NCE OF INTESTINAL PARASITES IN TWO INSHASA (ZAIRE) AND THEIR RELATION TO TER SUPPLIES

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Abstract. The prevalence of common intestinal nematodes (*Ascaris*, *Trichuris* and hookworms) and protozoa (*Entamoeba coli*, *E. histolytica*, *Giardia*, *Trichomonas*) was compared in two suburbs of Kinshasa, one provided with piped water and the other one with wells. Pit latrines were used in both places. No significant differences were observed for the worms, but the prevalence of the four common protozoa was approximately twice as high in the community without piped water supply. It is concluded that providing piped water has some impact on the transmission of potentially pathogenic intestinal protozoa, but no influence, at least on the short run, on intestinal worms. Infections with *Giardia* and *Trichomonas* were significantly associated.

Key words: intestinal parasite; domestic water supply; Zaire

Introduction

At the Laboratory for Parasitology of the University of Kinshasa we had observed a high number of cases of intestinal amoebiasis and giardiasis in people, living in the nearby district of Makala. Piped water not being available in this area, we thought that the use of well water might play a role in the local transmission of intestinal protozoa. We compared the prevalence of intestinal parasites in Makala with those in Ngaba, an adjacent and comparable district where piped water was available.

Though more profound studies are required to provide proof of the water-borne character of parasites, the results of this small-scale survey seemed interesting enough to report.

Population and methods

Makala and Ngaba are urban districts in the southern outskirts of Kinshasa, separated by a tarmac road. Both are inhabited by immigrants from nearby rural provinces. The socio-economic status and hygienic standards of both populations are comparable low. Families of 5 to 20 live in small houses surrounded by a yard, in which in general a pit latrine is present. Sewage systems are not available. Piped water is available in Ngaba since several years, but in Makala this provision did not exist at the time of the study. The inhabitants draw water from ± 5 m deep wells, present in most of the yards. This water is generally clear, but can become turbid after heavy rains.

The survey was carried out in August - September 1981 at the end of the dry season. The two suburbs were surveyed in immediate succession. Three avenues were selected in both suburbs; the study areas are situated

at less than one km distance. All resident families but one agreed to participate in the study. In Makala 220 people were examined against 146 in Ngaba.

About 30 fresh stool samples were collected each morning and at once transported to the nearby laboratory. Duplicata direct smears were immediately performed on each sample. The stools were then concentrated and examined following the formol-ether method.

People examined were subdivided according to sex and age in preschool children (0-6), school children (7-18) and adults (over 18 years) (*Table 1*).

Results

The results of the survey are presented for the three common nematodes and the four most common protozoa (*Table 1*). For *Giardia lamblia*, *Entamoeba histolytica* and *E. coli*, infections with trophozoïtes and/or cysts are considered together. Eggs of hookworms are not specifically designated as both *Ankylostoma* and *Necator* are present in Kinshasa [1].

Among other parasites observed, *Strongyloïdes stercoralis* was present in six people (3%) examined in Makala and five (3%) in Ngaba. *Schistosoma mansoni* was found in one examined person in Makala and four in Ngaba. They had all been staying in known endemic areas in a recent past. *Endolimax nana* was found in seven persons (3%) in Makala and fifteen (7%) in Ngaba. *Chilomastix mesnili* was found twice in Ngaba and *Iodamoeba buetschlii* was found in three samples in each suburb. No *Entamoeba hartmani* were identified.

It was observed in Makala that 55% of *Trichomonas hominis* infections were associated with *Giardia lamblia* (21% in the total population). Conversely, 54% of the *Giardia* carriers were associated with *Trichomonas* (21% in the total population).

In Makala 22 people produced liquid stool samples. Seven of them were positive for both *Trichomonas* and *Giardia*. No other correlation was found between the aspect of the stools and the presence of parasites.

Discussion

Day to day variability in the excretion of intestinal parasites is admittedly great. Furthermore, important monthly fluctuations have been observed [2]. In the present survey only one sample was examined and no attempt was made at longitudinal follow-up. Conclusions should therefore be careful and limited to the most salient points.

The general prevalence of intestinal nematodes is about the same in both districts with the exception of *Trichuris* which is 50% more common in Ngaba. Our figures for nematodes are much lower than those recorded in other suburbs of Kinshasa, e.g. in N'Djili [3] and in Bandalungwa [4].

The prevalence of the four most common species of intestinal protozoa is, contrary to that of nematodes, about twice as high in Makala as in Ngaba in all cases. There is a close correlation in the presence and prevalence of *Trichomonas* and *Giardia*. For both species the differences in prevalence between the districts is essentially due to lower figures in children and women in Ngaba, suggesting a domestic source of infection. This feature is less obvious for both *Entamoeba* species.

In Lagos (Nigeria), Oyerinde [5] found figures for *E. histolytica* and *G. intestinalis* which are near to those observed in Ngaba, but the prevalence of *Iodamoeba buetschlii*, an uncommon parasite in Kinshasa, was much higher in Lagos (M = 9,6%; F = 14,7%). Another study by Oyerinde [2] reports observations on *Entamoeba histolytica*

Table 1. Prevalence (%) of selected intestinal parasites in districts Makaba [Ma] and Ngaba [Ng] in Kinshasha

	Study Population		*Ascaris*		*Trichuris*		*Hookworm*		*Trichomonas*		*Giardia*		*E. coli*		*E. Histolytica*	
Age group (in years)	*Ma*	*Ng*	*Ma*	*Ng*	*Ma*	*Ng*	*Ma*	*Ng*	*Ma*	*Ng*	*Ma*	*Ng*	*Ma*	*Ng*	*Ma*	*Ng*
Men																
< 7	29	29	35	45	43	72	17	14	17	0	24	7	24	21	7	14
7-18	27	18	70	61	41	72	49	22	11	11	22	17	44	11	15	6
> 18	35	15	54	40	49	33	20	7	14	20	11	20	37	27	17	7
Total	91	62	53	48	46	63	27	15	14	8	19	13	35	19	13	10
Women																
< 7	37	28	43	50	31	71	14	18	30	14	38	18	24	0	16	7
7-18	41	30	56	77	54	60	15	20	39	0	34	13	46	23	39	7
> 18	51	26	55	46	39	58	12	15	14	4	6	0	47	38	14	19
Total	129	84	52	58	42	63	13	18	26	6	24	11	40	20	22	11
Population																
< 7	66	57	39	47	39	72	15	16	24	7	32	12	24	11	12	11
7-18	68	48	62	71	49	65	28	21	28	4	29	15	46	19	28	6
> 18	86	41	55	44	43	49	15	12	14	10	8	7	43	34	15	15
Total	220	146	52	54	44	63	19	16	21	7	21	12	38	20	19	10

only in Lagos. The prevalence of the infection in people who had water from wells at their disposal was 23.4% while it amounted to 10.6 - 12.4% in people obtaining their water from taps. Prevalence figures were highest in the wet season, giving credit to the hypothesis that the higher prevalence in well-users was due to contamination of the water through the proximity of the pit latrines.

The results of our study also suggest that the well water used in Makala can play an important role in the transmission of intestinal protozoa as *Trichomonas hominis*, *Giardia lamblia*, *Entamoeba histolytica* and *E. coli*. The availability of piped water in Ngaba is the only apparent factor which might explain the lower prevalence of intestinal protozoa in this district as compared to Makala. Other factors which could be of importance, as socio-economic and hygienic levels, nutritional habits and status, ecological surroundings are highly comparable for both areas. On the other hand, piped water as a measure of sanitation does not seem to influence the prevalences of intestinal nematoda, as already has been concluded by Jancloes [6].

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