

Coronary risk in West Sumatran men

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Lifestyle, food habits and blood lipid profiles were studied in two areas – one urban and one rural – of West Sumatra, Indonesia, where coconut oil is commonly consumed. Subjects were 102 randomly selected healthy adult men aged 25 to 39 years. Variables considered were socio-economic level, smoking habits, alcohol and coffee consumption, food intake, indices for obesity, and blood lipid profiles. Urban incomes were higher than in rural areas. The prevalence of cigarette-smoking was 75% in urban and 80% in rural areas. Alcohol consumption was higher in urban (31%) than rural areas (4%). Coffee was used by 52% of urban and 38% of rural men. However, quantities of alcohol and coffee consumed were small. Average energy intakes were 1915 kcal (456 kJ) in the urban and 1845 kcal (439 kJ) in the rural areas. Protein intake was 55.8g (11.3% of total energy) in the urban and 46g (9.8%) in the rural areas. Fat intake was 45.0g (20.4%) in the urban and 33.5g (16%) in the rural areas. Dietary fat intake was significantly higher in the urban compared to the rural areas ($P < 0.005$). The average BMI (kg/m^2) was 21.2 in the urban and 20.4 in the rural areas. Mean total body fat from 4 skinfolds was 13.4 kg in the urban and 9.1 kg in the rural areas (Durnin's equation). The waist-hip ratio was 0.90 in the urban and 0.88 in the rural areas. Concentrations of total serum cholesterol and of LDL, the LDL-HDL cholesterol ratio and the atherogenic index were significantly higher in the urban compared to the rural areas ($P < 0.001$). Serum HDL tended to increase in the urban areas. Overall, higher economic status married men generally had the higher prevalence of coronary heart disease risk factors.

Introduction

Food habits in urban areas of Indonesia appear to be changing away from basic food commodities and towards products which encourage a greater fat consumption. From the present study it is possible to assess coronary risk factors amongst both urban and rural dwellers in areas where coconut milk or coconut oil is used for cooking and also to consider some socio-economic and lifestyle variables.

In West Sumatra, especially in urban areas where coconut oil (minyak kelapa) is commonly used, because it is cheap and readily available, considerable change is taking place in lifestyle and food habits. Moreover, there is a traditional preference for fatty dishes in Padang, the capital of West Sumatra, as evidenced by such a favoured soup dish as Soto Padang, containing plentiful quantities of minyak kelapa, chicken, rice and vegetables. As well as coconut and use of other plant fats there has been a tendency to increase fat consumption by using beef and dairy fat. Changing cooking and smoking practices are also likely to have had an impact on fat consumption.

West Sumatra is now regarded as having the highest coronary mortality in Indonesia where it ranks after respiratory infection and diarrhoea. Its prevention is of increasing importance. The accepted view in the Western cardiovascular disease literature is that the intake of saturated fatty acids and cholesterol cause coronary heart disease through atherosclerosis¹ and that decreasing dietary fat intake will reduce the incidence of heart disease². This has been extrapolated to the use of

local fats, such as coconut oil, in Asia and the Pacific irrespective of whether their use has been traditional or modernized (eg oil rather than meat or milk). Doubts have been raised about these extrapolations because of the short chain length and greater splanchnic metabolism of these fatty acids compared with their shorter chain counterparts³. In West Sumatra, there are correlations between coronary risk factors and social class³ which also need to be explored.

As far as body fatness is concerned, the waist-to-hip ratio is now regarded as the best way of considering its contribution to cardiovascular disease, stroke and total mortality⁴. Thus its appraisal in West Sumatra's urban and rural communities should be of value.

Subjects and methods

Subjects were healthy adult males aged 25 to 39 years living in an urban or a rural area of West Sumatra. Fifty subjects were selected by a random sampling technique from all people of the age group in Kelurahan Sungai Lareh, subdistrict of Koto Tengah which is a rural area and 52 from Kelurahan Padang Pasir Selatan, Padang Barat subdistrict, Padang, an urban area. The criteria used to classify the village as a rural or urban area were

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population density, share of agricultural households and number of urban facilities⁵.

Methods

Sociodemography, lifestyle and habit. Economic status, marital status, educational level, and type of occupation were documented. Economic status was determined by consideration of the ratio of expenditure for food to total expenditure per capita per month. It was judged to be low if the ratio was 80% or above, high if below 50%, and medium if it was 50–79%. Cigarette and beverage consumption were evaluated.

