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Comparative Study of the Prevalence of Intestinal Parasites in Low Socioeconomic Condition in one Village Baltëz, Fier, Albania

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Abstract: ***A prospective study was carried out to determine the prevalence of intestinal parasite and its epidemiological risk factors among children in Baltëz village, Fier district, in Albania. The aim of this study was to determine the prevalence of parasites and to identify the risk factors associated with this infection. Standard parasitological procedures as recommended by World Health Organization were employed in sample collection and examination. Fecal samples were collected from (159) children aged from (2-15 years old) and were examined by direct wet preparation formalin-eter 10% and floatation method. This study was done during the summer season (June month 2011). Data relating to sociodemographic, socioeconomic level, environment and host were also collected by questionnaire. The children belong to three different ethnicities: Albania, Kosova and Roman ethnicity. Prevalence for all parasites (protozoa and helminthes) was 68.6%. The age group (11-15 years old) had the highest rate of infection (91%). Boys had higher rate of infection than girls (74.4% vs 63%) respectively. There was no significant difference (p>0.05) between age, sex, ethnicity groups and infection. Regarding the presence of infection and the presence of anemia were observed a significantly strong relationship with p <0.001, also an association between prevalence of infection and level of education for p <0:03. In this study Giardia intestinalis was the most predominant protozoa and for helminthes more predominat were T. trichiura and H. nana. These parasites could be prevented by possible grouping of better ecological design and hygiene. Conclusively, the examination of personal hygiene as well as routine medical examination and treatment is strongly recommended in the low socio-economic areas.***

Keywords: Intestinal Parasites, Prevalence, Baltëz village

1. Introduction

Intestinal parasites are parasites that populate the gastro-intestinal tract. In humans, they often spread from not clean hygiene connected with stools contamination, meat without baked goods which is contaminated with the parasite or contact with animals. Presence of them constitute a global health burden in numerous developing countries mainly due to fecal contamination of water and food (1), sympathetic climatic, and environmental and socio-cultural factors enhancing parasitic transmissions (2, 3). There are two classes of infectious agents called parasite who are protozoa and helminths. A protozoa organism is a cell which are broken and duplicated within the host. Helminths (worms) are multicellular organisms. The majority of inflections are asymptomatic but some are associated with acute or chronic diarrhea and intestinal irritation (4) which contributes to malaborption and nutritional deficiency especially in children (5, 6). Intestinal helminths, for example, affect more than one-sixth of the world's population (7), with children and pregnant women at particularly high risk (8). Among the protozoan parasites of the human intestine, *Giardia lamblia* and *Cryptosporidium spp* are the most common and have been reported to cause multiple waterborne outbreaks of human illness (7). *Entamoeba histolytica*, (Amoebiasis infection) is the third most important reason for death from parasitic diseases wide-reaching, with its furthermost impact on the people of developing countries. The World Health Organization (WHO) estimates that approximately 50 million people worldwide endure insidious amoebic infection each year, resulting in 40–100 thousand deaths yearly (9, 10). *E. hystolitica* has been considered the second most common cause of parasite-attributable death, after malaria (11, 12). Intestinal helminths hardly ever cause death. *Ascaris lumbricoides* can infect over a billion, *T. trichiura* can infect 795 million, and hookworms can infect 740 million people (13).

2. Subjects and Methods

This study was carried out in Baltëz village. This is a populated place in Fieri district of Albania country (Europe) with the region font code of Eastern Europe. Its coordinates are 40°54`19`` N and 19°32`20`` E in DMS (Degreees Minutes Seconds) or 40.7553 and 19.5389 (in decimal degrees). It is localated at an elevation of 8 meters above sea level. This village is only 5Km from the Fieri district.

The Baltez is a muddy area (the real meaning of the name in Albania language). In this village, there are about 250-300 families with an average of 5 to 6 members each. The greatest number of the families live in private houses and own plots of land. Population is in this village is heterogeneous who consists in three ethnic groups, autochthonous Albanian population, population of Kosova origin and also Roma population. Bisides the Albania public school the Roman population have established their own community school to teach Roma language and Roma culture to their children.

The subjects were investigated 'in the community'. The faecal samples were collected from each of 159 children aged 2–15 years old. The parents of each subject were requested to collect a faecal sample into a screw-capped container (from each of them were collected three samples in different days).

Any parents of the children were told the aims and methods of the study and asked to give their verbal consent. From each child were collected relevant demographic and clinical data. A standardized questionnaire was used to record each subject's age, gender ethnicity, level of education [elementary education is obligatory in Albania (14)].

Each stool sample was checked microscopically for parasitic cysts, oocysts and ova, both before any concentration (as a fresh smear stained with iodine) and as a wet mount or stained dry smears after formalin–ether concentration. Faecal samples were examined in the Parasitological Laboratory in the Institute of Public Health in Tirana, Albania. The children found infected were given the answer for appropriate treatment by their family doctors.

