Prevalence of Cardiovascular Risk Factors in a Rural Area in Southern Thailand: Potential Ethnic Differences

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In Thepa district, Songkhla province, Southern Thailand, parents of children being followed long term from conception for their development (N 1325), as well as health workers of the same district (N 150) were surveyed with regards to anthropometry, occupation, family size, food and leisure habits, and blood levels of lipids, sugar, creatinine and hematocrit. Differences among those of Thai or Chinese extracts (Thai-Buddhists) and those of Malay extracts (Thai-Muslims) were separately evaluated for males and females. The mean age for the group (N 1475, including 636 couples) was 31.5 ± 7.3 (SD) and ranged from 15-66 years. There were 794 females (485 Muslims) ages 29.6 ± 6.6 (SD). The Muslim families were larger in size averaging 2.8 ± 1.6 children while the Buddhist's averaged 1.9 ± 0.9. Fifty four percent of the group were engaged in rubber tapping and this often included both members of the family. Sixty eight percent of the males currently smoked. Differences in measured variables between Muslims and Buddhists were minimal. The most striking however was the high density lipoprotein cholesterol (HDL-C) among the males where the age-adjusted average was 51.3 ± 0.72 (SE) among the Buddhists and 42.2 ± 0.59 (SE) in the Muslims. This difference was significant even when adjusted for other related variables. Differences in the ethnic groups were also examined in terms of prevalence of risks (hypertension, BMI ≥ 25%, waist-hip-ratio, fasting plasma glucose ≥ 110 mg%, total cholesterol ≥ 200 mg%, triglyceride ≥ 150 mg% and low HDL-C). For hypertension (systolic ≥ 140 or diastolic ≥ 90 mmHg), female Muslims showed higher prevalence (4.5% vs 1.6%; OR 2.82 CI 1.04-7.64). For low HDL-C, male Muslim showed higher prevalence 23.6 vs 8.8%, OR 2.31 CI 1.27-4.22). Other risks showed no differences among the ethnic groups. The differences in parameters or in prevalence of risk between these two ethnic groups (minimal intermarriage) are distinct from differences among Malays and Chinese in Singapore where such differences were subsequently reflected in the differences in incidence and out-come of ischemic heart diseases.

Keywords: *Cardiovascular risk factors, Ethnic differences*

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Thailand is a developing country and as others, the health of the people is in a transitional state[1]. The life expectancy is increasing[2]. In 1996, the life expectancy was 69.9 years for males and 74.3 years for females and the disability adjusted life expectancy was 60.2 years. As infection and poverty-related diseases assume less importance in morbidity and mortality we need to look at other risk factors related to non-communicable diseases particularly the cardiovascular system. Up until the present the authors have only one published study on the incidence rate of cardiovascular disease[3] and this pertains to a highly urbanised group and only fatal incidences were reported. In contrast to the urban group, the proportion of rural population in Thailand is 67% of the total[4].

Apart from the distribution between those residing in rural and urban areas, there may exist

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differences among ethnic groups. In Singapore and Malaysia, there are 3 ethnic groups whose religious practices differ such that intermarriage is very uncommon. They are the Chinese, Malays and Asian Indians. These groups showed different incidences of diseases and risk factors[5-13]. Asian Indians had the highest rate of newly developed CHD (3 times higher than the other two groups) with a gross incidence of 10.6 per thousand person years of follow up. In addition, they had a higher prevalence of certain parameters of obesity such as waist circumference, waist hip ratio (WHR) and also a high insulin resistance and a higher percentage with low HDL-C (high density lipoprotein cholesterol). Tan[14] reported that some of these obesity indices lost their ethnic differences once the subject developed diabetes mellitus (DM). Deurenberg-Yap[9] commented that while dietary factors can be correlated to serum cholesterol, these were not significant enough to explain the ethnic differences, even when other factors were taken into account. Ethnic differences between Asian Indians and Chinese in Canada were reported for both sexes but only in death from ischemic heart and not death from stroke[15]. This is similar to the review of Chaturvedi[16]. There is currently no data comparing Malay-Thais (often labelled as Thai-Muslim) to other Thais (labelled as Thai- Buddhist).

