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RISK ANALYSIS OF HEALTH PROBLEMS, GROWTH AND DEVELOPMENT DISTURBANCES IN CHILDREN WITH INVASION OF INTESTINAL HELMINTHES

Key words: *intestinal helminth infections, preschool-age children, anemia, growth, development.*

Abstract. *The aim of our report was to study prevalence of intestinal helminth infection among preschool-aged children in Chernivtsi region. A total of 520 children aged 1-7 years were studied through clinical and paraclinical investigations and questionnaire concerning housing, socio-economic conditions etc. In our results, preschool-based deworming programmes must be promoted as a cost-effective strategy for control of nematode infections. So there are simple ways of improving personal hygiene and sanitation through hand washing, nail trimming and use of a latrine hygiene and clean water supplies must be encouraged. When a urinary tract infection is diagnosed in preschool-age girls, cellophane tape tests should be applied to both the perianal and the perineal regions on at least three consecutive days. In case of anemia attention must be concentrated on developing of rational nutritional guidelines and iron deficiency correction.*

Introduction

Infections with the soil-transmitted intestinal helminthes (*Ascaris lumbricoides*, *Trichuris trichiura* and *Enterobius vermicularis*), estimated to affect approximately 1 billion persons, are among the most common and widespread human infections [2,3]. Children are especially vulnerable for intestinal helminth infections. A cross-sectional study of 6897 schoolchildren in primary schools of Tanzania shows nearly 100% invasion of single- and multiple-species helminth infection. Even in London threadworms are believed to infect up to 50% of school children. Among children aged less than 7 years, intestinal helminth infections cause malnutrition and anemia, failure in normal growth and development [4]. Exposure to infections in infancy may induce a sustained bias in the immune response - reduced effect of previous BCG immunization was associated with a prevalence of intestinal nematode infection. Urinary tract infection is particularly common in young girls and pinworm is one of the most prevalent worms found in such children. The skin is an organ which has many important functions for body maintenance and health and wide variety of worms cause dermatological pathology in children [1].

Findings of the few prevalence studies of intestinal helminth infection among healthy preschool-aged children in Chernivtsi region ranged from 25% to 90%. The prevalence of intestinal helminth infections among healthy children aged 4-5 years in neighborhood regions was about 60%.

The aim

The aim of our report was to study prevalence of intestinal helminth infection among preschool-aged children in Chernivtsi region. We expect to estimate how exposure to intestinal helminth infections of three most widespread nematodes (*Ascaris lumbricoides*, *Trichuris trichiura* and *Enterobius vermicularis*) in preschool-aged may impact on children health and normal growth and development.

Materials and methods

A total of 520 children aged 1-7 years were studied through clinical and paraclinical investigations and questionnaire concerning housing, socio-economic conditions etc. A questionnaire survey includes visual and anamnesis parasitological data, anthelmintic treatment during last 6 months and dealt with life style and sanitary conditions and habits. Hemoglobin (Hb) levels were measured from a capillary finger-stick blood specimen using a hemoglobin photometer. Measurements of weight and height, open field locomotors activity were also performed and data of stool samples parasitological analysis was taken. Scores of the standard deviation (z-scores) for the weight-for-age, height-for-age, weight-for-height and BMI were used to characterize the growth profile. Denver development screening test II score was obtained for estimation of neurodevelopment profile.

Results and discussion

A high prevalence of intestinal parasites was detected with *Enterobius vermicularis* (64%), *Ascaris*

lumbricoides (41%), *Trichuris trichiura* (24%) and multiple-species helminth infection (17%) (fig.1.). Intestinal parasites infection was significantly correlated with life style and low sanitary conditions and habits ($r=0,83$), with children age ($r=0,49$).

Eleven per cent of the children were classified as showing growth deviation, retardation and stunting 24% of children had anemia of diverse intensity. The investigation found that palmar pallor described as sign of helminthiasis [2] was associated with anemia but not with intestinal helminth infection. But odd ratio of anemia risk in infected girls was 1,27 (95% CI 1,11-1,83). Inadequate daily caloric intake and non optimal balance of protein, carbohydrates and fats was observed in 78% of the investigated children and the proportion of those with inadequate protein intake was 34%.

Stunting and disproportional growth obtained by calculation of gender-age specific z-scores were significantly correlated with estimators of low economic income ($r=0,59$), inadequate protein intake ($r=0,44$) and polyparasitism ($r=0,37$), especially the association between *Ascaris lumbricoides* and *Trichuris trichiura* (fig.2). Skin symptoms were found mostly in atopic children and response was much stronger in the cases of antihelminthic treatment.

In the 24 young girls who had urinary tract infection, in 12 (50%) *Enterobius* eggs in the perianal and/or perineal region monitored using the cellophane tape method at least in one of the cellophane tape test were found. Odd ratio of urinary tract infection risk in infected girls was 1,97 (95% CI 1,23-2,98). These results suggested that urinary tract infections may be related to pinworms.

Previous anthelmintic treatment (deworming) improves nutritional status of school-aged children but in our investigation we did not find such confirmation.

