Short Communication

Enterobiasis among Preschool Children: a Study from Kayseri, Turkey

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SUMMARY: The infection rate of Enterobius vermicularis was investigated in 1,070 preschool children aged 5-7 years in Kayseri, Turkey by cellotape anal swab from May - September 2005. The children's parents were asked to complete questionnaires inquiring into the potential risk factors involved. The overall egg positive rate for E. vermicularis was 5.1%. The infection rate among boys and girls was similar. The association between family size, household income/month, education level of the parents, employment status of the mother and enterobiasis were found to be significant.

Enterobiasis (pinworm) is a common helminth infection occurring worldwide and affecting almost 1 billion people from all socioeconomic classes. Infection is more common in school and preschool children, who are easily exposed to overcrowded conditions and inadequate sanitation, and who have more active contact with each other than adults (1-4). The most common transmission is via anus-to-mouth by finger contamination and contaminated objects with which the children's hands make contact. The best method for diagnosis is the cellotape anal swab method (5-12). In local areas of Kayseri, a relatively high egg positive rate has been reported among primary school children (6, 7). The present study, the first large scale study conducted in our region, was undertaken to investigate the prevalence and risk factors for enterobiasis among preschool children.

This study was a cross-sectional survey conducted in Kayseri, Turkey, in 2005. Kayseri is an important commercial and industrial center located in Middle Anatolia, 360 km east from the capital city Ankara. It had a population of 1,099,574 in 2004. It has 16 districts, two of which are central. The numbers of children between the ages of 5-7 years living in the two central areas were 40,696. We calculated our sample number as 1,002 according to a value of 0.092, which was the enterobiasis prevalence in another study in this age group (13) (P) in a significant level of 0.05 (α), 1–β (power) = 0.80 and with a false rate of 0.03 (d). For this reason, the sample size was established as 1,100 children. In this study, 1,070 children between the ages of 5-7 years were analyzed. Permission was obtained from the Directorate of Health and ethical consideration was taken from a local committee. Informed consent to join the study was obtained from the children's parents.

Data was collected by a questionnaire consisting of questions concerning the sex and age of the child, educational level and occupation of parents, the number of household members, the household income per month, and the child's habits (habit of fingernail trimming and thumb sucking). The minimum wage for our country in 2006 was 350 New Turkish Lira (NTL, 1 Euro = 1,900 NTL), and the household income per month was categorized as ≤350 NTL and >350 NTL. According to the 2003 Turkey Demographic and Health Survey, the average household population size was 4.1, so our study family size was categorized as ≤4 and >5. Primary education in Turkey is 8 years, and the level of education was thus divided into two groups. Mothers were asked to perform a cellotape anal swab on their child who was participating the study. Laboratory slides were provided with cellulose tape attached to them, and the mother collected material for examination in the early morning, prior to defecation, once per child. On the same morning, the researchers collected the slides with the questionnaires. Medication was provided to egg positive children as well as their parents. Data are expressed as percentages. The Pearson χ² test and Fisher's exact test were used to analyze the association between demographic factors and enterobiasis. Statistical significance was defined as P < 0.05. All analyses were performed with the statistical package for social science (SPSS) version 13.0 (Chicago, Ill., USA).

In this study, 1,070 children between 5 and 7 years old were evaluated. The associations between demographic factors and enterobiasis are shown in Table 1.

In our study, the overall egg positive rate of Enterobius vermicularis was 5.1% (55/1,070). The association between family size, household income/month, education level of the mother and father, employment status of the mother and enterobiasis were found to be significant. Enterobiasis was statistically high in children whose household income/month was less than the minimum wage, whose family size was higher than four, whose parents' educational level was less than 8 years, and whose mother was unemployed.

This study was the first study conducted on enterobiasis in preschool children in Kayseri, Turkey. The present study shows that the prevalence of enterobiasis among 5-7-year-old children in Kayseri province is 5.1%. Gokahmetoglu et al. (8) reported that in the Erciyes University Creche the prevalence of enterobiasis was 1.2%, and Yazar et al. (9) found 1.3% E. vermicularis among 0- to 7-year-old children in the Kayseri Social Service Child Creche. In the study of Celiksöz et al. (10), the prevalence of enterobiasis was 11.2% among 0- to 6-year-old children. Like our study, these studies examined the materials only once. In the study of Norhayati et al. (11), the prevalence of enterobiasis was 40.4% among children aged 1-8 years in Malaysia. The authors tested the anal swabs three times. Enterobiasis in Korea among preschool children was found to be 9.5% in the study of Song et al. (12)
and 9.2% in the study of Yoon et al. (13) when taken the swabs twice. In these two studies the preschool children were attending nurseries or kindergartens. In our country, it is not common for children to go to day-care centers, and thus our prevalence is lower than in these studies. In addition, we took only one celotape anal swab per child, which was a limitation in this study, as it has been in other studies (4,8-10,17). Like our study, Okyay et al. (14), Song et al. (12), and Yoon et al. (13) reported that the infection rate was not different between boys and girls. In our study the prevalence of enterobiasis was higher in the group in which the mother in the household had a low education level, as has been shown in other studies (6,4,15). Some studies have found an association between the socioeconomic status of families and enterobiasis (16,17), whereas other studies did not (12). We also found a relation between the socioeconomic status of families and enterobiasis. There was also an association between crowded families (≥5) and enterobiasis in our study. The increased transmission may be due to elder brothers or sisters who are attending school (6).

Family size, household income/month and education level of the mother, education level of the father, and employment status of the mother were found to be significant. The ratio of uneducated women should be declined with specific programs. A multisectoral approach is needed. In addition, periodic surveys for those families with the risk factors are recommended.

REFERENCES


