

A BLOOD PRESSURE PROFILE OF RURAL KADAZANS AND BAJAUS IN SABAH, EAST MALAYSIA

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Abstract. A survey was conducted to document the blood pressures of two indigenous groups (Kadazans and Bajaus) who reside in rural Sabah in East Malaysia. Their health knowledge status is also recorded. Fifty percent of those surveyed were unable to associate high blood pressure with a risk factor and as high as 38% were unaware of the consequences of high blood pressure. A total of 16.2% had blood pressures ≥ 140 /or 90mm Hg while 3.9% had blood pressures ≥ 160 /or 95mm Hg. While these figures are low compared to those of developed countries, lifestyle changes associated with rapid urbanization in Malaysia may be expected to increase hypertension prevalence. The strengthening of health education programs is timely as health knowledge is limited and many hypertensives default treatment.

INTRODUCTION

Extensive blood pressure studies have been conducted in the major communities of most developed countries. In developing countries blood pressure studies are limited and are often focused on the urban communities who have acquired lifestyles similar to those of developed countries. The rural communities and minority ethnic groups are less well studied.

Malaysia, a developing country undergoing rapid industrialization will soon have much of its rural population changing their lifestyles. Blood pressure studies have already been conducted on the major communities residing in the more developed areas of West Malaysia (Kandiah *et al*, 1980; Arokiasamy and Gan, 1985). No blood pressure studies have been conducted on the ethnic groups in the less developed states of East Malaysia. This study documents the blood pressure profiles of two ethnic groups (the Bajaus and the Kadazans) residing in rural East Malaysia. The extent of elevated blood pressure prevalence and some aspects of knowledge regarding hypertension are also documented. The survey findings were intended for improving health services and for the development of health education programs in rural Sabah. It was also envisaged that rapid industrialization of Malaysia would bring changes in the lifestyles of its rural communities and the findings could also act as baselines for comparison with future blood pressure studies.

MATERIALS AND METHODS

Sabah, one of the fourteen states of Malaysia is located on Borneo island. The two major indigenous groups in Sabah are the Kadazans and the Bajaus. The survey was conducted in Kota Belud district (Fig 1) where farming (padi, cocoa, vegetables and rubber) was the main occupation. The district had a population of about 45,503 (1980 census).

As the study was to be on rural Kadazans and Bajaus, purposive selection of villages in the district which had predominantly Kadazan or Bajau residents was done. A second criterion used in the selection of villages was based on the distance from the two district government dispensaries. Villages near and distant to the government dispensaries had to be included to minimize bias. Based on these criteria, eight villages were included in the survey and the total population of these eight villages was approximately 5,000.

All adult villagers who were 20 years old or older were requested to participate. As the farm houses were widely scattered and the fact that the farmers worked in the fields throughout the day, a house to house survey was not feasible. Each village headman informed all the villagers about the survey and fixed a date and venue (usually the village community hall) for them to participate. Villagers were known to respond positively to the headmen's requests especially when they per-

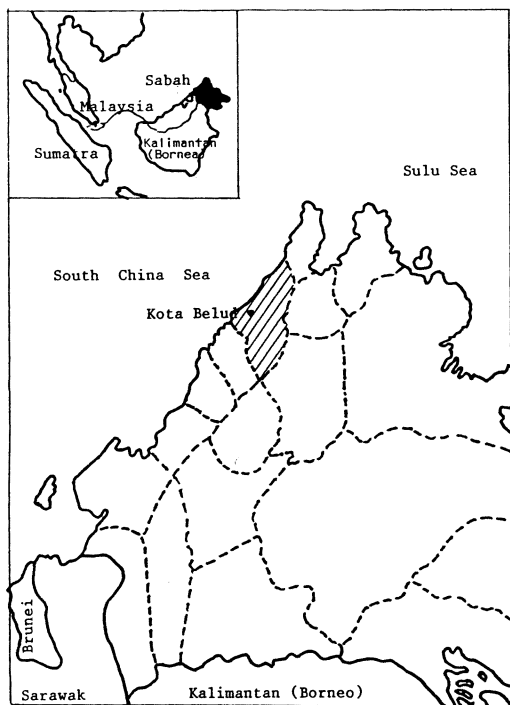


Fig 1—Kota Belud District, Sabah, Malaysia.

tained to health matters. It was expected that a small proportion would not participate due to various reasons. Interviews were conducted till late in the evening to accommodate those who worked in the fields.

