PARASITOLOGICAL FINDINGS IN STOOL SAMPLES OF CHILDREN UNDER FIVE YEARS IN AN INLAND RURAL COMMUNITY IN GHANA

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SUMMARY

Diarrhoea is one of the causes of childhood morbidity and mortality through dehydration in the developing countries. For this reason a 12-month study was undertaken to investigate the role of parasitic agents in diarrhoea among children under five years in an inland rural community. Four hundred and sixty five (465) stool samples made up of 203 diarrhoea and 262 non-diarrhoea cases were examined, using the direct smear and the formol-ether-concentration techniques for the presence of parasitic agents. Out of the 203 diarrhoea samples 70 (34.5%) were found to contain parasitic agents while 133 (65.5%) were free from such organisms. Eighty nine samples (34.0%) of the 262 non-diarrhoea subjects were also found to be positive and 173 (66.0%) were negative. The parasitic agents detected were Ascaris lumbricoides *followed by* Chilomastix mesnili, Giardia lamblia, *hookworm and* Strongyloides stercoralis. Entamoeba histolytica *and* Trichuris trichiura *were also detected. Concurrent infection was common. The youngest among the positive cases was a five month old child with a mix infection of* Ascaris lumbricoides *and hookworm, agents transmitted through the soil. According to these results there was no significant difference between the number of positive cases among both the diarrhoeal and non-diarrhoeal subjects but a prevalence rate of 44.2% and 20.2% of* G. lamblia *among the diarrhoeal and controls respectively is significant.*

INTRODUCTION

It is known that diarrhoea is one of the causes of childhood morbidity and mortality through dehydration in developing countries. Though investigations on the causative agents of diarrhoea have been conducted in Ghana much attention has not been given to the role of parasitic agents. For this reason, Anteson et al (1987) carried out a survey on diarrhoea causing agents in only children with diarrhoeal diseases from a children's hospital and a polyclinic in Accra. It was felt that more has to be done in this area. So this 12-month study among children under five years was conducted at the Noguchi Memorial Institute's field research station at Gomoa Onyadze, an inland rural community in Central Region.

MATERIALS AND METHODS

Fresh stool samples from diarrhoeal patients (203) and non-diarrhoeal subjects (262) were first examined macroscopically in the field for the presence of adult worms and segments of such organisms (Tab. 1). direct smears of the samples were then examined microscopically, especially for the presence of vegetative forms of potozoa. The rest of all the samples were transported in a cool box to the Institute on the very day of collection for further examination using the formol-ether-concentration technique. A drop of 5% Lugol's solution was added to both the preparations of the direct smear and the concentration technique for differentiation of *Entamoeba histolytica* from *E.*

coli. Specimens containing hookworm eggs were cultured using the filter paper technique for the differentiation of *Ancylostoma duodenale* from *Necator americanus*.

The figure shows the parasitic agents detected in the faecal samples of the total of 465 sample. *Trichuris trichiura* was encountered only once and *E. histolytica* was observed once in the

Table 1

NUMBER OF STOOL SAMPLES EXAMINED

Number of Diarrhoeal samples	203 (43·7%)
Number of Non-Diarrh. samples	262 (56·3%)
Total	465 (100%)

RESULTS

Out os the 203 diarrhoea samples examined 70 (34.5%) were found to contain parasitic agents while 133 (65.5%) were free from such organisms and 89 (34.0%) samples of the 262 non-diarrhoeal subjects were also found to be positive and 173 (66.0%) were negative (Table. 2).

