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Short communication

Study of the role of IQ in children with *Enterobius vermicularis* infestation compared to healthy children

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Abstract

Background: *Enterobius vermicularis* has the widest geographic distribution among parasitic worms. This parasitic infestation is more common among children in population centers (nursery school, preschool). These parasites can affect the mental performance of children. This study investigated the role of IQ in children infestation with *E. vermicularis* were compared with healthy children in child care centers in Zahedan.

Materials and methods: This descriptive study on 425 (218 boys- 207 girls) 3–10 years samples from three different geographical (North- south and center) were randomly selected. Scotch Tape Test was used to check for contamination with *E. vermicularis*. The Draw-a-Man test was used to study IQ in children. 30 children infestation with the parasite were selected as case group and 30 healthy children were selected as control group. Data were analyzed using SPSS software version 20 and pair sample T Test.

Results: Prevalence of infestation was 7/5%. Average IQ scores in the control group was 106 and in patients' group was 104/5. The highest rate of infestation in children with average intelligence factor was 15(50%). Children with high IQ was the low rate of infestation 2 (6%) and showed no significant relation between 2 group in Average IQ scores ($PV \geq 0.05 = 0.2$). The highest rate of infestation was in the southern region (15 case).

Conclusion: The mental performance of children in group control was improve and recommended affect cure *E. vermicularis* in mental performance of children.

Background

Enterobius vermicularis (needle worm, thread worm or chair worm) is one of the nematode worms that has more geographical distribution than other worms [1]. It is estimated that at least 200 million people worldwide, especially children, are infected each year [2]. The prevalence of *E. vermicularis* infestation is associated with poor environmental hygiene, inadequate personal hygiene, and contaminated food [3].

Numerous studies have been performed on the relationship between the prevalence of *E. vermicularis* in children with

sex, age, demographic and geographical factors, blood and immunological factors [2]. However, psychological and IQ tests in children have not been performed.

The Draw-a-Man test is one of the easiest, most practical and universal visual tests that is used to determine the degree of intelligence of the child's mental age and IQ and we want to reach a conclusion about the child's IQ as soon as possible [4]. The aim of this study was to compare the IQ of children with *E. vermicularis* infestation in comparison with healthy children by a simple Draw-a-Man test.



Materials and methods

Sample study and microscopic examination

A cross-sectional study was conducted on 425 children (3–10 years). samples from three different geographical (North-south and center) Zahedan southwest in IRAN were randomly selected. Cellophane tape samples were taken from participants. The adhesive tape was pressed on the anal area and around it several times in different directions and then labeled on the glass slide. This procedure was performed by mothers of children in the morning and evening and defecation, using the toilet or taking bath. The cellophane tape samples were examined microscopically by a parasitologist in the laboratory of Islamic Azad University of Zahedan with light microscope.

The Draw-a-Man test and to score

The Goodenough–Harris Drawing test was a projective personality test used for clinical purposes and intelligence testing. Children participating were asked to draw three pictures, one of a man, a woman, and of themselves. The drawings were then evaluated using 64 scoring items. A score is assigned to each component of Draw-a-Man if drawn by the child. The given scores are added together and then, using a special table (tables test), the raw score is converted to mental age and then obtained by the IQ formula [5].

Data entry and statistical analysis

Data were collected and then entered in SPSS 20 statistical software and pair sample T Test was used to compare IQ in case and control groups. $P \leq 0.05$ was considered statistically significant.

Results

Of the 425-cellophane tape, 7.52% (32/425) samples of *E. vermicularis* were detected by microscopic examination. However, the frequency of infestation among girls was higher than that among boys at rates of 8.17% (17/208) and 6.91% (15/217), respectively. Statistically, no significant ($P > 0.05$) difference in infestation rate was recorded between girls and boys with enterobiasis. The highest infestation was reported in the age group of 7–10 years with a rate of 9.04%. Statistically non-significant ($P > 0.05$) differences were observed among age groups concerning enterobiasis (Table 1).

The mean IQ scores were 106 in the control group and 104.5 in the group of children with *E. vermicularis*. The highest rate of accessory infestation was seen in children with moderate IQ (50% (15 cases)) and in children with high IQ (genius) had the lowest rate of infection (2 cases (6%)) and results showed

no significant relation between 2 group in average IQ scores ($PV \geq 0.05 = 0.2$). Based on the samples collected from the north, center and south of Zahedan, positive cases of 7, 10 and 15 were reported, respectively. The highest rate of enterobiasis infestation was in the southern region (15 case).

Discussion

Children are among the population groups most infected with parasites. They are usually asymptomatic carriers and can increase the prevalence of parasites and cause health problems [6]. In the present study, the rate of parasitic infection among children aged 3–10 years was 7.5% and mean IQ scores were 106 in the control group and 104.5 in the group of children with *E. vermicularis*.

Most children start their painting by Draw-a-Man. This drawing is easy and attractive for children, and from this simple drawing, the level of intelligence of the child can be understood. Another advantage of such a test is that it is applicable from the age of 3 to 13 and is also useful for children who are unable to speak or do not know the language and the test does not take much time. Knowing your child's level of intelligence and consulting with a child psychologist will help your child get on the right track in life. Expectations should be commensurate with his or her level of intelligence and his or her tastes and abilities. It is even possible to improve the child's intelligence [7,8].

Symptoms of *E. vermicularis* include anal itching, burning sensation in the sitting area, sleep disturbance, fatigue, restlessness and anger [9]. These symptoms can affect a child's intelligence and senses [10]. Other symptoms, such as bruxism or tooth decay due to stress and nightmares, can upset a child and have a devastating effect on his or her mental functioning.

This study showed that IQ scores were slightly higher (IQ scores = 106) in healthy children than in children with infestation *E. vermicularis*. To conclude, more studies should be done with different IQ tests. but according to the results of treatment of *E. vermicularis* infection for better mental function in children is recommended.

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Table 1: Prevalence of *E. vermicularis* among children in relation to age group.

Age groups	Total examinations	Gender	Negative enterobiasis	Positive enterobiasis	Total no. (%)
3-6	196	girl	88	7	13(6.63)
		boy	95	6	
7-10	229	girl	103	10	19(9.04)
		boy	107	9	
total	425		393	32	32(7.52)



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