Ethnicity aside, it is highly likely that environment and socio-economic development play a large part in the incidences of diseases. Zhang[17] examined trends of death from cerebro-vascular disease and cancer and found that the Chinese living in Hong Kong and living in Singapore both showed decreasing total mortality from 1965 to 1995. This includes a decrease in cerebrovascular deaths. However, deaths from ischemic heart disease (IHD) showed an opposite trend. The mortality from IHD in Hong Kong males decreased from 2.1 to 1.3 per thousand per year in the 30 year span, while death rates in Singapore males went up from 2.8 to 3.7 per thousand per year (age standardized to 45-74 years), an incidence similar to that of the USA and over 5 times that from Japan.

In the Southern part of Thailand, there exists a rural group, in which the majority is registered with a single community hospital. The group is composed of 2 religious factions. One faction is of Thai and Chinese extract who is predominantly Buddhist while the Malay-Thais are mainly Muslim. From a selected group in this community, a longitudinal follow up of child development was initiated in 1999 [Prospective Cohort of Thai Children[18]]. Parameters assessed in this Children's program include diet and environment which covers family structure, mental attitude, child rearing, culture etc. In this district a thousand couples were enrolled into the program. It was thought worthwhile to parallel this study by evaluating the parents as well so as to coordinate entry parameters and follow up, such that disease events could be monitored and risk factors determined.

This manuscript reports on certain parameters of the survey and attempts to delineate differences among the two ethnic groups living together in Southern Thailand.

Material and Method

Subjects

The parents of the project "Prospective Cohort of Thai Children" (1000 couples) were invited via rallies, pamphlets and then contacted personally. These were volunteers whose female counterpart happened to be pregnant during the recruitment of the Children's project between 1999-2000. For the present project (started December 2001) after an over-night fasting, their attendances in the Adult project resulted in the following: withdrawal of blood, a structured interview, measurements of anthropometry, blood pressure, a chest X'ray and for the males, 12 leads electrocardiogram. These procedures were explained at recruitment as well as during registration when they also signed the informed consent which had been accepted by the institutional ethical committee. Once the results of the tests were known a written report was sent with additional advice if the findings were at the upper limits. They were contacted if a medical follow up was needed.

Aside from the above group, the authors also accepted another set of volunteers also living in the same district but who were health workers belonging either to the community hospital or attached to the district itself. Their only inclusion criteria aside from the willingness to be followed were that they were less than 50 years old, married, and not recently pregnant.

Measurement and tests

Anthropometry: Subjects fasted over-night and dressed lightly when seen. The height was measured with a wall-mounted tape and movable headpiece. The body weight and height were conventionally measured. The hip was measured at the level of the trochanters. This was done in a partitioned enclosure with a wrap around instead of their pants. The circumference of the bared waist was measured using a spring tensioned tape at a mid-level between the iliac crest and lower rib margin and failing that, 2 inches above the umbilicus [no special modification was made for those few with hung-down belly]. The measurement was to the nearest 0.1 centimeter. These were done twice starting with the waist then the hip and back to the waist.

Ten milliliters of venous blood was taken. A portion was spun for hematocrit. The EDTA/NaF plasma kept in ice was estimated for glucose (hexokinase method) within 6 hours after the blood was taken. A portion of the serum was tested for creatinine (Cr) (Jaffe-method); ALT (kinetic method, IFCC without pyridoxal phosphate) and lipids [total cholesterol (TC) using enzymatic CHOD-PAP, high density lipoprotein cholesterol (HDL-C) by the direct method without precipitation and triglyceride (TG) using enzymatic GPO-PAP]. These were done within 24 hours (using Hitachi 917 and reagents from Roche Diagnostic). The laboratory CV for these estimations were [low/high concentrations]: creatinine 2.31/1.28%, alanine aminotransferase 3.93/1.81%, total cholesterol 2.23/1.47%, triglyceride 1.75/1.32% and HDL-C high concentration only, was 2.50%. The remainder of the serum was frozen at -20^{o}C and tested for HBsAg, HBeAg and anti-HBe by electrochemiluminescence [ELECSYS 2010, Roche Diagnostic] and for antiHCV by microparticle enzyme immunoassay [AXSYM of Abbot Laboratory Ltd]. These were done in batches so as to reduce the cost of the reagents.

