. *Am J Clin Nutr* 1995; 61:1129-1139.
10. World Health Organization. *Diet nutrition, and the prevention of chronic disease*. Technical Report Series. Geneva: World Health Organization, 1990: 797.
11. Yap MD, Li T, Tan WL, Staveren WA, Chew SK, Dereunberg P. Can dietary factors explain differences in serum cholesterol profiles among different ethnic groups. *Asia Pacific J Clin Nutr* 2001; 10: 39-45.
12. Mensink RP, Katan MB. Effect of a diet enriched with monounsaturated or polyunsaturated fatty acids on levels of low-density and high-density lipoprotein cholesterol in healthy women and men. *N Engl J Med* 1989; 321: 436-441.
13. Kushi LH, Lew RA, Stare FJ, Ellison CR, El Lozy M, Bourke G, et al. Diet and 20-year mortality from coronary heart disease. The Ireland- Boston Diet-Heart Study. *N Engl J Med* 1985; 312: 811-818.
14. Hegsted DM. Egg consumption and serum cholesterol. *Am J Clin Nutr* 1993; 57: 87-89.
15. Edington JD, Geesie M, Carter R, Benfield L, Ball M, Mann J. Serum lipid response to dietary cholesterol in subjects fed a low-fat, high-fiber diet. *Am J Clin Nutr* 1989; 50: 58-62.
16. Hayes KC. Dietary fat and coronary heart disease. In: *Preventive nutrition. The comprehensive guide for health professionals*, Bendich A & Deckelbaum R, editors. New Jersey : Human press Inc, 1997: 153-169.
17. Guthrie HA, Picciano MF. Lipid. In: *Human Nutrition*. St Louis Missouri: Mosby Publishing, 1995: 111-150.