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研究資料

The Fifth Japan-Nepal Health Scientific Expedition

Comparative Epidemiological Studies on the Genesis of Hypertension

—Jomosom Study—

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- | | |
|--|---|
| 1. Name of the Expedition
Japan-Nepal Health Scientific Expedition
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| 3. Sponsored by :
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6. Objects of the Expedition

During the summer of 1987, an International Joint Research titled "Tribhuvan University-Kyushu University Hypertension Project(TU-KUHP)" was carried out by the "Japan-Nepal Health Scientific Expedition(JANESE '87)" group, which was composed of the Dean and professors of the Institute of Medicine, Tribhuvan University, and Japanese specialists of hypertensiology, exercise physiology, nutrition, and cultural geography including the applicants. The ultimate goal of this project was to clarify the factors which affect the pathogenesis of hypertension. To know the important conditions which generate the hypertension, the health status, dietary practice, and physical activities of the Nepalese people, whose blood pressures are low in general, were compared with those of the Japanese.

The blood pressure, body fat mass, blood chemistries including complete blood counts, nutritional intakes of the inhabitants were measured and ECG was taken at the two sites in Nepal; one of which was a hilly village, named Kotyang in Kabhre District, the other a suburban village, named Bhadrakali in Kathmandu District. The prevalence rates of the hypertensives in both sites(0.7% in Kotyang, 6.9% in Bhadrakali) were by far lower than those in Japan(25-30% in general) in spite of the fact that the levels of average salt intake of the two countries were almost identical(about 12 g/day). Taking the other results into consideration, we assumed that the blood pressure might be influenced by physical activity, fat free mass and nutrient intake rather than by the amount of daily salt intake, although a weak positive link of salt consumption to blood pressure was detected statistically.

On the basis of these results, we have already presented them at several international meetings of medical and nutritional science and have published 2 books (244 pages in 1989; 107 pages in 1991).

The purpose of the fifth TUKUHP investi-

gation is to measure the difference of body composition, blood pressure, electrocardiogram, blood chemistries, nutrient intakes and physical activities in Mustang District and to compare the people living in the mountain area with those who had been investigated in the first (Kotyang and Bhadrakali) and the third TUKUHP study (Jawalakhel). It is said that the people living in the mountain area have taken salt tea still in their life and their salt consumption is more than 15g per day.

The similar methods to the previous TUKUHP studies were applied to the fifth one so that the data can be compared.

Annexed Objects are:

- 1) Diagnosis and treatment of the people concerned.
- 2) A contribution to the accumulation of the information on the amelioration of nutritional status in Nepal.
- 3) A contribution to the development of the scientific fields included in this project in Nepal.
- 4) The promotion of the scientific relationship between Japan and Nepal.

7. Schedule of Survey

The field research was carried out at Tukuhe and Marpha areas in Mustang District at or above 2,600 meters above sea level. We left Kathmandu for Tukuhe on September 5th, 1992. It was possible to charter a flight from Kathmandu to Jomosom airport directly. The research started on September 7th and lasted for 4 days. Because of the lack of the participants, the survey area was changed to Marpha, and the research there was continued for 5 days from September 12th till 16th.

8. Temporary View on the Results

- 1) The subjects investigated

A total of 434 subjects more than 20 years old investigated in the two areas are shown by sex and age group in Table 1. No sex differ-

Table 1. Number of subjects participated, by sex, age group and area

Age Group (yrs)	20-29	30-39	40-49	50-59	60-69	70-	Total
Tukuche village							
Men	33	20	8	11	8	7	87
Women	18	11	15	12	7	4	67
Marpha village							
Men	37	40	29	19	9	8	142
Women	45	29	23	20	15	6	138

Total							
Men	70	60	37	30	17	15	229
Women	63	40	38	32	22	10	205
	133	100	75	62	39	25	434
(%)	(20.6)	(23.0)	(17.3)	(14.3)	(9.0)	(5.8)	(100)

ence was observed between the two areas. Since the people living in the two areas are ethnologically identical, both Takhari Tribes, the numbers of the subjects are presented by the sum of the two areas investigated.

2) Nutritional Survey [Appendix-I]

A) Methods

The survey for the nutrient intakes was carried out by 24-hour recall method to obtain the individual food consumption using the food models and the chart as shown in Appendix-I.

The measurement method was also applied to about 10% of total subjects.

B) Results and Comments

(1) Diet mainly consisted of Phapar Dhindo or Bhat, Dal and Tarkari, and occasionally of Achar in both areas. Sattu and salt tea or sugar tea were usually taken for breakfast.

(2) All were habitually drinking salt tea or sugar tea in both areas, the approximate amount ranging from 1,000 to 2,500 ml per person. The women took salt tea more than the men, while young generation preferred sugar tea.