Each study subject answered a semi-structured questionnaire administered by a medical technologist and had his or her blood pressure taken by a trained nurse. Two medical technologists and three nurses completed the survey within two weeks in June 1988. All those with elevated blood pressures were referred to the nearest clinic for further investigations.

For blood pressure measurements, standardized mercury sphygmomanometers with 14 cm wide cuffs were used. Each subject was rested for 5 minutes before the measurement was taken. The reading was taken with the subject seated and with his/her forearm on the table and arm at heart level. The systolic pressure was recorded at the appearance of the first sound when the cuff was deflated slowly. The diastolic pressure was taken at the point of disappearance of all sounds. Both pressures were measured to the nearest mm

of mercury. The blood pressure measurement was only taken once. The criteria for raised blood pressure was set at ≥ 140 systolic and or ≥ 90 diastolic mm Hg.

RESULTS

A total of 736 adults participated in the study of which 385 were Kadazans and 351 were Bajaus. Of these, 88 turned out to be diagnosed hypertensives 25 of whom were on medication while the rest either were treatment defaulters or sought treatment irregularly. For the community blood pressure profiles, these known hypertensives were not included as some had controlled blood pressures while others were not treated regularly. This left 648 subjects for blood pressure profile analysis.

The age group, sex and ethnicity of the study subjects are shown in Table 1. Almost 65% of these adults were farmers while 13% were housewives. The rest were engaged in occupations typical to rural communities such as teachers, shopkeepers and laborers. Table 2 shows that more than half of the study subjects have had no formal education. As there was no significant differences in the mean systolic and diastolic pressures between the two ethnic groups for each age group, combined mean systolic and diastolic blood pressures for both ethnic groups are shown in Fig 2 and Tables 3 and 4. Generally the mean values increased with age. The females had lower mean values than males until about 55 years when their mean pressures began to rise and the situation became reversed. The extent of elevated blood pressure by ethnic group and sex is shown in Table 5. About 18% male Bajaus and 16% male Kadazans had elevated pressures while about 16% female Bajaus and 15% female Kadazans had elevated blood pressures. For both sexes the proportion of people with elevated blood pressures was higher in the older age groups as shown in Table 6.

All those surveyed had heard of the term "blood pressure" and 88 had revealed that they were diagnosed hypertensives. Of the 648 remaining participants, 30% had never had a blood pressure taken in their life-time. Table 7 shows the place and time the last blood pressure was taken. 38% of these 648 study subjects were not able to name any adverse effects as a consequence of high blood pressure. Table 8 shows what were identified as adverse consequences of high blood pres-

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Table 1
Age, sex and ethnic groups.

Age (years)	Bajau			Kadazan			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
20 - 29	40	56	96	51	45	96	91	101	192
30 - 39	28	47	75	32	62	94	60	109	169
40 - 49	14	35	49	21	39	60	35	74	109
50 - 59	32	22	54	19	15	34	51	37	88
60 - 69	19	18	37	13	16	29	32	34	66
70 and above	4	5	9	7	8	15	11	13	24
Total	137	183	320	143	185	328	280	368	648

Table 2
Educational levels.

Educational level	Bajau	Kadazan	Total (%)
No formal education	188	173	361 (55.7)
1 - 6 years	41	73	144 (17.6)
7 - 12 years	89	80	169 (26.1)
> 12 years	1	2	3 (0.4)
Not given	1	0	1 (0.2)
Total	320	328	648(100.0)

sure. Almost 51% were not aware of any risk associated with high blood pressure (Table 9). Of those who were able to identify a risk factor, the majority related it to food.