The interview: This was done by the researchers who were mainly physicians and nurses. The interview aimed at the work-loads, leisure, family structure including the family-size and the parents of the subjects being interviewed. The majority of the parents of the subjects being interviewed lived in the same district. The subjects were then interrogated with regards to their own past and present illness and as well, of the immediate members of the family, particular attention was paid to histories of hypertension, diabetes and cancer. Regular use of analgesics, vitamins, cigarettes and alcohol were recorded. The authors also enquired as to traffic accidents (a large majority depended on motorcycles as the mode of transport), and frequency (per week) of intake of various types of food [meat, fish, fowl and greens]. Following the interview the sitting blood pressure was taken with a digital read-out oscillometric device (OMRON model 705 and T5) which had been weekly and simultaneously compared with measurement made on a mercury manometer using varied size arms. Blood pressure of the subject was measured on the right arm and repeated until the pressures and pulse were near steady state (defined as within 7-8 mmHg or 8 beats per minute and showed neither ascending nor descending trend).

Every tenth serum was separately stored at -70^{o}C and then sent to the laboratory at Ramathibodi Hospital and Medical School where the lipid was estimated. The interval of storage ranged from 2 weeks to 18 months. The latter laboratory had been approved by the CDC laboratory during the InterASIA study[19]. The linear correlation for our laboratory's estimation versus that of the Ramathibodi's laboratory was (a + bX and 'r', where X represents the value from the CDC-approved laboratory): for total cholesterol = 5.6 + 0.95X, r = 0.98; triglyceride = 3.0 + 1.00X, r = 1.00 and HDL-C = 0.5 + 1.04X, r = 0.98 and the relationship did not appear to depend on the duration of storage nor the lipid concentration of the serum.

Data storage and reduction

The results from the interview, the blood, and other measurements were double-entered into the computer and verified.

Body mass index (BMI) is expressed in per cent of weight (in kg) over height (in meter) squared. Waist hip ratio is defined as waist circumference divided by hip circumference (both in cm.). Low density lipoprotein (LDL-C) is calculated from Friedewald's formula as TC-HDL-TG/5 and excludes those with TG greater than 400 mg%.

Data analysis

The authors separated the group in terms of gender and religious beliefs (which as stated, implied Chinese and Thai or Malays but labelled as Buddhist or Muslim) and compared the differences between groups of the same gender [no comparison was made between gender]. In the comparison, the authors examined each group as a continuum and then in terms of risks. The statistical evaluations were made with adjustment for age as well as other potentially related variables including cigarette-smoking and alcohol.

In the age- and multivariate-adjustments, the authors removed variables that were correlated e.g. total cholesterol was replaced by LDL-C, waist-hip-ratio instead of waist etc. Criteria for risk was such that the magnitude of the frequency will be high enough. [there were only 4% with BMI $\geq$ 30%, less that 1% with FPG $\geq$ 126 mg%, and 8% with total cholesterol greater the 240 mg%]. The partitioned values chosen for separating risks were: BMI $\geq$ 25%, for hypertension SBP $\geq$ 140 or DBP $\geq$ 90 (mmHg), WHR for male $\geq$ 0.90 and for female $\geq$ 0.85[20], FPG $\geq$ 110, TG $\geq$ 150, HDL-C $\geq$ 35 for males and 40 for females, LDL-C $\geq$ 130 (all of these are in mg%).

In the continuous variables the comparisons between ethnic groups of the same gender were made using multiple regression. The authors also examined, at differences between ethnic groups, interactions between age and religion and the outcome and accordingly placed these in the model. In the dichotomised groups (risk vs non-risk), logistic regression was applied. Among the females, prevalences of alcohol and smoking were very low and these were not always used in the multivariate for the odds ratio. Statistical tests were done using STATA soft-ware version 7. Statistical significance was accepted for $p \leq 0.05$.

Results

There were a total of 1558 measurements. Excluding those who were recalled for repeated measurements and those who happened to be pregnant again, the authors were left with 1475 subjects who comprised the basis of this report. There were 636 couples (not all candidates turned up as pairs). If one includes only the subjects from the Prospective Cohort of Thai Children[18] there was data on 1325 subjects and 561 couples (NB. The authors should have collected 1000 couples). Comments will be made about this latter group in the discussion. The present report will not cover many of the variables obtained during the interview, the roentgenogram, the electrocardiogram and the hepatitis profiles. Table 1 presents characteristics of the group including the hematocrit but not the other biological variables.