(3) High carbohydrate diet was dominant and

protein intake was extremely low in both areas, while fat intake was slightly lower than that of Japan.

(4) Protein energy ratio was approximately 7 %, being lower than the Japanese.

(5) Animal protein ratio was approximately 10 % in most all of the subjects, whereas animal fat ratio was more than 50%, most of which were taken from Tibetan tea.

(6) The intakes of energy per kg of body weight were considered to be 35-45kcal, which were almost equal to those in Tarkeghyang and Shermathang investigated in the Fourth study, and higher than those in the Japanese.

3) Morphological & Physiological survey: [Appendix-II]

A) Methods

(1) Measurement of body height, weight, skinfold thickness (Triceps, Subscapular, Suprailiac, Umbilical and Calf) for estimating % fat of the body.

(2) Measurement of maximal aerobic power (Margaria's indirect method) and estimation of energy expenditure by 24-hr ECG method.

All subjects shown in Table 1 participated in

Appendix I

IHS417 NUTRITION SURVEY IN NEPAL 1992

Subj.No. _____ Name: _____ Sex(M.F)Age _____ BH(. cm) BW(. kg)

MENU	FOOD	Bihanako Kaja	B.Baht	Khaja	Belukako Khana
Rice (Bhat)					
Roti (Bread)					
Thukpa					
Momo					
T-Momo					
Sattu					
Pau Roti					
Dal					
Tarukari	Alu (potato)				
	Simi				
	Parwar				
	Ghiraula				
	Bodi				
	Kakro (cucumber)				
	Radish				
Gedaguri	Bandakobi (cabbage)				
Masu (Meat)	Chicken				
	Mutton				
	Buffalo				
Masala					
Achar					
Chiya	Black Tea				
	Milk Tea Sugar				
	Salt Tea				
	Salt Tea & Butter				
Milk	Daily/Powder Milk				
Dahi (yogurt)					
Phul (egg)					
Phalphul (Fruit)					
Chang Jand (Local Beer)					
Rakshi					

IHS417 NUTRITION SURVEY IN NEPAL 1992

Subject No. _____ Name _____ Activity _____

- Please tell me your family numbers. _____ persons
- Do you smoke? (2) No
(1) Yes What kind of smoke?
1. Churot (pieces/) 2. Surty (pieces/)
3. Churot (packages/) 4. Bidi (pieces/)
5. Tamakhu(time/)
- Do you have a drink? (2) No
(1) Yes What kind of drink?
1. Chang (time/) 2. Raksi(time/)
- How many times do you eat Alu? (/)
Pindaluko gabha? (/)
- How many times do you eat Phul? (/)
- How many times do you eat Kukhurako masu?
(/)
Rangoko masu? (/)
Khasiko masu? (/)
- How many times do you drink Duh? (/)
Dudhko chiya? (/)
- How many times do you have Khuva? (/)
- How many times do you have Dahi? (/)
Mahi? (/)
- How many times do you have Tea? (/ day)
- How long have you been drinking "Tea"?
Salt Tea from [] till [] y.o
Salt tea & Butter from [] till [] y.o
Milk tea & Suger from [] till [] y.o
- How many times do you have vegetables?
Rayoko saga? (/) (/)
- How many times do you have dehydrated vegetables?
Gundruk? (/) Sinki? (/)
- How many times do you have pickles?
Amp?(/)
Golbhenda?(/)
Mula?(/)
- How many times do you use oil?
Ghiu(Ghee)?(/)
Toriko tel?(/)
Bhatmas tel?(/)
- How many times do you have fruits?
Suntala?(/) Amp?(/)
Syau?(/) Kera?(/)
Naspati?(/)
Bhuin Katahar?(/)
- How many times do you use Masala?
Jira?(/) Khursani?(/)
Besar?(/) Aduwa?(/)
Chyapi?(/) Lasun?(/)
- How many times do you have herba?
Dhaniya leaves?(/)
Dhaniya?(/)
- How many times do you have Dal?
Mungi dal?(/)
Kalo mas?(/)
Musuk Dal?(/)
Rohar dal?(/)
- How many times do you have dry beans?
Bhatmas?(/)
Simi?(/)
- Please tell me the name of the food you cannot take.
(1)Gaiko masu (2)Rangoko masu (3)Kukhurako masu
(4)Khasiko masu (5)Sangurko mase (6)Phul (7) _____
(8) _____ (9) _____ (10) _____

Appendix II

Anthropometry and Physical Fitness

Date / Sept. 1982

ID No				M • F	Age		ys
Name							
01 Farmer	02 Publ. Officer	03 Blacksmith	04 Tailor				
05 Teacher	06 Merchant	07 Shop Assist.	08 Carpenter				
09 Soldier	10 Police	11 Driver	12 Cook				
13 Med. Staff	14 Household	15 Student	16 Misc.				
17 Priest	18 Monk	19	00 No				

