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MEDICAL SURVEYS ON YAP PROPER: INTESTINAL HELMINTHIC INFECTIONS, DISTRIBUTION OF MOSQUITOES AND HEALTH CONDITION OF INHABITANTS

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Abstract

Of 111 persons examined , 12 (10.8%) were infected with one or two intestinal parasites. Eggs of helminths found were *Ascaris lumblicoides*, hookworm and *Trichuris trichura*. The prevalence of *T. trichura* was relatively high in Rull. Larval mosquitoes were collected at 60 habitats which are composed of coconut shells, cans of drinks, tree holes, old tires, artificial containers, drums for drinking water, canoes, small water pool, and dam. Ten mosquito species were collected at various natural and artificial habitats, and *Aedes hensilli* was the most abundant mosquito species. The habits of smoking and/or bettlenut chewing with lime and tobacco seemed to relate with hypertension and alkaline urine.

Key words: Intestinal parasite, Mosquito, Health condition

We carried out surveys of intestinal helminthic infections, distribution of mosquitoes and health condition of inhabitants on Yap Proper.

Survey of Intestinal Helminthic Infections

Parasitism is usually considered as a common condition in rural populations in developing countries. Although the mortality rate by intestinal helminthic infections is rather low, these infections are recognized as a serious public health problem because of the high prevalence. Here we describe the prevalence of intestinal helminthic infection among inhabitants in Yap Proper.

The survey was conducted by stool examination in October 1999. Fececes of 111 inhabitants aged 1 to 72 (56 males and 55 females) from six municipalities in Yap proper were examined for intestinal helminthic infections by thin smear method after fixation in 10% formalin.

Table 1 presents the result of the stool examination. Of 111 persons examined, 12 (10.8%) were infected with one or two intestinal parasites. Eggs of helminths found were *Ascaris lumblicoides*, hookworm and *Trichuris trichura*. Eleven persons had one parasite infection and

Table 1. Prevalence of intestinal parasites in Yap Proper

Municipality	No. examined	No. positive		
		Ascaris lumblicoides	Hookworm	*Trichuris trichura*
Dalipebinaw	12	0	0	0
Gagil	6	0	0	0
Maap	24	0	2	0
Rull	42	2	0	9
Tomil	5	0	0	0
Weeloey	22	0	0	0
Total	111	2	2	9

one person had two parasite infections, *A. lumblicoides* and *T. trichura*. The pattern of infection in six municipalities was not similar. Infections of *A. lumblicoides* and *T. trichura* were found only in Rull, and hookworm infection in Maap. The prevalence of *T. trichura* was relatively high (21.4%) in Rull.

The number of patients visited hospital because of intestinal parasites decreased from 688 to 277 during the period of 1988 to 1992 (Yap State, 1995). As intestinal parasites infections occur closely relating to the environmental sanitary condition, the decrease of patients may indicate the improvement of the sanitary conditions in Yap Proper. However, transmissions of intestinal helminthic infections are still occurring in some municipalities. The sanitation improvement and health education should be continued for transmission control of parasites.

Distribution of Mosquitoes

The most important group of biting insect is the mosquitoes. Their biting is a considerable nuisance in many parts of the world. More importantly, mosquitoes are carriers of a number of diseases, mostly in the tropics, causing illness and death on a large scale. Dengue fever is caused by several closely related viruses, called dengue type 1, 2, 3 and 4. The disease is transmitted from person to person mainly by *Aedes aegypti*, but *Aedes albopictus* can also act as a vector. Two forms of the disease occur; dengue fever and dengue haemorrhagic fever. The disease is prevalent in the tropics and subtropics particularly Southeast Asia. World Health Organization estimates that 2000 million people are at risk. Each year there are millions of infection and thousand of deaths. Recently, A dengue fever/dengue haemorrhagic fever outbreak in Yap State caused by dengue-4 virus was confirmed serologically and by virus isolation from serum samples. And, entomologic investigations implicated the native mosquito species, *Aedes hensilli* as a previously unrecognized epidemic vector of dengue viruses (SAVAGE *et al.*, 1998). We report here the fauna and breeding sites of mosquitoes in Yap Proper.