As in most of the surveys, more females volunteered. There were also more Muslims. The average ages for the different groups ranged from 29 (Buddhist females) to 34 (Muslim males). Over half were rubber tappers and a fifth of the females cited house-work as their primary occupation. Shop-keeping was reported in 6-7% of the females. This occupation included selling groceries and soft drinks. Female Muslims often worked in factories involved in seafood processing or in production of rubber gloves. The non-rubber-tapping males were either laborers (mainly in construction) or trucker drivers. Fishery, mainly sea-fishing was reported in 6.6% of male Muslims and 0.4 among male Buddhists. A much higher proportion of Buddhists was engaged in teaching, or as local government officials or health care workers. The Muslims had larger families. In both ethnic groups, about 70% of the males smoked and 13% were ex-smokers (generally among the older subjects). A high

Table 1. Characteristic of 1475 subjects

	Females		Males	
	Buddhist	Muslim	Buddhist	Muslim
Subjects, number	309	485	271	410
Age range, years	17-45	15-49	17-56	17-66
mean (SD)	29 (6)	30 (7)	33 (7)	34 (8)
Major occupation, %				
rubber tapping	52.1	54.7	55.0	55.6
housewife (f)/laborer (m) *	19.7	22.5	8.5	5.4
shopkeeper	6.1	6.8	2.6	2.9
factory (f)/truck driver (m)	2.6	4.1	4.4	3.4
teacher-administrator	12.6	3.0	11.1	1.7
Family size				
range	0-7	0-9		
average (SD)	1.9 (0.9)	2.8 (1.6)		
> 3, %	6.5	25.2		
> 5, %	0.3	8.2		
Cigarette, %	1	1	61	72
Alcohol, %	2	1	68	17
Hematocrit, % (SD)	41 (3)	41 (3)	47 (3)	46 (3)
< 35 in F, %	2	2		
> 50 in M, %			16	13

* = for females, the frequencies are for those who reported that looking after the children and the house were their major occupation and for the males, this was laboring

percentage of male Buddhists imbibed alcohol regularly. Anemia was rare. Two percent of the females showed hematocrit less than 35% while a large number of males had hematocrit above 50% [among these, the prevalence of smokers differed between the 2 ethnic groups, 56% among the Buddhists and 90% among the Muslims].

Tables 2, 3 list continuous variables comparing ethnic groups of the same gender. In Table 2, the un-adjusted data showed differences in fasting plasma glucose (FPG), Cr, total cholesterol (TC) and triglyceride (TG) among the females. Male Buddhists showed higher systolic and diastolic blood pressures, greater girth and higher average high density lipoprotein (HDL-C). Table 3 presents the distribution of these variables adjusted for age and in a separate column, adjusted for other related variables. It is seen that most indicators related to obesity (BMI, WHR and TG) were minimally higher in the Buddhist females. HDL-C was higher in both Buddhist males and females but FPG showed different trends between the males and females (significantly higher in female Muslims and lower in male Muslims). Again, these differences were minimal except for the HDL-C.

When differences are expressed in terms of risks (Tables 4, 5) the ethnic differences among the females were seen only for the higher prevalence of hypertension in female Muslims (4.5 vs 1.6%) and in the males, low HDL-C being more prevalent (23.6 vs 8.8%) among the male Muslims.

Table 2. Distribution of entry variables according to gender and ethnicity

	Female			Male		
	Buddhist	Muslim	p-value	Buddhist	Muslim	p-value
SBP, mmHg	110 (11)	112 (13)	0.053	122 (13)	119 (14)	0.008*
DBP, mmHg	70 (8)	70 (9.0)	0.72	74 (10)	71 (11)	0.002*
BMI, Kg/M^2	22.8 (3.8)	22.6 (3.8)	0.34	22.4 (3.4)	22.0 (3.2)	0.11
WAIST, cm	69.1 (9.6)	68.4 (9.4)	0.30	72.3 (9.2)	70.5 (8.2)	0.008*
WHR	0.77 (0.06)	0.77 (0.07)	0.06	0.82 (0.06)	0.81 (0.05)	0.07
FPG, mg/dl	85 (9)	87 (11)	0.006*	93 (12)	92 (16)	0.78
Cr, mg/dl	0.88 (0.10)	0.87 (0.09)	0.01*	1.11 (0.11)	1.12 (0.11)	0.07
TC, mg/dl	186 (33)	181 (34)	0.049*	196 (39)	192 (40)	0.21
TG, mg/dl,	85 (48)	77 (44)	0.02*	133 (80)	129 (77)	0.56
HDL-C, mg/dl	52.9 (12.5)	52.3 (12.0)	0.47	51.4 (14.3)	42.1 (9.3)	<0.001*
TC/HDL	3.67 (0.94)	3.63 (1.04)	0.54	4.05 (1.29)	4.73 (1.32)	<0.001*
LDL-C, mg/dl	116 (29)	113 (31)	0.23	118 (36)	124 (36)	0.053