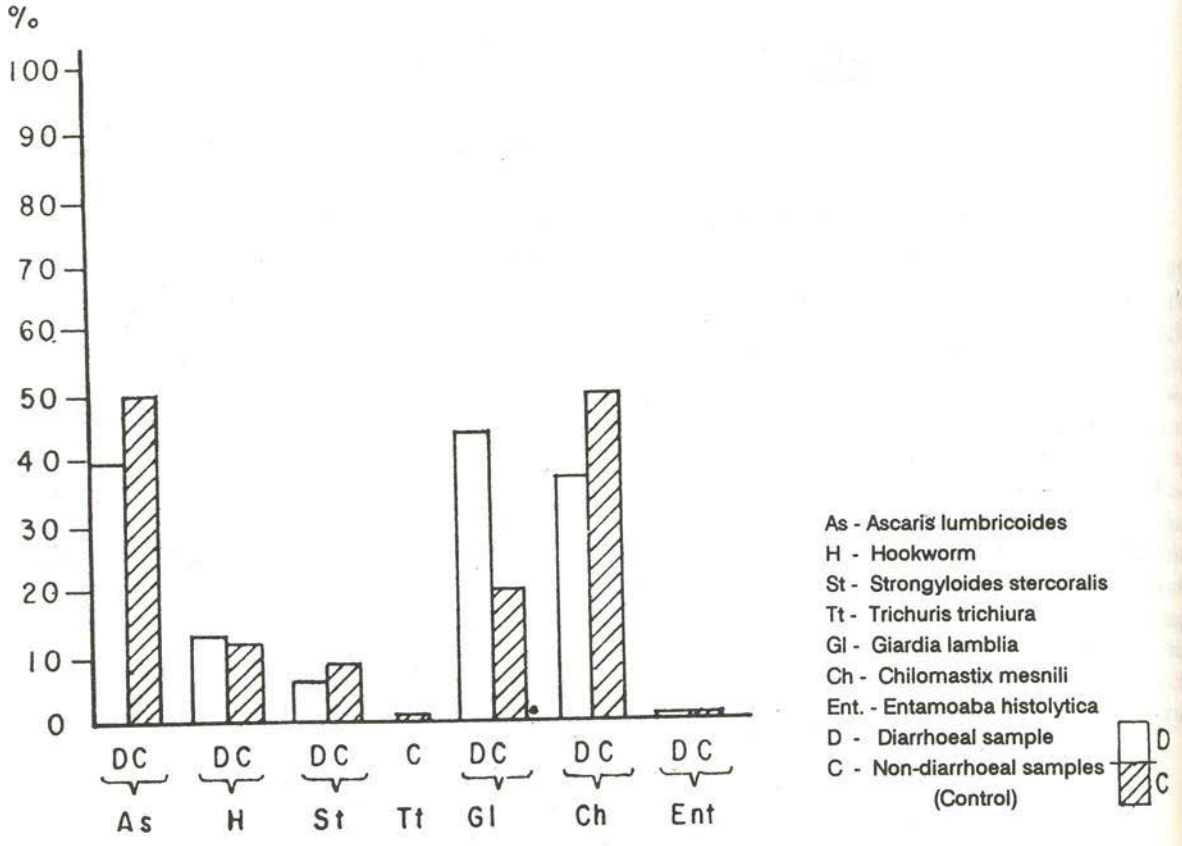
diarrhoeal and non-diarrhoeal specimens respectively. Concurrent infection was common. The youngest among the positive cases was a five month old child with a mix infection of *Ascaris lumbricoides* and hookworm, agents transmitted throught he soil i.e. through inadequate sanitation.

Table 2

RESULTS OF DIARRHOEAL AND NON-DIARRHOEAL STOOL SAMPLES

	Total	Pos.	Neg.
Diarrhoeal samples	203	70 (34·5%)	133 (65·5%)
Non-Diarrh. samples	262	89 (34·0%)	173 (66·0%)

PARASITIC AGENTS IN STOOL SAMPLES FROM CHILDREN UNDER 5 YEARS.



DISCUSSION

Among the parasitic organisms detected in the positive stool samples were the known diarrhoea causing agents, namely, *Giardia lamblia, E. histolytica, Trichuris trichiura* and *Strongyloides stercoralis*[5]. According to that report the global prevalence rates of *E. histolytica* vary from 2% to 60%. Out of 32 diarrhoeal patients of different ages found to be harbouring parasitic agents at Gomoa Fetteh, a rural coastal village in the Central Region of Ghana and the 154 positive non-diarrhoea subjects 1 (3.1%) and 1 (0.6%) were *E. histolytica* - positive respectively[2] The figure was 0.3% among young children with diarrhoea in Accra[1]

In the present study the prevalence rate was 1.3% of the 70 diarrhoea and 1.1% of the 89 non-diarrhoea infected subjects. Infection rates of *Giardia lamblia* in different populations ranged from less than 1% to more than 20%[5]. Anteson et.al. recorded 0.9% in 1987. The most common parasitic agent encountered in 143 children with diarrhoea and 116 aged-matched control group in a farming community in Zimbabwe was G. lamblia4). They observed 34% positive cases among the diarrhoea pa-

served 34% positive cases among the diarrhoea patients and 29% in the controls. In the same year Mason and Patterson recorded 19.4% in children from rural and urban areas near Harare, in Zimbabwe[3]. Lower rates of this infection were reported from Gomoa Fetteh in Ghana[2]. Though there was no significant difference between the number of positive cases among both the diarrhoeal and non-diarrhoeal subjects (Table 2) a rate of 44.2% and 20.2% of *G. lamblia* infection among the diarrhoea and the controls respectively, is significant.