DISCUSSION

It is seen that in rural Sabah, large proportions of the population have had little formal education and many adults can be expected to be illiterate. As many as 30% of adults had never had a blood pressure taken in their life-time. A large proportion were unable to identify hypertension as a disease problem nor to associate it with a risk factor.

When the criteria was set at ≥ 140 /or 90 mm Hg, other surveys in West Malaysia (Kandiah *et al*, 1980; Arokiasamy and Gan, 1985) had yielded 14% and 21.5% of the population having elevated

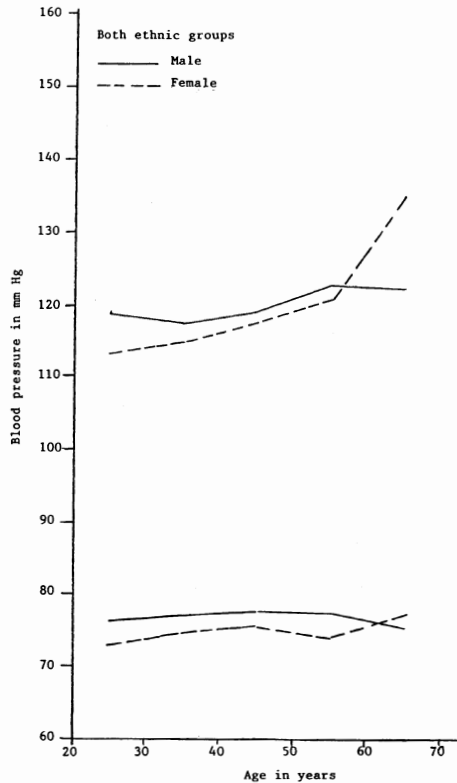


Fig 2—Men systolic and diastolic blood pressures of both ethnic groups by sex and age groups.

Table 3
Mean systolic blood pressure.

Age (years)	Male				Female			
	No. of persons	Mean	Standard deviation	Coefficient of variation (%)	No. of persons	Mean	Standard deviation	Coefficient of variation (%)
20 - 29	91	118.8	10.48	8.8	101	112.7	10.7	9.5
30 - 39	60	117.8	11.32	9.6	109	114.3	10.7	9.4
40 - 49	35	119.3	12.59	10.6	74	117.9	14.84	12.6
50 - 59	51	122.8	16.87	13.7	37	120.6	16.25	13.5
60 - 69	32	122.0	21.26	17.4	34	135.4	26.52	19.6
70 and above	11	117.3	14.21	12.1	13	140.0	25.42	18.2

Table 4
Mean diastolic blood pressure.

Age (years)	Male				Female			
	No. of persons	Mean	Standard deviation	Coefficient of variation (%)	No. of persons	Mean	Standard deviation	Coefficient of variation (%)
20 - 29	91	76.2	7.73	10.1	101	72.5	8.84	12.2
30 - 39	60	77.0	9.06	11.8	109	74.3	8.18	11.0
40 - 49	35	77.6	7.79	10.0	74	75.9	8.25	10.9
50 - 59	51	77.6	9.22	11.9	37	74.4	8.85	11.9
60 - 69	32	75.3	10.15	13.5	34	76.9	9.97	13.0
70 and above	11	76.4	12.06	15.8	13	78.2	8.62	11.0

Table 5
Blood pressure status by ethnic group and sex.

Ethnic group	Normal blood pressure			Elevated blood pressure			Total
	Male	Female	Total	Male	Female	Total	
Bajau	112 (81.8)	154 (84.2)	266 (83.1)	25 (18.2)	29 (15.8)	54 (16.9)	320
Kadazan	120 (83.9)	157 (84.9)	277 (84.5)	23 (16.1)	28 (15.1)	51 (15.5)	328
Total	232 (82.9)	311 (84.5)	543 (83.8)	48 (17.1)	57 (15.5)	105 (16.2)	648 (100.0)

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Table 6
Elevated blood pressure by age and sex.

