

## OBJECTIVE RECORDING BLOOD PRESSURE MEASUREMENT OF INHABITANTS OF PAPUA NEW GUINEA

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### Introduction

To clarify the characteristic vascular sound and blood pressure level of the inhabitants of Papua New Guinea, vascular information data was sampled by the  $\alpha$  blood pressure measurement system at two districts in Papua New Guinea and a study was conducted on the relationship between blood pressure and the physical condition of the people.

### Subjects and Method

The subjects were 36 young adults in Sawom Village and 19 young adults in Lae. Sawom is a seashore village located 90 km northwest from Wewak (East Sepik Province). There were about 240 inhabitants and 70 houses in Sawom village at the time of this study, and they kept about 20 pigs and 100 chickens. They had no electricity or running water. They usually eat sagos, bananas, taros, aibika, and occasionally eggs, shrimps, fish, animals such as cuscus. They usually drink river water, not rain water. The 36 subjects (22 males, 14 females) were volunteers from a young adults committee that consisted of 60 members and their age ranged from 18 to 45 years old.

Nineteen subjects (8 males, 11 females) in Lae (Morobe Province) were staff members such as nurses or medical technicians at ANGAU Memorial Hospital and their age ranged from 19 to 38 years.

Blood pressure, weight and skin fold thickness were measured. Blood pressure was measured using an automatic blood pressure measurement device called the  $\alpha$  system. Vascular sounds sampled by transducer in the cuff were changed to digital data and recorded by a data recorder along with the pressure scale data collected. Using RS-232C interface, various data was fed into a personal computer and analyzed. Blood pressure values were determined based on our laboratory's recognition standards. Blood pressure were measured two times and we took the pairs value as individual values when systolic blood pressure was low. Skin fold thickness was measured by Harpenden Calipers, and the measurement points were the triceps and the subscapular.

### Results

Fig. 1 shows a sample obtained using the vascular information database system. This system was developed for the manual recognition to measure of blood pressure using a cursor and to check the recognition point using the  $\alpha$  system. We found nothing to indicate the characteristic vascular waves descending cuff pressure in Papua New Guineans. We were therefore able to determine the blood pressure values using the same standards. Vascular wave information by transducer in the cuff was changed to digital data and recorded using

a data recorder. The data was then transferred to a personal computer and displayed on a CRT. This figure shows the change in the vascular information wave with a reduction cuff pressure. Whole data in the measurement are shown in the middle of the figure while enlarged data within the rectangular are shown in the lower parts of the figure. After looking at the changing pattern of Korotkov Sounds overlapping pulse wave, we analyzed the first wave which showed a sharp rise and we decided on a systolic blood pressure of 107 mmHg

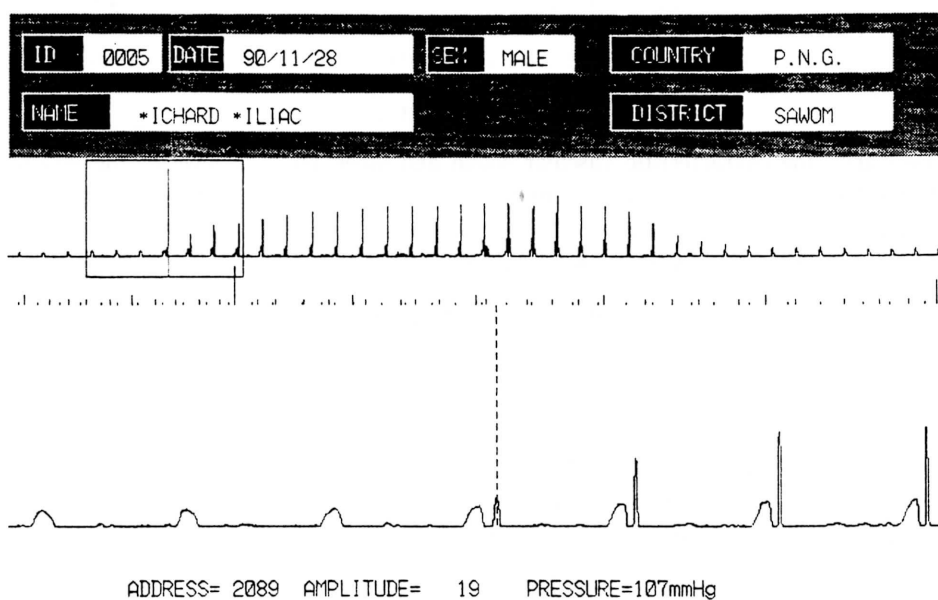


Fig. 1. A sample of vascular information data base system.