Surveys of larval mosquitoes were carried out on February, October and November 1999 in nine municipalities of Yap Proper except Rumung. Larval mosquitoes were collected at 60 habitats which are composed of coconut shells, cans of drinks, tree holes, old tires, artificial contain-

Table 2. Number of mosquitoes and their habitat types collected in Yap Proper

Species	No. collected (%)	Habitat types
Culex (*Culex*) *annulirostris*	3 (0.4)	Coconut shell Small water pool
Culex (*Culex*) *quinquefasciatus*	35 (4.8)	Can, Tire
Culex (*Culex*) *sitiens*	5 (0.7)	Small water pool
Culex (*Culex*) *tritaeniorhynchus*	1 (0.1)	Tire
Culex (*Lutzia*) *fuscanus*	3 (0.4)	Tire
Aedes (*Stegomyia*) *hensilli*	506 (70.0)	Coconut shell, Can,Tire Drum, Tree hole, Canoe
Aedes (*Stegomyia*) *maehleri*	97 (13.4)	Coconut shell, Tier Tree hole, Canoe
Aedes (*Skusea*) *lamelliferus*	61 (8.4)	Coconut shell, Drum, Tire Tree hole, Canoe
Aedes sp.	5 (0.7)	Small water pool, Drum
Aedeomyia catasticta	7 (1.0)	Dam, Small water pool

ers, drums for drinking water, canoes, small water pools, and a dam (source of water supply).

Table 2 presents the result of the mosquito collection. Ten mosquito species were collected at various natural and artificial habitats. *Aedes hensilli* was the most abundant mosquito species. Larvae of *Aedes hensilli* were mainly collected at coconut shells and cans of drinks, and also at tire, drum, canoe tree hole. *Aedes* larvae are container-breeders which thrive in both clean and organically rich water in both natural and artificial containers. Destruction or elimination of unwanted natural and artificial containers in and around human living premises definitely contribute to an overall reduction of *Aedes* population. In Yap Proper, coconut shells and cans should be removed to prevent accumulation of water and larval breeding near houses.

Health Condition of Inhabitants

Yap proper is not isolated from foreign countries now, and life style of inhabitants is influenced from outer civilization. As imports of many kinds of foods changed a habit of eating, diabetes and hypertension seem to increase in number. As we have an interest in the relationship of health condition of Yapese with habits of smoking, chewing bettlenuts and eating, we performed measurement of blood pressure, urine analysis and questionnaires.

We checked the health condition of 69 inhabitants with a medical team delivered from the Yap Hospital in three villages of Yap Proper. These inhabitants included 47 males from 9 to 75 years old, and 22 females from 16 to 63 years old. They were 61 of Yap proper, two of Faraulep, one of Ifalik, two of Lamotreck and three of Satawar. We measured blood pressure, and analyzed urine. Levels of blood sugar of volunteers were also measured. Sixty-one inhabitants filled out our questionnaire forms for check habits of smoking, chewing bettelnut.

Hypertension is a state of systolic pressure over 160 mmHg and/or diastolic pressure over 90 mmHg. 13.6% of female and 27.7% of male were hypertensive in systolic, and 18.2% of female and 27.7% of male were hypertensive in diastolic pressure. This criteria for hypertension is adopted when objective person was calm. In the field, people were in sitting position and after walking to the place the medical team gathered when we checked their blood pressure. This condition seemed to influence the level of blood pressure. As, considering this point, we adopted our criteria for hypertension as over 200 mmHg in systolic and/or 100 mmHg in diastolic pressure, three females (13.6%) and six males (12.8%) were hypertensive. This hypertensive group include one female and five males with habits of smoking relating to hypertension.

Eleven females and 13 males received urine test. None of females showed protein in urine. 15.4% of males was positive, but they were negative of occult bleeding in urine. One of them revealed high value over than 30 mg/ml of protein. Occult bleeding in urine was positive in five females (45.5%). As three of them were menopausal, renal and/or uterine disorders were strongly

Table 3. Habitats of smoking and chewing of bettlenuts

Habitats	Male	Female
Non-smoker	27/41	18/21
Smoker less than one package a day	10/41	2/21
Smoker over one package a day	4*/41	1/21
Chewing of bettlenuts	33/41	16/21
Chewing of bettlenuts with tobacco	22/33	13/16
Smoking and chewing of bettlenuts with tobacco	1/33	0/16

* Three of them were diabetic, occult blood-positive or urine protein-positive.

suspected. In males, three over 40 years old showed occult bleeding in urine. As five of occult blood-positive seven persons over 40 years old were hypertensive, renal disfunction was suspected.

One male showing positive urine glucose was diabetic because of his hyperglycemia of 309 mg/dl.

Interestingly, several urine revealed strong alkaline pH over 7. All of these person had a habit of bettlenut chewing with tobacco and lime (Table 3). As this might influence effects of drugs absorbed from alkaline urine, the dose, timing and interval of medication should be considered in Yapese.

References

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