Nutrient intakes and food habit. The method chosen for collecting dietary data was the 24-h recall. Respondents were asked to describe, in as much detail as possible, the food intake for the previous 24-h period. Nutrient conversion was undertaken using the Indonesian Food Composition Tables. The interview was conducted by trained personnel using food photographs, as well as standard measuring instruments to aid in estimating portion size. The subjects were also interviewed about food beliefs.

Anthropometric measurements. The anthropometric measurements were made by trained observers of height, fatfolds in four different parts of the body (triceps, biceps, suprailiac, and scapula), along with waist (at the umbilicus point) and hip circumferences. Conversion to body fat from skinfold was made using the Durnin and Wommersley tables.

Blood lipid profile. Alternate subjects had 5 ml serum taken, after an overnight fast. Venous blood was taken for measurement of total cholesterol, triglyceride, high-density lipoprotein (HDL) cholesterol and low-density lipoprotein (LDL) cholesterol. These were determined from samples of serum in duplicate with kits from Boehringer Mannheim (Mannheim, West Germany). The quality control checks revealed that cholesterol standards read at 96.5% of standard (102–130 mg%) and the triglyceride solution at 103% triglyceride solution of standard (86–116 mg%).

Data analysis. Student's t-test was used for assessing the significance of differences between two means obtained from small samples. Differences were considered significant at $P < 0.05$.

Results

Non-nutritional variables

It was found that socio-economic status was higher in the urban than the rural area. In the same age group (Table 1), there were less married people in the urban than the rural area.

Activities of daily living. Urban and rural subjects worked about 9 hours per day. More than 50% of rural subjects were farmers, whose work was mostly heavy.

Smoking in both urban and rural areas was high (Table 1). The average duration of smoking was 129 months and quantities of cigarettes smoked were 16 per day in

the urban and 18 per day in the rural communities. As far as type of cigarette was concerned, clove cigarettes were used by 64.1% and 60% in urban and rural areas respectively. In both urban and rural areas smoke 43.6% and 57.5% was inhaled.

Alcohol consumption. More urban subjects drank alcohol than did rural subjects (Table 1). Almost two-thirds drank light beer in both urban and rural areas. The quantities of beer consumed were <2 glasses whether urban or rural subjects, with an average 6 times per month in rural and 4 times per month in urban subjects.

Coffee drinking prevalence was 46.2% for urban and 38.0% for rural subjects (Table 1). Coffee was consumed on average 1.3 times and 1.7 times per day in urban and rural areas (1.5 and 1.9 glasses) respectively.

Food beliefs and taboos

Certain vegetables were subject to a food taboo for urban subjects and fresh water fish to a food taboo for some rural subjects, but subjects with taboos were few (Table 1 below). Food intake of significant nutrient sources was determined by a scoring system devised by Suhardjo et al. Significant amounts of cholesterol were considered to be provided by food such as eggs, organs of beef and buffalo, and prawns which were consumed more in urban than rural areas. However, foods containing unsaturated fat were consumed almost similarly between urban and rural communities.

Nutrient intake

Energy intake did not differ significantly between urban communities (Table 2). The Indonesian Food and Nutrition Board has recommended that energy intake per adult per day be 2500 kcal (595 kJ) and protein 50g per day⁷. Both energy and protein intakes were below these levels.

Table 1. Socio-economic and lifestyle characteristics of subjects.

	Urban (n=52) %	Rural (n=50) %
Economic status:		
Low	3.9	42.0
Medium	51.9	48.0
High	44.2	10.0
Education level:		
Primary school (not completed)	0.0	48.0
Primary school (completed), 6 years	13.5	22.2
Junior high school, 3 years	7.7	8.0
Senior high school, 3 yrs	44.2	18.0
University/academy level	34.6	4.0
Marital status:		
Single	59.6	18
Married:	40.4	82
Lifestyle and habits:		
Smokers	75.0	80.0
Alcohol consumers	30.8	4.0
Coffee drinkers	46.2	38.0
Food taboo observers:	17.3	22.0
Sea fish	11.1	9.1
Fresh water fish	–	18.2
Vegetables	11.1	–
Other	77.8	72.7

Table 2. Nutrient intake (mean \pm SD).

Nutrient	Urban (n=52)	Rural (n=50)
Energy kcal(kJ)	1915 \pm 522(456 \pm 124)	1845 \pm 470(439 \pm 112)
Protein (g)	58 \pm 18	46 \pm 19
Protein as % total energy intake	11.3 \pm 3.1	9.8 \pm 2.3
Fat (g)	45 \pm 18*	34 \pm 16*
Fat as % total energy intake	20.4 \pm 9.8	16.0 \pm 6.3

*(P <0.005) by Student's t-test

Anthropometric measurements

BMI tended to be greater in the urban community where total body fat was higher than in the rural area (P <0.005). Waist-to-hip ratio also tended to be higher in urban subjects (Table 3).