BMI = body mass index; SBP, DBP = systolic, diastolic blood pressure; WHR = waist-hip ratio; FPG = fasting plasma glucose; Cr = serum creatinine; TC = total cholesterol; TG = triglyceride; HDL-C = high density lipoprotein cholesterol; TC/HDL = ratio of TC and HDL-C; LDL-C = low density lipoprotein cholesterol (excluding 7 with TG > 400)
Values are expressed as mean (SD), *significantly different

Table 3. Differences of entry variables according to gender and ethnicity (age and multivariate adjusted) [reference = Buddhist]

	Female			Male		
	Buddhist	Muslim	Coef (95%CI)	Buddhist	Muslim	Coef (95%CI)
SBP, mmHg	110 (0.7)	111 (0.5)	1.56 (-0.09–3.22)	123 (0.80)[a]	119 (0.67)	-0.68 (-3.13–1.78)
BMI, Kg/M^2	22.9 (0.21)	22.5 (0.17)	-0.61 (-1.01– -0.20)*	22.5 (0.19)[a]	21.9 (0.16)	-0.30 (-0.74–0.13)
WHR	0.77 (0.004)	0.77 (0.003)	0.01 (0.00–0.02)*	0.83 (0.003)[a]	0.81 (0.003)	-0.003 (-0.01–0.003)
FPG, mg/dl	85 (0.6) [a]	87 (0.4)	1.85 (0.43–3.27)*	93 (0.9)	92 (0.7)	-14.4 (-24.7– -4.0)*
Cr, mg/dl	0.88 (0.01)[a]	0.87 (0.004)	-0.02 (-0.03– -0.002)*	1.11 (0.01)	1.12 (0.01)	0.01 (-0.01–0.03)
TG, mg/dl,	85 (2.6)[a]	77 (2.1)	-9.22 (-15.50– -2.95)*	136 (4.7)	127 (3.9)	-9.44 (-20.64–1.74)
HDL-C, mg/dl	53.1 (0.70)	52.1 (0.56)	-0.45 (-0.70– -0.20)*	51.3 (0.72)[a]	42.2 (0.59)	-0.27 (-0.50– -0.04)*
LDL-C, mg/dl	117 (1.7)	113 (1.4)	-1.39 (-5.75– 2.98)	120 (2.2)	123 (1.8)	1.14 (-5.48– 7.75)

[a] Significantly different following age adjustment. Values are expressed as mean (SE)
* Significant once adjusted for differences in SBP, BMI, WHR, TG, HDL-C, LDL-C, cigarette-smoking, alcohol and age
NB. 1. TC was not used in the multivariate since related directly to other lipid
2. For FPG, HDL-C and LDL, age and religion were put in the model as interacting terms

Table 4. Risk (%) profiles according to gender and ethnicity

	Female			Male		
	Buddhist	Muslim	p-value	Buddhist	Muslim	p-value
SBP ≥ 140/DBP ≥ 90	1.6	4.5	0.03	10.3	10.2	0.97
BMI ≥ 25	23.9	24.8	0.69	20.0	15.0	0.07
WAIST, M ≥ 90 or F ≥ 80	14.6	12.4	0.37	4.1	3.4	0.67
WHR, M ≥ 0.90 or F ≥ 0.85	11.7	12.6	0.69	10.4	7.4	0.28
FPG ≥ 110	0.7	1.9	0.22	5.8	5.6	1.00
TC ≥ 200	31.7	25.8	0.07	41.2	39.7	0.72
TC ≥ 240	5.2	4.2	0.48	13.8	11.3	0.33
TG ≥ 150	8.5	6.7	0.33	30.4	29.4	0.81
HDL-C, M ≤ 35 or F ≤ 40	13.1	16.0	0.33	8.8	23.6	<0.001
TC/HDL ≥ 5	9.2	9.4	0.92	19.2	37.7	<0.001
LDL-C ≥ 130	27.8	27.9	0.98	34.1	39.9	0.13

Table 5. Odd Ratios for differences in frequencies of the risks (reference= Buddhist)

