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Analytical survey of contaminated samples from soil, water, vegetables and fruits in relation to human parasites

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Abstract: An attempt was made to study the possible sources of transmission of protozoan cysts and helminthe eggs to man in the Samastipur town of Bihar from media such as soil, water and raw edibles (vegetables & fruits). A total of 2091 samples comprising 402 soil samples, 526 water samples, 375 fruit samples and 788 vegetables samples were examined. The highest prevalence rate (30.6 percent) was observed in soil samples and the lowest (12.05 percent) in vegetable samples. Out of the contaminated samples, 5.93 percent, 4.02 percent, 9.90 percent were position for *Entamoeba histolytica, Giardia intestinalis* and *Ascaris lumbricoides* respectively.

Key words: Protozoan cysts, helminthe eggs, *Entamoeba histolytica, Giardia intestinalis* and *Ascaris lumbricoides*

INTRODUCTION

In course of studying the prevalence and pattern of intestinal parasitic infections in man in the Samastipur town of Bihar it was thought desirable to explore out the particular fact of transmission dynamics, i.e., the possible source of their transmitting medium or the vector such as soil, water, fruit, and vegetable.[1]

For this purpose, the most common protozoans viz., *Giardia intestinalis, Entamoeba histolytica and Ascaris lumbricoides* among the helminthe parasites were selected considering their very high prevalence rate in the Samastipur town of Bihar.[2]

MATERIALS AND METHODS

Soil, water and fruit samples were collected from different wards and it was endeavored to assess the amount of contamination with the free living cysts of *Giardia intestinalis, Entamoeba histolytics* and the embryonated eggs of *Ascaris lumbricoides* in them.

For this purpose, two slides of each sample were prepared by two different methods for their subsequent microscopic examination. The methods used were as follows:

1. Sedimentation by simple centrifugation:

Water used for washing the fruit samples was kept for an hour for sedimentation. In case of water samples, they were kept for sedimentation without adding water to it. But in the case of soil samples, this process was repeated thrice after every three hours. The collected sediments were mixed with water and centrifuged at 2000 r.p.m. for two minutes. After this the whole contents of centrifuged tubes was poured down leaving only a few drops. A drop was taken on a micro slide and after putting a coverslip it was subjected to microscopic examination.[3]

2. Floatation by saturated zinc- sulphate solution

The seconds slides was prepared by floatation method using saturated Zinc sulphate which gave better results.

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RESULT AND DISCUSSION

Out of a total of 2091 samples, 402 soil samples, 526 water samples, 375 fruit samples and 788 vegetable samples were collected from different localities of the town and were examined to find out the prevalence rate of the most common intestinal parasites:

Out of the total examined 2091 samples, 415 samples (19.85 percent) were found to be contaminated with one or the other parasite. Of these contaminated samples, 124 samples (5.93 percent) were infected with *Entamoeba histolytics*, 84 samples (4.02 percent) with *Giardia intestinalis* and the remaining 207 samples (9.90 percent) with *Ascaris lumbricoides* respectively. Cysts, trophozoites, eggs and larva of some other intestinal parasites were also observed but they were not taken into consideration in the present study.[4]

The following is the account of the various examined samples.

SOIL SAMPLES

402 Soil samples from different parts of the town were collected and examined. These samples were taken from the crop- field, ponds, ditches & river banks, road sides and fruit orchards.

Of these 141, 85, 74 and 102 samples were collected from crop-fields, ponds, ditches & river banks, road sides and fruit orchards respectively.

Out of these 402 examined soil samples, only 123 samples (30.60 percent) were contaminated. These comprised 37 samples (9.20 percent) infected with *E. histolytics* 24 samples (5.97 percent) with *G.intestinalis* 62 samples (15.42 percent) with *A.lumbricoides.*

WATER SAMPLES

Water samples were collected for examination from various sources such as hand- pump, well, irrigation canal or drain, municipal supply and from river & ponds of which 171, 166, 62 and 85 water samples were examined from the above sources respectively.

A total of 526 samples of water were collected from various sources, from which the town people drink water and were examined. Out of theses 134 water samples (25.47 percent) were found to be contaminated 45 samples (8.55 percent) with *Entamoeba histolytics,* 31 samples (5.89 percent) with *Giardia intestinalis* and 58 samples (11.03 percent) with *Ascaris lumbricoides.*

Highest prevalence of the parasites was observed from the water samples of river and ponds. Out of 85 such samples examined, 28 samples (32.94 percent) were infective.

FRUIT SAMPLES

375 fruits samples of locally available cheap seasonal fruits, purchased from the markets or collected from the fields were examined to assess the degree of contaminated- 18 samples (4.80 percent) were *Entamoeba histolytics*, 10 samples (2.67 percent) with *Giardia intestinalis* and 35 samples (9.33 percent) with the embryonated eggs of *Ascaris lumbricoides.*[5]

VEGETABLE SAMPLES

Vegetable samples were collected for examination from the vegetable fields or purchased from the local markets. Of these 140, 176, 165, 134, and 173 samples were of Radish, Carrot, Sag, Mint leaves and Coriander leaves respectively.

Out of these 788 examined vegetable samples, only 95 samples (12.05 percent) were contaminated. These comprised 29 samples. (3.68 percent) infected with *E.histolytica*, 15 samples (1.90 percent) with *G. intestinalis*, 51 samples (6.47 percent) with *A. lumbricoides.*[6]

A review of the literature, regarding the transmission of intestinal parasites through different median reveals that not many workers have carried out the analysis of these media for the free- living stages of humans parasites, i.e., the cysts of *Entamoeba histolytics, Giardia intestinalis* and embryonated eggs and larvae of *Ascaris lumbricoides.*[7]

The general prevalence rate of the intestinal parasites was recorded to be 19.85 percent. Out of 2091 examined samples were from soil, 134 samples from water, 63 samples from fruits and 95 samples from vegetables respectively.

28.37 percent prevalence was reported from soil samples of river banks, where water is easily available for ablution. It leads to heavy concentration of human's fecal matter. The results are in conformity with the finding of Haich H.C. (1965)[8]. Pranavkshari *et.al* (1978)[9] also observed that areas adjacent to rivers, ponds and open sewage canals have higher rate of contamination.

In the case of 526 water samples collected for examination from various sources, 134 samples (25.47 percent) were found to be infected for intestinal parasites. Chaurasia (1993)[10] recorded the prevalence of many

helminthic parasites in the well's water of India and attributed that ablution near the wells may be the main reason. Of the 375 cheap seasonal fruit samples from areas of the district, 63 samples (16.30 percent) were found to be contaminated with the cysts of protozoans and eggs of helminthic parasites.

Returning of human excreta directly to soil as a matter of habit and convenience, bring about contamination of food and water, which in turn infects the population of the Samastipur with intestinal protozoan and helminthic parasites.

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