Ascaris lumbricoides was the predominant parasitic agent observed at Gomoa Fetteh in Accra and in the present investigation.

* This report is part of a multi-unit investigation comprising the Bacteriology, Epidemiology, Parasitology and Virology Units

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Chairman: Thank you very much Dr. Aryeetey. The paper is now open for questions and comments.

Dr. Adubofour: When you say treatment of diarrhoea, what precisely went on?

Speaker: Health education is part of the treatment. If you educate them, they know what to do when you are advising them. They must know what the whole thing is about. They must take part in the whole process and that is exactly what the Epidemiology Unit is doing. They have roles to play and you tell them why they are having the diarrhoea. Not that you only go there and give them some tablets and leave them. In the long run the diarrhoea will still be there. We want a permanent control.

Dr. Adubofour: Did you give them tablets?

Speaker: Well when it is an acute one then we had to give them tablets.

Dr. Adubofour: What tablets were they?

Speaker: I think the Epidemiology Unit can answer that.

Dr. Afari: The part we are playing is trying to help mothers to recognise diarrhoea in its early stages, and use oral rehydration therapy as the main thrust for diarrhoea disease control. This is simple and pure. No tablets. Maybe if tablets are given, they are given for other diseases like malaria or other parasitic diseases. This is what we do over there. So we all agree that diarrhoea should be managed by oral rehydration therapy.

Chairman: I think I will like to emphasize the point she made about health education. Oral rehydration therapy will handle the complications of diarrhoea but the loose stools will still be there unless health education is emphasized. So I accept what you are saying but I am only emphasizing what she said.

Dr. Afari: It is part of an education process. When we went there it was observed that diarrhoea was a problem and as a result an under five diarrhoeal morbidity and treatment survey was carried out to collect information on what mothers know about diarrhoea and what they are doing about it. It was found out that mothers would wait until their children have about 5 to 8 stools a day before accepting that a child has got diarrhoea. They are also managing diarrhoea with paracetamol, ampicillin capsules, etc. This was information for us that we should reverse the trend. So it starts with health education. Health education involving mothers and these are recorded on videos and played back to them and then the oral rehydration therapy follows.

Speaker: Well if we find patients with diarrhoea, oral rehydration alone can only stop the running of the stool, but the parasites must be cared for, and that is what I am saying.

Co-chairman: I wanted to make a point about oral rehydration. We have always talked about oral rehydration in the recent past and now I find it very difficult when we say we should give ORS without looking at what is happening in the community. We must save the child by giving this. But the child is given this and the mother does not realise that it is the unsanitary condition that is causing the problem and the child is back to the same mud and the same infected area, and then oral rehydration. So they have taken oral rehydration as a magic thing. The child does not have dehydration but then you are wasting money. You are not dealing with the particular problem of health education within the community. So the person can't stop having diarrhoea all the time. I think we are pressing too much oral rehydration without looking at the other side of the coin. It is costing money. The other may be easy to deal with.

Prof. Laing: Mr. Chairman, I don't see the connection between the discussions and the piece of research that has just been narrated. You simply compared diarrhoeal with non-diarrhoeal cases. It is not as if you compared treated, not treated, given oral rehydration, not given oral rehydration and so forth. So there is no connection. It may be in some other work you want to superimpose such differences i.e. these other comparisons. I would like to know whether in your protocol you had in mind looking at these parasites. I am afraid, being a non zoologist, I can't recognise these species. But were you just looking at animal (zoonotic) parasites and did you exclude bacteria completely or were you working hand in hand with the bacteriologist so that you could get an idea of both the fauna and the flora there.

Speaker: This is part of multi-unit investigation carried out on diarrhoeal diseases. The Bacteriology, Virology and Parasitology Units together with the Epidemiology Unit were actually involved in this study. Dr. Nakano presented the overall results of this paper, but I am only taking the parasitological aspect of it. And again we were dealing with human parasites.

Prof. Laing: One thing that worries me is that, you have a situation where the individual seems to be overwhelmed with such a very rich fauna of these animals at the same time. Now, in such a situation it is terribly difficult to say what is happening, whether a parasite is causing or not causing or related or not related to the diarrhoea.

Speaker: We have concurrent infections too and what we noticed is that we had *Ascaris* together with other parasites, but as you are saying it is actually difficult to know the exact organism which is causing the diarrhoea. But if we have *Ascaris* together with *Entamoeba histolytica* or together with *G. lamblia*, well we presumed that the *G. lamblia* or the *Entamoeba* could be the causative agent.