	Female		Male	
	age-adjusted	Multivariate*	age-adjusted	Multivariate*
SBP ≥ 140/DBP ≥ 90	2.71 (1.01-7.27)[a]	2.82 (1.04-7.64)*	0.76 (0.45-1.30)	1.14 (0.57-2.27)
BMI ≥ 25	1.00 (0.71-1.41)	1.00 (0.68-1.48)	0.59 (0.39-0.89)[a]	0.76 (0.39-1.28)
WHR, M ≥ 0.90 or F ≥ 0.85	0.99 (0.64-1.53)	0.97 (0.59-1.62)	0.49 (0.26-0.91)[a]	0.47 (0.19-1.18)
FPG ≥ 110	2.66 (0.57-12.47)	3.13 (0.64-15.32)	0.85 (0.43-1.70)	0.77 (0.32-1.85)
TG ≥ 150	0.75 (0.44-1.29)	0.66 (0.36-1.14)	0.84 (0.59-1.20)	1.17 (0.73-1.89)
HDL, M ≤ 35 or F ≤ 40	1.22 (0.81-1.85)	1.30 (0.84-2.00)	3.25 (1.97-5.35)[a]	2.31 (1.27-4.22)*
LDL ≥ 130	0.96 (0.70-1.33)	0.95 (0.68-1.33)	1.18 (0.84-1.64)	1.26 (0.83-1.92)

* Adjusted for differences in SBP, BMI, WHR, TG, HDL-C, LDL-C, cigarette-smoking, alcohol and age, but in the females, smoking and alcohol were dropped because of the low prevalence where HT, FPG, TG and HDL-C were outcomes.
For FPG, HT was dropped and for HT as outcome, FPG was dropped, a = significantly different, (95% Confidence interval)

Discussion

As stated in the methods section, the present group comprised the parents of the Children's Cohort (1325 persons) and another 150 health related workers of the district. The latter tended to be older whose jobs were more professional (nurses, police and teachers) rather than rubber tappers. Some were childless. Hence the combined group as contrast to the 'pure' villagers of 1325 subjects, is older by 1 year and the percent with greater than 3 children would be 7.1% among the Buddhists and 26.0% among the Muslims rather than the 6.5 and 25.2% as shown in Table 1. Most measured biological variables showed similar values and the minimal differences among those parameters between the Buddhists and Muslims for each gender were maintained whether one included the 150 health related works or not.

With regards to other groups within East Asia and with similar age-range, the authors were able to obtain detailed values from a study done recently in Thailand and mainland China[21]. In that study, cohorts were collected from rural and urban areas. The comparison to the present study is shown in Table 6 for subjects with ages restricted to 35-44. For the InterAsia survey in Thailand, the authors present both urban and rural subjects. For the InterAsia study done in China the authors chose only those from the rural areas in South China, simply because these are nearer to Thailand. Compared to "representative" rural areas in Thailand, the present group had a smaller waist, lower WHR, and lower TG (but males showed higher TC and LDL-C levels despite having lower TG level) and less prevalence of low HDL-C (≤ 40 mg%). Note that the rural Southern Chinese showed a higher concentration of HDL-C, independent of how this was presented, (e.g. as average, as% with HDL-C ≥ 60 or as% with HLD-C ≤ 40 mg%). However, the rural population that we presented, had higher average creatinine despite showing none with creatinine ≥ 1.5 mg%.

The present cohort showed minimal difference between those with Chinese or Thai ancestries

Table 6. Distribution of risk factors between the groups from InterASIA (Thailand and China) and Thepa for ages 35-44