Table 3. Frequency of consumption of foods containing dietary fats by percentage of subject: A = > once per day; B = once per day; C = 4-6 times per week; D = 1.3 times per week; E = < once per week.

Food type	Urban (%)					Rural (%)				
	A	B	C	D	E	A	B	C	D	E
Egg	-	7.9	10.9	36.6	44.6	-	1.0	6.3	32.3	60.4
Beef meat	-	3.5	6.3	33.1	57.0	-	-	3.7	11.1	85.2
Organ (beef/buffalo)	-	-	1.0	5.1	93.9	-	-	-	3.3	96.7
Goat meat	-	-	-	7.9	92.1	-	-	-	-	100
Chicken	-	7.0	12.0	34.0	47.0	-	-	2.6	16.7	80.0
Fish/shrimp	0.6	10.6	13.8	28.1	46.9	-	6.4	22.7	24.1	46.8
Unsaturated fat	0.1	6.9	7.1	30.3	55.6	-	2.5	11.4	32.6	53.5
Fruit	-	9.2	7.0	28.9	54.9	-	3.1	8.5	24.0	64.3
Snack	-	0.7	3.4	25.0	70.9	-	0.6	5.3	20.9	73.3

Blood lipid profiles

Table 4 shows the results. Total cholesterol and LDL cholesterol were significantly higher for urban than rural subjects (P <0.001). LDL cholesterol-to-HDL-cholesterol ratio was significantly higher in the urban than the rural community (P <0.001). Total cholesterol was significantly higher in both the 25-29 year old and 30-39 year old age groups (P 0.001). LDL cholesterol was significantly higher in both urban age groups (P <0.001) than their rural counterparts. Total cholesterol was higher in married subjects in both urban and rural areas.

Table 4. Anthropometric measurements.

Measurement	Urban (n=52)	Rural (n=50)
Body weight (kg)	56.4 \pm 10.8	53.2 \pm 7.3
Height (cm)	161.8 \pm 7.7	157.4 \pm 2.3
Body mass index (BMI)	21.2 \pm 3.4	20.4 \pm 2.9
Total body fat (kg)	13.4 \pm 5.3*	9.1 \pm 3.5*
Waist (cm)	78.1 \pm 11.0	74.0 \pm 6.9
Hip (cm)	86.3 \pm 7.5	83.5 \pm 4.7
Waist-to-hip ratio	0.90 \pm 0.06	0.88 \pm 0.04

* P < 0.005 by Student's t-test

Table 5. Blood lipid profile.

Lipid	Urban (n=26)		Rural (n=27)	
Overall				
Total cholesterol (mg%)		231 \pm 44**		185 \pm 25**
HDL cholesterol (mg%)		62 \pm 10		73 \pm 23
LDL cholesterol (mg%)		146 \pm 39**		94 \pm 26**
Triglyceride (mg%)		125 \pm 56		112 \pm 38
LDL:HDL cholesterol ratio		2.41 \pm 0.76**		1.49 \pm 0.59**
By age group	25-29 yrs	30-39 yrs	25-29 yrs	30-39
Tot chol	227 \pm 40	234 \pm 49**	178 \pm 49***	190 \pm 24**
HDL	61 \pm 13	64 \pm 6	70 \pm 14	65 \pm 13
LDL	141 \pm 36**	151 \pm 43***	88 \pm 27**	100 \pm 35***
Trig	129 \pm 49	120 \pm 65	100 \pm 23	122 \pm 45
LDL:HDL		2.39 \pm 0.67**	1.35 \pm 0.64**	1.60 \pm 0.55**
By marital status	Single	Married	Single	Married
Tot chol	224 \pm 30**	234 \pm 50	174 \pm 26****	188 \pm 24****
HDL	62 \pm 14	62 \pm 7	73 \pm 14	66 \pm 14
LDL	140 \pm 25**	149 \pm 46**	82 \pm 27**	99 \pm 25*
Trig	115 \pm 42	130 \pm 63	98 \pm 25	117 \pm 41
LDL:HDL	2.37 \pm 0.64	2.43 \pm 0.84	1.22 \pm 0.70	1.58 \pm 0.54

* P <0.0001; **<0.001; ***<0.01; ****<0.02; *****<0.05

Discussion

Fat intake is still low and predominantly from coconut in these urban and rural communities where lifestyle is transitional and coronary mortality increasing. However, accepted cardiovascular risk factors, such as abdominal fatness and serum lipids, are greater in urban than rural men in West Sumatra. Thus, the determinants of these factors, which may include dietary factors other than fat, and non-dietary lifestyle changes such as in smoking, remain important to clarify.

