The Korean Journal of Parasitology
Vol. 37, No. 3, 145-147, September 1999

A survey of helminthic infections in the residents of rural areas near Ulaanbaatar, Mongolia

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Abstract: A total of 738 samples was collected to survey the helminthic infections of residents in two rural areas near Ulaanbaatar, Mongolia for 2 weeks from July 23 to August 2, 1998. Among 391 scotch-taped slides of anal swabs of children and of young teenagers, *Enterobius vermicularis* eggs were detected in 138 cases (35.3%). With the fecal samples of 206 Kato-Katz thick smear slides from adults, the eggs of *E. vermicularis* were observed in 9 cases and *Taenia* sp. in one case, respectively. And by ELISA on 141 blood samples absorbed to blood sampling paper, 12 cases (8.5%) were found to be positive against the hydatid cyst antigen. Enterobiasis and hydatidosis are two major endemic diseases which are related closely to the life style of Mongolian.

Key words: Mongolia, *Enterobius vermicularis*, hydatid cyst, scotch tape anal swab, thick smear, ELISA

A survey was performed to define the status of helminthic infections among the residents of two rural areas near Ulaanbaatar, Mongolia, where systematic medical services had ceased due to the democratic changes and the loss of Soviet subsidies in the 1990s. Celeu is located about 200 km southwest of Ulaanbaatar, while Batsumber lies about 200 km northwest. The people in both areas are mainly engaged in the farming of livestock including sheep, goats, and cattle, and they live in modernized houses or in the traditional tents called the Gels. They feed on mutton and milk-derivatives with limited vegetables, and they have habits of no-bathing and no-washing due to the arid climate with rare occurrence of rain.

• Received 5 August 1999, accepted after revision 31 August 1999.

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A total of 738 samples was collected in both regions for 2 weeks from July 23 to August 2, 1998. The samples consisted of 391 scotch-taped slides of anal swabs of children and of young teenagers who were under 16 in order to detect the eggs of *Enterobius vermicularis*, 206 fecal samples of Kato-Katz thick smears from adults, and 141 blood samples collected and dried on Nobuto's blood sampling paper (Type 1, Toyo Roshi Kaisha Ltd., Tokyo, Japan). The former two methods, scotch-taped slides and thick smears, were applied at the site, and the analysis of blood samples was subjected to ELISA after returning to the laboratory in Korea.

With the use of anal swab method, the eggs of *E. vermicularis* were observed in 138 cases among 391 (35.2%) examined. As expected, the egg positive rate was higher for the subjected girls (38.7%) than the boys (31.0%), and there was no difference in samples

Table 1. Egg detection rate of *Enterobius vermicularis* by anal swabs

Village	No. of positive/No. of examined (%)		
	Male	Female	Total
Celeu	23/88 (26.1)	45/105 (42.8)	68/193 (35.2)
Batsumber	31/86 (36.0)	39/112 (34.8)	70/198 (35.3)
Total	54/174 (31.0)	84/217 (38.7)	138/391 (35.2)

Table 2. ELISA positive cases among 141 examined against various antigens

Antigen	Cut-off value[a)]	No. of Positive (%)
Entamoeba histolytica	0.409	4 (2.8)
Toxoplasma gondii	0.336	6 (4.3)
Cysticercus	0.221	4 (2.8)
Sparganum	0.268	5 (3.5)
Hydatid cyst	0.580	12 (8.5)
Toxocara cati	0.396	6 (4.3)

[a)]Cut-off values were calculated as mean + 2SD from the total measured.

between the two villages (Table 1). Infection of *E. vermicularis* is affected primarily by both the environmental and behavioral factors. (Cherubin and Shookoff, 1963; Choi et al., 1987). On top of their poor sanitary conditions, their traditional tents (Gels) seemed to have provided the optimal environment for easy and continuous infection of the parasite. The patients were treated with flubendazole (Fluvermal® 500 mg, Janssen Korea Co., Seoul, Korea) as recommended by Kim et al. (1991).

Through the stool examination method using thick smear slides, 10 cases out of 206 (4.9%) were identified as the egg-positives: 9 cases were found to carry *E. vermicularis* eggs, and the rest with *Taenia* sp. eggs. The eggs of soil transmitted parasites were not observed at all. As mentioned previously, vegetables are not the main food source for the local residents. As a matter of fact, they hardly eat vegetables; therefore, the soil parasites, which are easily transmitted through unwashed vegetables, are less likely to be found among Mongolian.

The ELISA was performed on several antigens such as cysticercus, sparganum, hydatid cyst, *Toxocara cati*, *Entamoeba histolytica*, and *Toxoplasma gondii*. The blood on the sampling paper was extracted with PBS in 1:100 dilution indicated by a manual. The reaction was done according to the conventional method described by Choi et al. (1992). By the ELISA, the positive rate was shown to be high only for the hydatid cyst antigen which was 8.5% (12 cases out of 141), whereas the rest was between 2.8% to 4.3%; however, the cut-off value of each antigen was calculated from the total regardless of their infection or not as in Table 2. The prevalence of hydatidosis among Mongolian is also related to their farming of livestock which need so much watchdogs which could function as final hosts for *Echinococcus* sp. (Watson-Jones et al., 1997). Mongolia seems to lie in the endemic area where cyclozoonotic hydatidosis are prevalent (Haridy et al., 1998; Hosseini and Eslami, 1998).

Both enterobiasis and hydatidosis are prevalent in the residents of rural area near Ulaanbaatar, Mongolia, which seems to be tightly related with their life-style of dwelling and food habit.

ACKNOWLEDGEMENT

We are grateful to The Catholic Doctors Association and The Catholic Hospitals

Association for their support in the activity of the Foreign Medical Service Team at Mongolia from July 21 to August 4, 1998.

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