Height	. cm	Weight	. kg
Upper Arm Girth	. cm	Forearm Girth	. cm
Abdominal Girth	. cm	Hip Girth	. cm
Thigh Girth	. cm	Calf Girth	. cm
Humerus Breadth	. cm	Femur Breadth	. cm
Triceps SF	. mm	Subscapular SF	. mm
Suprailiac SF	. mm	Umbilical SF	. mm
Calf SF	. mm	%Fat	. %

	1-st	2-nd	3-rd
Frequency	Hz	Hz	Hz
Heart Rate	/min	/min	/min
Platform	cm	MAP	. ml/kg/min

the morphological survey. However, maximal aerobic power was measured in 188 men and 138 women, respectively.

B) Results

The mean body height (Ht), weight (Wt), % body fat (%Fat) and maximal aerobic power (MAP) are shown in Table 2.

Mean body height, body weight and %Fat of present subjects were similar to those of hilly villagers (Helambu) and slightly lower than those of the Japanese. Mean maximal aerobic power (MAP) of the present subjects was higher than those in the Japanese. No significant differences in MAP were found between the present subjects and the hilly villagers in all age group. The energy expenditure by 24-hr ECG method was not determined. These data will be analysed in Japan.

4) Medical survey: [Appendix-III]

A) Methods

Table 2. Mean and standard deviation of morphological parameters and maximal aerobic power for subjects by sex

Age (yrs)	Men				Women			
	Ht (cm)	Wt (kg)	%Fat (%)	MAP (ml/kg/min)	Ht (cm)	Wt (kg)	%Fat (%)	MAP (ml/kg/min)
20-29	163.4 ±7.3	53.6 ±6.8	12.0 ±2.6	51.2 ±9.8	152.7 ±5.1	50.8 ±7.6	20.6 ±5.9	35.1 ±9.6
30-39	163.6 ±7.3	56.8 ±8.5	14.1 ±4.7	45.0 ±12.5	152.0 ±5.3	50.7 ±8.6	19.6 ±6.0	34.3 ±10.3
40-49	163.6 ±7.7	58.0 ±9.6	14.9 ±5.8	41.5 ±10.2	153.0 ±6.3	51.4 ±8.8	21.1 ±6.6	35.4 ±5.6
50-59	159.9 ±6.0	58.9 ±7.6	15.8 ±5.6	36.5 ±7.2	152.9 ±5.3	52.0 ±9.5	21.2 ±6.7	35.1 ±7.4
60-69	161.5 ±6.4	55.4 ±7.1	14.3 ±5.5	32.2 ±5.8	150.6 ±5.3	49.5 ±7.6	19.0 ±5.1	30.9
70-	164.8 ±5.0	58.5 ±10.1	14.6 ±5.9	30.0 ±5.4	151.2 ±5.8	53.6 ±11.6	24.4 ±8.1	—

Ht: body height, Wt: body weight, %Fat: percent of the body fat,

MAP: maximal aerobic power

Appendix III

IHS Japan-Nepal Health Scientific Expedition, 1992

Exam_Sept() . 1992

Country	District	Ward	Family	Indi
1	2	3	4	5

Name: _____

(In English, up to 15 letters, a space between consecutive names)

Sex Birth day yr mo day Age

31	32	33	34	35	36	37	38	39	40	41
1										

y.o.

Ethnic	Cast	Occupation	Marital state
42	43	44	45
			46
			47

1. single
2. married
3. separated
4. died

43-49 Ethnic

44 Cast (for Parbatiya)

45-46 Occupation

47 monk

<Check list> Please check after/finish!!

1. reception	1	
2. anamnesis	2	
3. Anthropometric	3	
4. urinalysis	4	
5. urine sampling	5	
6. blood sampling	6	
7. ECG	7	
8. BP	8	
9. physical exam	9	
10. Nutrition	10.	

<Memo> Breakfast or Tea (+), (-)

Rp. _____

(1)

[Family History]

[Life History]

	healthy	sick	died	unknown	
Father	1	(2)	(3)	9	48
Mother	1	(2)	(3)	9	49

Paternal

grandfather	1	(2)	(3)	9	50
grandmother	1	(2)	(3)	9	51

Maternal

grandfather	1	(2)	(3)	9	52
grandmother	1	(2)	(3)	9	53

Siblings 1 (2) (3) 9 54

Children 1 (2) (3) 9 55

<< for mothers only >>

No. of alive children 56 57

No. of pregnancy 58 59

No. of abortion 60 61

No. of children died after birth 62 63

(First) Marriage(y.o.) 64 65

First delivery(y.o.) 66 67

Last delivery(y.o.) 68 69

<< for females >>

Menarche (y.o.) 70 71

Menopause (y.o.) 72 73

regularity of Menses 1. regular 2. irregular 3. amenorrhea

<< for males and females (for the person asked) >>

Temporary contraceptive use (yes 1. no 2) 74 75

Permanent contraceptive use (yes 1. no 2) 76 77

if yes, the age of operation(y.o.) 78 79

Past history of malarial disease (yes 1. no 2) 80 81

if yes, the age of suffering(y.o.) 82 83

(3)

[Present States]

	good	so so	poor	unknown
Appetite	1	2	3	9
Bowel movement	1	2	3	9

how many times a day?