Data were analysed using version 16 of the SPSS Windows software. Associations between proportions were explored in χ^2 tests. A *P*-value of <0·05 was considered indicative of a statistically significant difference or association.

Ethical Approval: The study protocol was approved by the Institute of Public Health, in Albania.

3. Results

The total sample collected from this village was 159, of which 68.6% were positive and 31.4% were negative cases. Table 1 depicts the prevalence of each age-group and the prevalence of parasites in boys and girls. These results show that the prevalence was highest in the children of age group from 11-15 years in 91% of cases and the boys harboured larger proportion of infection compared to the girls.

Table 2 depicts the prevalence of infection according to the data of questioner as ethnicity, presence of symptoms, and the level of mother`s education. The roman population show the high prevalence of infection compared to other ethnicity (Kosova and Albania population). Weight of loss and presence of anemia were the most predominant symptoms to those children. Most of them presented weight of loss 91/159 and half of them with presence of anemia 71/159 children in total. The education level of mothers was as follow: 47/58 mothers were "Illiterate or incomplete primary", 56/91 was "Complete primary or secondary" and 6/10 was committed "High school". No one of them has done the "University". The percentage of positivity shows a decrease with regard to increase in education level. The high prevalence was in illiterate mothers that may be show the implications of education in sanitary living.

Giardia lamblia, *Entamoeba spp* and *Blastocistis hiominis* are the most frequent protozoa found to this study and for helminths the most frequent were *Trichuris trichiura*, *Enterobius vermicularis*, and *Hymenolepis nana.* To the same children in almost of them we found a combination of two or more parasites. Table 3 depicts the kind of parasites and their combination in percentage found to this study.

4. Discussion

The present study included analysis of 159 stool samples for presence of parasites (intestinal protozoa and helminths) in low socioeconomic area in Baltëz village. This study has resulted in higher prevalence (68.6%) of intestinal parasites. This prevalence is similar with another study carried out from Spinelli et. al (66.06%) in healthy subjects in Albania (15). The relatively prevalence observed were not agrees with previous finding carried out in different places of Albania (16, 17, 18, 19) or in other country like Italy and Turkey (20, 21). To those studies the prevalence for parasites were lower compared to our study.

The min and max age were from 2 until 15 years old with mean 7.96 and mode 8. The prevalence of infection was higher in the age group 11-15 years. There was no significant difference (p>0.05) between age groups and infection. We think that this higher prevalence may be was related to an active life outdoors of boys than girls. As regards the division by sex we have a small difference between the boys and the girls 78 and 81 children respectively. The positivity in this study for the boys resulted 74.4%, whereas for girls resulted 63%. Although boys are in smaller number compared to the girls, the positivity to them resulted to be higher. Similar results were found by Traore et. al., in his study, when reported that boys have higher prevalence of intestinal parsites compared to girls and also Cifuentes et. al., from Mexico reported that the prevalenve for *G. intestinalis* were higher to the boys (22, 23). So this study found that the overall prevalence for intestinal parasite infection was highest between the ages 11-15 years and to the man, even thought the observed difference in prevalence by age and sex was not statistically significant (Table 1).

Based on the data collected from the questioners regarding the group of ethnicity, the largest number of cases infected with the parasite appears to Roma population 71.7%, whereas for the Albanian population of Kosovo and that positivity is almost similar 68.3 and 66.6% respectively. Ish-Horowicz et al., and Hielt et al., have reported that clinical signs found mainly parasitic infections caused by Giardia infection range from asymptomatic to severe syndrome as pronounced anemia, nausea, vomiting, abdominal pain etc (24, 25). This is because the infection can cause chronic inflammatory changes without showing obvious clinical signs. Factors that may contribute to the variety of clinical manifestations include virulence of Giardia, the number of cysts ingested and the state of the host immune system at the time of infection (26, 27, 28, 29). Regarding the data concerning to manifestation of major symptoms of the intestinal parasitic infection like weight loss and presence of anemia to these children, we can be say that; from 159 children, most of them 136 (85.5%) children presented weight loss, so and their positivity resulted also very high in value 67%. Presence of anemia was observed in almost half of the tested children (55.3%), and the positivity for presence of parasite resulted 80.7% in all cases. Regarding the presence of infection and the presence of anemia were observed a significantly strong relationship with $\chi 2 = 13.44$ $p < 0.001$, but for weight loss no significant relation was observed. Most of mothers had committed basic level education that mention the "Illiterate or incomplete primary" and "Complete primary or secondary school". Only 10 cases had committed "High school" and none of these mothers had gone to the "University". All mothers were domestic.

Highest number of positivity were observed to the children whose mothers had not even completed basic education level in 81% of cases, even for other cases presented to a very high positivity respectively 61.5% for children whose mothers have completed complete primary or secondary school and 60% for those children whose mothers have completed high school.