Table 1. The average of age, weight, skin fold thickness and blood pressure by district and sex.

		AGE	WEIGHT	ARM-S	BACK-S	S.B.P.	D.B.P
SAWOM	N	22	22	22	22	22	22
MALES	MEAN	24.8	57.57	6.50	10.26	119.96	67.09
	S.D.	5.94	7.321	1.597	2.442	11.244	9.376
SAWOM	N	14	14	14	14	14	14
FEMALES	MEAN	28.5	50.57	6.52	14.32	124.50	75.00
	S.D.	9.85	6.265	1.883	5.336	11.353	6.552
LAE	N	8	8	8	8	8	8
MALES	MEAN	28.6	64.94	8.40	20.79	118.75	69.00
	S.D.	4.63	11.384	2.087	8.371	7.246	7.091
LAE	N	11	11	11	11	11	11
FEMALES	MEAN	28.0	63.82	16.24	26.30	110.55	67.27
	S.D.	5.60	10.486	7.217	7.532	12.380	8.719

ARM-S: TRICEPS, BACK-S: SUBSCAPULAR, S. B. P: SYSTOLIC, D. B. P: DIASTOLIC

Table 2. The difference of average between Sawom and Lae using independent sample t-test.

		AGE	WEIGHT	ARM-S	BACK-S	S.B.P.	D.B.P.
males	t	1.632	2.095	2.656	3.504	0.282	1.522
	p	N.S.	*	*	**	N.S.	N.S.
females	t	0.160	3.829	4.352	4.657	2.932	2.534
	p	N.S.	**	**	***	**	*

N.S.: not significant, \*:  $p < 0.05$ ; \*\*:  $P < 0.01$  \*\*\*:  $P < 0.001$

at this time using the display cursor of the personal computer.

Table 1 shows the average age, weight, skin fold thickness and blood pressure by sex and district. Using an independent sample t-test, we investigated the difference in the average between Sawom and Lae as shown in Table 2. A significant difference was found in weight ( $p < 0.05$ : males;  $p < 0.01$ : females), in the skin fold thickness of triceps ( $p < 0.05$ : males;  $p < 0.01$ : females), in the skin fold thickness of the subscapular ( $p < 0.01$ : males;  $p < 0.001$ : females), in systolic blood pressure ( $p < 0.01$ : females), and in diastolic blood pressure ( $p < 0.05$ : females).

There was no significant correlation between blood pressure and physical condition in any district. Furthermore, the correlation coefficient indicated no significant correlation between blood pressure and age.

## Discussion

Nevertheless, there were no hypertensive patients among the healthy young adults either in Sawom nor in Lae according to our Objective Recording of blood pressure (MIKAMI *et al.*, 1989), and blood pressure of Sawom females was higher than that of Lae females. Both the male and females of Lae were considerably fatter than those of Sawom. In the past study it was said that there was a correlation between blood pressure and age, obesity (DYER *et al.*, 1990), and salt intake (LAW *et al.*, 1991). But in Papua New Guinea, it was reported that blood pressure appeared to fall with advancing age (MADDOCKS and ROVIN, 1965) by lowering one's salt intake. There was no correlation between blood pressure and physical condition within the population. It therefore appears that the blood pressure and physical condition of Papua New Guineans are good. That is to say, there seems to be no hypertensive patients or excessive obesity in Papua New Guinea. Salt intake should be measured, and we have therefore collected the urine samples from the same subjects both in Sawom and Lae, and have collected several food samples in Sawom. We will measure the sodium contents of the urine, the results of which may explain why blood pressure in Sawom was higher than in Lae.

## References

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