

□ **Brief Communication** □

## *Enterobius vermicularis* egg positive rates in primary school children in Gangwon-do (Province), Korea

Kyu-Jae LEE<sup>1)</sup>, Yung-Kyum AHN<sup>2)</sup> and Yong-Suk RYANG<sup>2)\*</sup>

Department of Parasitology and Institute of Basic Medical Science<sup>1)</sup>, Wonju college of medicine, Yonsei University Wonju 220-701, and Department of Medical Technology and Institute of Health Science<sup>2)</sup>, College of Health Science, Yonsei University Wonju 220-710, Korea

**Abstract:** A survey of the infection rate of *Enterobius vermicularis* among students in 4 primary schools located in Gangwon-do (Province) was done from May to June 2001. Among the 398 examinees, 39 (9.8%) were infected with *E. vermicularis* demonstrated by the adhesive cellotape anal swab method. The infection rates ranged from 8.3% to 11.8% among the four schools. The infection rate of males and females was 10.7% and 7.7% respectively. The first grade students showed the highest infection rate, 28.7%. The confirmed cases were treated with albendazole three times at an interval of 15 days. We were able to confirm that *E. vermicularis* infection is still prevalent among students in Gangwon-do, Korea.

**Key words:** *Enterobius vermicularis*, primary school, Gangwon-do, Korea

In Korea, Enterobiasis shows the highest infection rate among the nematode infections, and a high infection rate in children living or studying in a large group, such as schools, kindergartens, and orphanages (Lee et al., 1996). *Enterobius vermicularis* causes symptoms including neurosis, anal itching, vomiting, sleeping disorder, and salpingitis (Beaver et al., 1984; Chung et al., 1997). Several conditions such as complexity of diagnosis and treatment, short duration of life cycle, and high infectivity make the control of the disease difficult. Recently, high infection rates were reported in kindergartens (7.8%) and primary schools, (14.8%) in Korea (Lee et al., 2000; Yoon et al., 2000). The infection rate of *E. vermicularis* in Gangwon-do was 15.3% in 1991 (Kim et al., 1991) and 17.5% in 1997

(Yang et al., 1997). Two species in the genus *Enterobius* were found in Wonju-si (city), Gangwon-do. Ahn et al. (1992) reported *E. gregorii* made up 23.2% of the examined worms in Wonju.

This survey was conducted to identify the infection rate of *E. vermicularis* in primary school children in Gangwon-do. We examined all the students attending four schools, 397 students altogether. One of the four schools was located in the small town of Goseong-gun (county), and the other three schools were located in the rural area around Wonju. The survey was done by adhesive cellotape anal swab methods. The infection rate in the four schools was 8.3%, 8.5%, 10.4%, and 11.8% respectively. First grade students showed the highest infection rate (28.7%) and the lowest infection rate was in the fifth grade (2.6%). The mean infection rate of the examinees was 9.8%. All of the infected students were treated with 400 mg albendazole twice at three-week interval. It is well known that adhesive

• Received 6 September 2001, accepted after revision 8 November 2001.

\*Corresponding author (e-mail: yangys@dragon.yonsei.ac.kr)

**Table 1.** Egg positive rates of *Enterobius vermicularis* by different grades in four primary schools in Gangwon-do

Grade	Male		Female		Total	
	No. exam.	No. positive (%)	No. exam.	No. positive (%)	No. exam.	No. positive (%)
1	45	9 (20.0)	23	2 (8.7)	68	11 (28.7)
2	36	4 (11.1)	27	3 (11.1)	63	7 (11.1)
3	25	4 (16.0)	39	2 (5.1)	64	6 (9.4)
4	31	4 (12.9)	29	4 (13.8)	60	8 (13.3)
5	42	2 (4.8)	35	0 (0.0)	77	2 (2.6)
6	36	2 (5.6)	29	3 (10.3)	65	5 (7.7)
Total	215	23 (10.7)	182	14 (7.7)	397	39 (9.8)

cellotape anal swab methods show about a 50% egg detection rate in the first examination (Kim et al., 1991). This survey was executed as a one-time adhesive cellotape anal swab method, so it is presumed that there were undetected students. Goseong-gun is far from Wonju, but the infection rate in Goesong-gun was slightly different from that in Wonju. This study was done by a random sampling method. Thus similar infection rates of *E. vermicularis* are suspected in other schools in Gangwon-do and an expanded survey of schools in other areas is required.

Effective methods of *E. vermicularis* control in primary schools are an exact diagnosis and treatment to prevent infection to other students. A variety of infection routes of the worm to the student, including retrograde infection, air borne infection, and anus to mouth infection, maintain the high infection state. It is difficult for primary schools to control the *E. vermicularis* by themselves. Endeavors by public health and educational institutions could reduce the infection rate of *E. vermicularis* in Gangwon-do.

**REFERENCES**

Ahn YK, Chung PR, Soh CT (1992) *Enterobius gregorii* Hugot, 1983 recovered from school

children in Kangwon-do, Korea. *Korean J Parasitol* **30**: 163-167.  
 Beaver PC, Jung RC, Cupp EW (1984) Clinical parasitology. 9th ed. pp 302-306, Lea & Febiger, Philadelphia, USA.  
 Chung DI, Kong HH, Yu HS, Kim J, Cho CR (1997) Live female *Enterobius vermicularis* in the posterior fornix of the vagina of a Korean woman. *Korean J Parasitol* **35**: 67-69.  
 Kim JS, Lee HY, Ahn YK (1991) Prevalence of *Enterobius vermicularis* infection and preventive effects of mass treatment among children in rural and urban areas, and children in orphanages. *Korean J Parasitol* **39**: 235-243.  
 Lee KJ, Lee IY, Im KI (2000) *Enterobius vermicularis* egg positive rate in a primary school in Chungchongnam-do (Province) in Korea. *Korean J Parasitol* **38**: 177-178.  
 Lee SH, Chai JY, Hong ST (1996) Synopsis of Medical Parasitology. 1st ed. pp 106-112, Korea Medicine, Seoul, Korea.  
 Yang YS, Kim SW, Jung SH, Hun S, Lee JH (1997) Chemotherapeutic trial to control enterobiasis in school children. *Korean J Parasitol* **35**: 265-269.  
 Yoon HJ, Choi YJ, Lee SU, Park HY, Huh S, Yang YS (2000) *Enterobius vermicularis* egg positive rate of pre-school children in Chunchon, Korea (1999). *Korean J Parasitol* **38**: 279-281.