The findings in our report could not be generalizable beyond plains areas of Chernivtsi region. There are subject to at least two limitations. First, children who participated in the study may not be representative of all children in region because we did not study prevalence in mountain districts of Bucovina. Second - laboratory diagnostics of helminth infections differ in rural and urban areas.

Conclusion

Preschool-based deworming programmes must be promoted as a cost effective strategy for control of nematode infections.

Simple ways of improving personal hygiene and sanitation through hand washing, nail trimming and use of a latrine hygiene and clean water supplies must be encouraged.

When a urinary tract infection is diagnosed in preschool-age girls, cellophane tape tests should be applied to both the perianal and the perineal regions on at least three consecutive days.

In case of anemia attention must be concentrated on developing of rational nutritional guidelines and iron deficiency correction.

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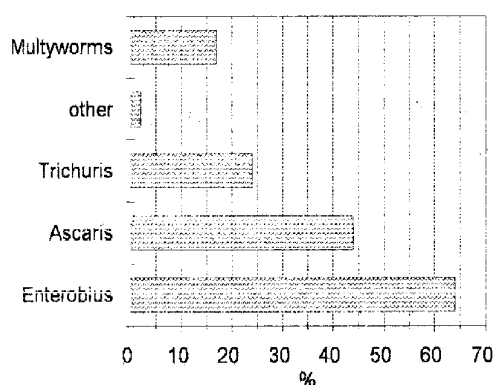


Fig.1. Prevalence of intestinal parasites

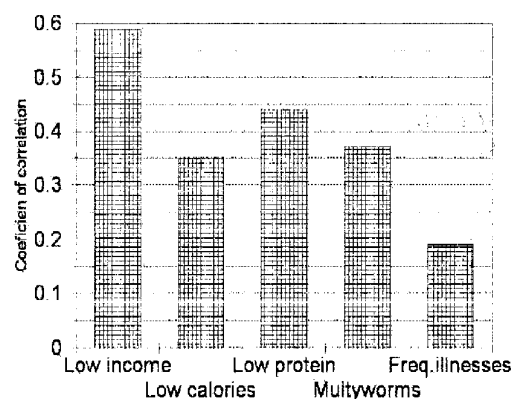


Fig.2. Correlation between children anemia and different factors

helminth infection on energy metabolism in Gambian children / *Am. J. Trop. Med. Hyg.* - 2004. - №4. - P. 476-479.

**АНАЛІЗ РИЗИКУ ВИНИКНЕННЯ ПОРУШЕНЬ
ЗДОРОВ'Я, РОСТУ ТА РОЗВИТКУ В ДІТЕЙ ІЗ
ИНВАЗІЄЮ ІНТЕСТИНАЛЬНИМИ ГЕЛЬМІНТАМИ**

Ю.М. Нечитайло, С.Є. Фокіна

Резюме. Метою нашого дослідження було вивчення розповсюдження інвазії інтестинальними гельмінтами серед дітей дошкільного віку Чернівецької області. В цілому 520 дітей від 1 до 7 років було обстежено клінічними, параклінічними методами та анкетуванням стосовно до умов проживання, соціально-економічного стану тощо. Отримані результати свідчать про те, що дегільмінтуєючі програми повинні бути впроваджені як економічно-вигідна стратегія для контролю за інвазією нематодами. Повинен бути впроваджений простий шлях покращання індивідуальної гігієни: миття рук, обрізання нігтів та використання туалетної гігієни та чистої води. При діагностуванні інфекції сечовивідних шляхів у дівчаток дошкільного віку необхідним є накладання целофанових серветок на періанальну та перінсальну ділянки як мінімум на 3 дні. У випадку анемії увага повинна бути сконцентрована на раціональне харчування та корекцію дефіциту заліза.

Ключові слова: інфекція інтестинальними гельмінтами, діти дошкільного віку, анемія, ріст, розвиток.

**АНАЛИЗ РИСКА ВОЗНИКНОВЕНИЯ НАРУШЕНИЙ
ЗДОРОВЬЯ, РОСТА И РАЗВИТИЯ У ДЕТЕЙ С
ИНВАЗИЕЙ ИНТЕСТИНАЛЬНЫМИ ГЕЛЬМИНТАМИ**

Ю.Н. Нечитайло, С.Е. Фокина

Резюме. Целью нашей работы было изучение распространения инвазий интестинальными гельминтами среди детей дошкольного возраста Черновицкой области. В целом 520 детей от 1 до 7 лет было обследовано клиническими, параклиническими методами и анкетированием по поводу условий проживания, социально-экономического состояния и т.п. Полученные результаты свидетельствуют, что дегельминтизирующие программы должны быть внедрены как экономически-выгодная стратегия по контролю за инвазией нематодами. Должен быть внедрен простой путь улучшения индивидуальной гигиены: мытье рук, обрезание ногтей и использование туалетной гигиены и чистой воды. При диагностировании инвазии мочевыводящих путей необходимо наложение целлофановых салфеток на перианальную и перинеальную области как минимум на 3 дня. В случае анемии внимание должно быть сконцентрировано на рациональное питание и коррекции дефицита железа.

Ключевые слова: инвазия интестинальными гельминтами, дети дошкольного возраста, анемия, рост, развитие.

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