	Thailand				Thepa		China	
	URBAN		RURAL		RURAL	RURAL	RURAL	RURAL
	M	F	M	F	M	F	M	F
N	317	247	613	371	242	199	733	806
SBP/DBP, mmHg	119/80	112/74	114/74	113/72	123 (14)/75 (11)	115 (14)/72 (9)	119/77	115/75
HT *, %	24.4	8.7	9	7.3	13.6	6.5	10	9.4
Current cigarette, %	49	5	61	3	62	2	63	7.4
BMI	24.3	24.8	22.6	25.3	22.9 (3.4)	23.9 (3.8)	22.1	22.4
> 25, %	38	44.2	22.2	46.6	23.3	35.9	13.6	16.6
> 30, %	7.7	10.1	2.7	11.3	3.3	6.1	0.8	1.8
Waist, cm	83.6	78.8	77.6	78.9	74.2 (9.0)	72.3 (9.9)	76.8	73.7
WHR	0.89	0.83	0.87	0.83	0.84 (0.06)	0.80 (0.07)	0.85	0.81
Cr , mg %	1	0.76	0.97	0.78	1.12 (0.11)	0.88 (0.09)	0.86	0.71
> 1.5, %	0.0	0.3	0.0	0.4	0.0	0.0	0.3	0.0
FPG , mg %	106	96	94	91	93 (15)	89 (13)	94	93
IFG, %	9	2.8	5.1	1.7	3.4	2.1	5.6	4.6
DM, %	3.2	4.7	1.6	4.1	1.3	1.0	3.1	1.5
TC , mg %	213	209	182	193	202 (38)	190 (39)	177	174
200-239, %	32.2	38.2	25.4	31.5	38.8	27.7	18.8	17
≥ 240, %	25	18	4.1	10.1	12.9	9.7	5.6	3.2
HDL-C , mg %	46	53	41	45	46 (14)	52 (13)	53.1	54.6
< 40, %	32.5	14.6	52.2	31.6	37.1	17.4	18.1	12.8
≥ 60 , %	97	25.5	-	6.7	12.1	26.2	26.9	33.6
TG , mg %	172	112	190	133	150 (92)	87 (47)	-	-
LDL-C , mg %	137	134	106	120	128 (36)	120 (36)	100	97
≥ 130, %	52.6	49.5	-	-	44.2	38.5	13.9	11.4
≥ 160, %	29.9	21.2	-	-	21.2	11.8	3.7	2.2

China = southern part; M = male, F = female, SBP/DBP = systolic/diastolic blood pressure, HT = hypertension (systolic ≥ 140 mmHg or diastolic ≥90); * = in the interASIA (21), this included the treated HT; BMI = basal metabolic rate, WHR = waist-hip ratio, FPG = fasting plasma glucose, Cr = serum creatinine; IFG = impaired fasting glucose (FPG 110-125 mg%), DM = FPG ≥ 126 mg%, TC = total cholesterol; HDL-C, LDL-C = high or low density lipoprotein cholesterol, TG = triglyceride, - = no data

(Thai-Buddhist) versus those of Malay extract (Thai-Muslim). The exception is perhaps the HDL-C among the males. Table 3 shows that Buddhists tended to be heavier with higher TG and but these differences did not persist if segregated into "risk". Muslim males had lower HDL-C and this difference became more prominent when expressed as negative risks (i.e. HDL-C ≤ 35 mg%) or as TC/HDL-C greater than 5. Muslim females had a higher prevalence of hypertension (expressed as SBP ≥ 140 or DBP ≥ 90), 4.5 vs 1.6% [Note that the males from this survey showed higher percentage of hypertensives when compared to rural males from Thailand or Southern China (Table 6)].

The data from Singapore[5-13]: Although not restricted to the age group of the present report, showed distinct differences between Malays and Chinese. Malays (especially the males) tended to be heavier and more obese. They also showed higher risks with regards to serum lipids, presence of DM and presence of insulin resistance although not as high as the Indians[11,14]. This is perhaps reflected in the higher coronary mortality among the Malays and highest (3-4 times) in the Indians[10,13], similar to the earlier reports from Emmanuel[5] and Hughes[6]. The latest report from Singapore[13] was equally interesting with regards to acute myocardial infarction. The incidence was lowest among the Chinese, followed by the Malays while the Indian males and females had 3 times the rate of the Chinese. However, the Indians showed the lowest case fatality at 28 days and at one year. When followed up for longer time, i.e. in terms of long survivals, this was lowest among the Malays. For stroke, the female Malays[8] showed a very high incidence of first stroke being 2.6 times higher than the Chinese and the Indians and as high as the males. This predominance of stroke in female Malays had been reported in 1990 by Hughes[6].

Hence the present finding of minimal differences in risks among ethnic groups living in close proximity in a district in Southern Thailand is in contrast to the reports from Singapore. There, the ethnic differences are distinct in many aspects: risk factors, body habitat and incidences of some but not all diseases i.e. IHD in males and females and stroke only in females.

The present cohort is small and is so far only a prevalence evaluation. The subjects are still young and hopefully the authors will eventually obtain events to correlate with these measured variables.