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西蘇門答臘男子冠心病的危險率 摘要

印度尼西亞蘇門答臘KELURAHAN SUNGAI LAREH, KOTO TENGAH行政區的鄉村和PADANG市區的生活方式、習慣、食物模式和血脂輪廓在變化中，這些地區通常進食椰子油。我們隨機選擇了102位25-39歲的健康成年男子為對象，研究他們的社會經濟水平，吸煙，飲酒，咖啡消耗，食物進食，肥胖指標和血脂輪廓等。

城市居民的收入高于鄉村居民。城市和鄉村居民的吸煙率分別為75%和80%，鄉村居民的酒消耗（4%）低于城市居民（31%）。鄉村居民飲用咖啡者占32%而城市占52%，但酒與咖啡的消耗量較國際資料低。

鄉村居民平均每日能量進食為1845千卡，而城市居民為1915千卡，鄉村居民每日蛋白質進食為46克（占總能量9.8%），而城市居民為55.8克（占總能量11.3%）。鄉村居民每日脂肪進食為33.5克（占總能量16%），而城市居民為45.0克（占總能量20.4%）城市居民的脂肪進食明顯高于鄉村居民（ $P < 0.005$ ）。

鄉村居民平均體重指數（公斤/米²）為20.4，而城市居民為21.2，鄉村居民平均腰臀比值為0.88，而城市居民為0.90

高經濟狀況的已婚男子通常有較高的冠心病患病率。

Faktor risiko penyakit jantung koroner pada pria di Sumatra Barat

Telah diteliti pola hidup, pola makan dan profil lemak darah di daerah perkotaan di Padang dan di daerah pedesaan di kelurahan Sungai Lareh, Kecamatan Koto Tengah dimana minyak kelapa sering digunakan. Sebanyak 102 orang pria dewasa sehat (umur antara 25-39 tahun) dipilih secara acak. Variabel-variabel yang diamati adalah tingkat sosioekonomi, kebiasaan merokok, konsumsi alkohol dan kopi, konsumsi makanan, parameter obesitas dan profil lemak darah.

Pendapatan daerah perkotaan lebih besar daripada daerah pedesaan. Kebiasaan merokok didapatkan 75% di daerah perkotaan dan 80% di daerah pedesaan. Konsumsi alkohol di daerah perkotaan (31%) lebih tinggi bila dibandingkan dengan daerah pedesaan (4%). Kopi diminum oleh 52% pria daerah perkotaan dan 38% pria daerah pedesaan.

Konsumsi energi rata-rata adalah 1915 Kcal (456 KJ) di daerah perkotaan dan 1845 Kcal (439 KJ) di daerah pedesaan. Konsumsi protein didapatkan 55.8 g (11.3% total energi) di daerah perkotaan dan 46 g (9.8% total energi) di daerah pedesaan. Konsumsi lemak ditemukan 45 gram (20.4% total energi) di daerah perkotaan dan 33.5 gram (16% total energi) di daerah pedesaan. Konsumsi lemak di daerah perkotaan lebih tinggi secara bermakna ($p < 0.005$) bila dibandingkan dengan daerah pedesaan.

Indeks Massa Tubuh (kg/m^2) rata-rata adalah 21.2 di daerah perkotaan dan 20.4 di daerah pedesaan. Total lemak tubuh rata-rata dari 4 lipatan kulit dengan menggunakan persamaan Durnin adalah 13.4 kg di daerah perkotaan dan 9.1 kg di daerah pedesaan. Rasio lingkaran pinggang terhadap panggul didapatkan 0.9 di daerah perkotaan dan 0.88 di daerah pedesaan.

Kadar serum total kolesterol, kolesterol-LDL, dan rasio kolesterol-LDL/kolesterol-HDL, serta indeks aterogenik lebih tinggi secara bermakna di daerah perkotaan ($p < 0.001$) dibandingkan dengan daerah pedesaan. Kadar serum HDL-kolesterol cenderung meningkat di daerah perkotaan.

Secara keseluruhan dapat disimpulkan bahwa semakin tinggi status ekonomi pria yang telah berkeluarga, semakin tinggi pula prevalensi risiko mendapatkan PJK.