Age (years)	Total population		Elevated blood pressure					
			140/90 to < 160/95 mm Hg		≥ 160/or ≥ 95 mm Hg		Total	
	Male	Female	Male	Female	Male	Female	Male(%)	Female(%)
20 - 29	91	101	7	5	1	1	8 (8.8)	6 (5.9)
30 - 39	60	109	10	9	1	-	11(18.0)	9(8.2)
40 - 49	35	74	2	11	1	2	3(8.6)	13(17.6)
50 - 59	51	37	13	5	2	2	15(29.0)	7(18.9)
60 - 69	32	34	5	8	3	8	8(25.0)	16(47.0)
70 and above	11	13	3	2	0	4	3(27.0)	6(46.0)
Total	280	368	40	40	8	17	48(17.1)	57(15.5)

Table 7
Place and time last blood pressure taken.

Place blood pressure taken	Time last blood pressure taken					Total (%)
	Has never been taken (%)	Within last 1 year (%)	Within last 2 - 5 years (%)	> 5 years ago (%)	Taken but year not known (%)	
Blood Pressure never taken	193 (29.8)					193 (29.8)
Hospital	-	69 (10.6)	78 (12.0)	19 (2.9)	10 (1.5)	176 (27.2)
Health Center	-	83 (12.8)	87 (13.4)	12 (1.9)	5 (0.8)	187 (28.9)
Mid-wife clinic	-	9 (1.4)	11 (1.7)	4 (0.6)	-	24 (3.7)
Private clinics	-	10 (1.5)	7 (1.1)	1 (0.2)	-	18 (2.7)
Travelling clinic	-	-	-	1 (0.2)	-	1 (0.2)
Others eg exhibitions	-	21 (3.2)	24 (3.7)	3 (0.5)	1 (0.2)	49 (7.6)
Total	193 (29.8)	192 (29.6)	207 (31.9)	40 (6.2)	16 (2.5)	648 (100.0)

Table 8

Awareness of health consequences of high blood pressure.

Consequences of high blood pressure	Male	Female	Total (N = 648)	%
Not aware of any	101	147	248	38.3
Headache/giddiness	92	107	199	30.7
Death	12	10	22	3.4
Weakness	8	6	14	2.2
Heart disease	5	4	9	1.4
Paralysis	5	4	9	1.4
Various vague symptoms	38	20	58	8.9
Unsure/no response	19	70	89	13.7

Table 9

Ability to associate high blood pressure with a risk factor.

Risk factor	Male	Female	Total (N = 648)	%
Not aware of any	137	190	327	50.5
Food (salt, fat, excess)	65	53	118	18.2
Worries/sadness	12	22	34	5.2
Hereditary	7	8	15	2.3
Obesity	7	7	14	2.2
Smoking	6	6	12	1.9
Other factors (pregnancy, birth control, pills)	27	23	50	7.7
Unsure/no response	19	59	78	12

blood pressures. This survey yielded 16.2% having elevated blood pressures. When a systolic pressure of 160 mm Hg and a diastolic pressure of 95 mm Hg are taken as the upper limits of normality, then 3.9% of the study population fell into this category compared to 6.1% in the study in West Malaysia (Arokiasamy and Gan, 1985). This figure of 3.9% is low compared to the figures in Singapore (Lee *et al*, 1977), USA (US Department of Health, Education and Welfare, 1966) and Japan (Kimura, 1973) which have reported rates between 14% and 26%. Other surveys in the developing countries have yielded hypertension prevalence rates ranging from 1% to over 30% (Nissenen *et al*, 1988).

In spite of the relatively lower rate of elevated blood pressure in rural Sabah compared to the developed countries, health education programs with regards to hypertension should be strengthened in the region. Villagers are not only limited in health knowledge but default follow-up treatment even when diagnosed. Lifestyle changes with rapid urbanization can only increase the prevalence of hypertension and health education as a preventive measure cannot be over emphasized.

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