Medications: Antihypertensives; No...1; Yes...2
Drugs for heart ; No...1; Yes...2
Others ; No...1; Yes...2

Subjective symptoms

	yes	no	unknown
Any	1	2	9
Headache	1	2	9
General fatigue	1	2	9
Cough	1	2	9
Sputa	1	2	9
Chill	1	2	9
Dyspnea	1	2	9
Edema	1	2	9
Nausea	1	2	9
Vomiting	1	2	9
Epigastralgia	1	2	9
Diarrhea	1	2	9
Abdominal pain	1	2	9
Visual disturbance	1	2	9
Arthralgia	1	2	9
Lumbago	1	2	9
Myalgia	1	2	9
Dermatitis	1	2	9
()	1	2	9
()	1	2	9
Others	1	2	9
Colter	1	2	9

(2)

< Anthropometric measurement >

Body Height (cm)	Body Weight (kg)	Skinfold Arm (mm)	Back (mm)
141	145	146	150

< Urinalysis >

Bacteria	PH	Protein	Sugar
0 1 2 3 4 9	5 6 7 8 9	0 1 2 3 4 9	0 1 2 3 4 9

Keton body	Urobilinogen	Bilirubin	Oculta blood
0 1 2 3 4 9	0 1 2 3 4 9	0 1 2 3 4 9	0 1 2 3 4 9

未検: not examined

< Blood pressure >

Systolic	Diastolic	Pulse	Memo
167	110	172	175
176	119	182	184
185	128	191	193
194	137	200	202

< Electro cardiograph >

HR (/min)	P-Q (sec)	QRS (sec)	QT (sec)
83	206	210	214

SaVf (mm)	SV ₁ (mm)	SV ₂ (mm)	RV ₁ (mm)	RV ₂ (mm)
218	222	226	230	234

R-S, I (mm) R-S, aVf (mm)

(4)

The medical chart identical to the previous one was prepared in advance, and the individual medical check was carried out according to the chart shown in Appendix III.

(1) Family history, life history, present status and physical examination were checked by the Nepalese doctors.

(2) The subjects usually voided in the morning after arising. The next voided urine was collected as "a second morning voiding urine" into a paper cup and 8 variables (pH, protein, sugar, occult blood, urobilinogen, bacteria and keton body) were determined semiquantitatively using the strip (BMTEST 8-11, Yamanouchi Co., Ltd.) by one examiner.

(3) Blood pressure (BP) and pulse rate (PR) were measured 3 times consecutively in the sitting position using the semiautomated BP measuring device (OMRON HEM 401C, Tateishi Electric Co., Ltd.) prior to the blood sampling. The room temperature at the time of the BP measurement was between 22 and 26°C in both areas. The average of 3 consecutive measurements for systolic and diastolic BP and PR were computed and were used for the analyses. The subjects were classified into 3 groups according to WHO criteria.

(4) Approximately 7 ml of blood was drawn through the median vein from the subjects who agreed to blood sampling. The blood specimen was centrifuged at 3,000 rpm for 15 minutes and each separated serum was frozen by the liquid nitrogen gas. Complete blood counts were not determined in the present study.

(5) Electrocardiogram (ECG) of the participants

more than 30 years old was taken by standard 12 leads (CARDIMAX FX-323, Fukuda Denshi Co., Ltd.).

B) Brief Results and Comments

The prevalence rates of borderline hypertensives and hypertensives in the two areas were 9.4% and 13.4%, respectively. There was no remarkable sex difference in the classification of blood pressure. The prevalence rates of hypertension in the present study were lower than those in Tarkeghyang and Sermathang (Fourth study) and higher than those in Jawalakhel (Third study).

The incidences of proteinuria and microscopic hematuria were 0% and 0.4% in men and 1.0% and 1.5% in women, and that of glucosuria was zero in both genders, respectively.

Concerning the ECG findings, the incidences of left ventricular hypertrophy were 8.2% in men and 3.5% in women over the age of 30, and those of myocardial ischemic changes were 6.3% in men and 7.7% in women, respectively.

All data including the blood chemistries will be analysed in Japan and will be sent to the counterpart in Nepal to be distributed to the individual participants.

This progress report was sent to the Research Division at Tribhuvan University on September 24, 1992, just before the Japanese team left Nepal for Japan.