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ความชุกของปัจจัยเสี่ยงของโรคหัวใจและหลอดเลือดแดงในภาคใต้ของประเทศไทย : ความแตกต่างระหว่างเชื้อชาติที่อำเภอเทพา จังหวัดสงขลา

ธาดา ยิบอินซอย, อภิรดี ลิ่ม, วรวุฒิ จินตภากร

ผู้ปกครองของเด็กที่อยู่ในโครงการติดตามเด็กระยะยาว (ศึกษาการพัฒนาของเด็กตั้งแต่ก่อนเกิดที่อำเภอเทพา จังหวัดสงขลา) จำนวน 1,325 คน (561 คู่) ร่วมกับพนักงานโรงพยาบาลเทพา และเจ้าหน้าที่อนามัยของอำเภอเทพา 150 คน (75 คู่) ได้รับการสัมภาษณ์ ตรวจร่างกาย ตรวจเลือด เพื่อหาระดับน้ำตาล ไขมัน เครียตินิน (creatinine) ฯลฯ ในปี 2545-2546. รายงานนี้วิเคราะห์ความแตกต่างระหว่างกลุ่มไทยพุทธ (เชื้อชาติไทยหรือจีน) และไทยมุสลิม (เชื้อชาติมาเลย์) ของแต่ละเพศ อายุเฉลี่ย ± ค่าเบี่ยงเบนของกลุ่ม 31.5 ± 7.3 ปี เพศหญิง 794 คน อายุเฉลี่ย 29.6 ± 6.6 ปี เป็นหญิงมุสลิม 485 คน กลุ่มมุสลิมมีบุตร 2.8 ± 1.6 คน และร้อยละ 25 มีบุตรเกิน 3 คน เมื่อเปรียบเทียบกับพุทธ 1.9 ± 0.9 และเพียงร้อยละ 6.5 ที่มีบุตรเกิน 3 คน ร้อยละ 54 ของทั้งหมดมีอาชีพกรีด/เก็บยางพารา ร้อยละ 68 ของชายสูบบุหรี่เป็นประจำ

ความแตกต่างของปัจจัยระหว่างพุทธหรือมุสลิม (จำแนกตามเพศชายหรือเพศหญิง) มีปริมาณน้อยมาก เมื่อปรับตามอายุและปัจจัยอื่น ความแตกต่างที่เด่นคือปริมาณของ high density lipoprotein cholesterol (HDL-C), ค่าเฉลี่ย ± SE ของ means ในชายพุทธ 51.3 ± 0.72 มก.% ในชายมุสลิม 42.2 ± 0.59 (SE) มก.% (แตกต่างอย่างมีนัยสำคัญทางสถิติเมื่อปรับตามอายุและปัจจัยอื่น) ถ้าศึกษาความแตกต่างโดยใช้ความชุกของปัจจัยที่ถือว่าเข้าฐานของความเสี่ยงสูง (เช่น ความดันเลือดสูง ดัชนีมวลกาย (BMI) ≥ 25 กก./ม^2., น้ำตาล ≥ 110 มก.%, สัดส่วนของรอบเอวหารด้วยรอบสะโพก total cholesterol ≥ 200 มก.%, triglyceride ≥ 150 มก.% หรือปริมาณ HDL-C ≤ 35 มก.% ในชาย และ ≤ 40 มก.% ในหญิง) จะพบความ แตกต่างใน 2 ปัจจัยเสี่ยงเท่านั้น หญิงมุสลิมมีความชุกของความดันเลือดสูง (ซิสตอลิก ≥ 140 หรือ ไดแอซตอลิก ≥ 90) มากกว่า (ร้อยละ 4.5 เปรียบเทียบกับร้อยละ 1.6) และชายมุสลิมมีความชุกของ HDL-C ต่ำมากกว่า (ร้อยละ 23.6 เปรียบเทียบกับร้อยละ 8.8) ความแตกต่างนี้มีนัยสำคัญทางสถิติหลังปรับตามอายุและความชุกอื่นที่เกี่ยวข้อง เป็นที่สังเกตว่าความ แตกต่างระหว่าง 2 เชื้อชาติที่จังหวัดสงขลานี้แตกต่างจากรายงานจากประเทศสิงคโปร์อย่างเด่นชัด ชายเชื้อชาติมาเลย์ที่อยู่สิงคโปร์มีปัจจัยเสี่ยง (ทั้งไขมัน ระดับอินซูลิน ขนาดของร่างกาย) ฯลฯ สูงกว่าชาวจีนที่อายุทัดเทียมและหลังปรับตามปัจจัยอื่น นอกจากนั้นแล้วคนเชื้อชาติมาเลย์ยังมีความชุกของโรคและอัตราตายจากโรคหลอดเลือดหัวใจที่สูงกว่าด้วย