Regarding the education status for mothers, there was an association between prevalence of infection and level of education. This difference is statistically significant ($p < 0.03$; $\chi 2 = 6.6$) (Table 2).

Among the main types of protozoa found in our study, *G. duodenalis* were the most prevalent parasites compared to the others like *B. hominis and Entamoeba spp.* While for the helminths can mention the presence of *Enterobius vermicilaris, Hymenolepis nana, Trichiuris trichiura, Strongyloides stercoralis*. This predominanc of *G. duodenalis* in our founding compared to other protozoa was similar with the study done in our country by Berrilli et. al., which described in his study how 22 (44%) of 50 stool samples from Albanian children with acute gastro-enteritis were PCR-positive for *G. duodenalis* (30, 18). On the other hand in one study carried out in Diarrhea in Hospitalized Children in Tertiary Hospital by Nezaj et. al, the prevalence of *Entamoeba spp* was highest compared to prevalence of *Giardia intestinalis* (8.4% and 4.6% respectively). Regarding the prevalence of helminthes Mitrushi in one study in Albania found *Trichuris trichiura, Ascaris lumbricoides* and *Oxyuris vermicularis* appear to be the most common intestinal helminthes in 246 (40·7%) of 604 young children (aged 3–6 years) (17).

What catches the eye in this sample is the presence of two or more parasites to the same child. A mixture of parasite protozoa and helminths in a fecal sample were more predominant and the number for presence of parasites reaches two to four parasites (Table 3).

5. Conclusion

The high rate of presence of infection to these children could be related to some factors as, the low level of mother's education, which cared for growth, education and nutrition of these children, low socio-economic conditions, which has reflected badly in presence of anemia and weight loss. Such an ethnic mix within a village of this size has led to passage the infection from children of one ethnicity to another, because these children were studying in the same school and played together all the time. So the examination of personal hygiene as well as routine medical examination and treatment is strongly recommended in the low socio-economic areas.

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Table 1: Distribution of Positivity infection among children in Baltëz according to age groups and sex

Characters	Infected with parasites	Pozitivity No. (%)
Age groups (years): P>0.05		
2-3	14	10 (71.4%)
4-6	47	27 (57.4%)
7-10	65	42 (64.4%)
11-15	33	30 (91%)
Gender: P>0.05 χ^2=2.39		
Male (-)	20	25.6%
Male (+)	58	74.4%
Female (-)	30	37%
Female (+)	51	63%

(-) negative cases
(+) positive cases

Table 2: The positivity of parasites according to the data of standardized questioner

Data	Negative	Positive	Total nomber	Statistics data
Ethnicity				P>0.05 χ^2=0.33
Kosovo	13	28	41	
Roman	13	33	46	
Albanian	24	48	72	
Weight loss				P>0.05 χ^2=1.175
Children without loss of wight	5	18	23	
Children with loss of wight	45	91	136	
Anemia				P<0.001 χ^2=13.44
Without Anemia	33	38	71	
With Anemia	17	71	88	
Mother education status :				P< 0.03 χ^2=6.6
Illiterate or	11	47	58	
incomplete primary				
Complete primary	35	56	91	
or secondary				
High school	4	6	10	
University	0	0	0	

Table 3: The kind of pathogens and their percentage

Pathogens	*Frequency*	*Percent*
Ascaris lumbicoides	1	0.6
Blasocystis hominis	18	11.3
Chilomastic masnili	1	0.6
Endolimax nana	2	1.3
E. nana and B. hominis	1	0.6
Entamoeba spp	6	3.9
Entamoeba spp and B.homis	17	10.6
Entamoeba spp and B.homis and E. nana	3	2
Entamoeba spp and E.nana	1	0.6
Enterobius vermicularis and Entamoeba spp and E. nana and B. hominis	1	0.6
Entrobius vermicularis and Entamoeba spp	1	0.6
Giardia lamblia	20	12.6
G. lamblia and A. lumbricoides	1	0.6
G. lamblia and B.hominis	5	3.1
G. lamblia and Entamoeba spp	4	2.5
G. lamblia and Entamoeba spp and B. hominis	1	0.6
G. lamblia and Trichuris trichiura	3	2
Hymenolepis nana	5	3.2
H. nana and Entamoeba spp	1	0.6
H. nana and Entamoeba spp and B. hominis	1	0.6
H. nana and G. lamblia and Trichuris trichiura	1	0.6
H. nana and Strongyloides stercoralis	1	0.6
H. nana and T. trichiura and B. hominis	2	1.3
S. stercoralis	1	0.6
T. trichiura	6	3.9
T. trichiura and Entamoeba spp and B. hominis	4	2.5
T. trichiura and G. lamblia and Entamoeba spp and B. hominis	1	0.6
Negativ	50	31.4