

# An Epidemiological Study of Protozoan Parasites in The Human Population of Saharsa Municipality, North Bihar

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**Abstract:** - Amoebiasis, caused by *Entamoeba histolytica*, has a worldwide distribution and is of public health significance in many developing countries. It has a fecal–oral transmission cycle and is most prevalent in developing countries in regions where substandard sanitary conditions exist due to poverty. Saharsa town is the headquarter of Koshi Division of Bihar lying in Koshi belt witnesses' higher percentage of incidence of intestinal parasites. The town has no drinking water supply and people mostly use drinking water from low-deep hand pump. The perennial water logging in mohallas, insanitary disposal of human excreta and use of drinking water from low-deep hand pumps prevailing in the town favours the infestation of intestinal parasites.

**Key Words:** — *Incidence, Intestinal parasites, Perennial water, Low-deep hand pumps.*

## I. INTRODUCTION

Protozoan Parasitic infestation to man is a major public health problem with not only medical but also social and economic involvement. The state of Bihar, due to its peculiar topographical features and climatic conditions, is very much favorable for the growth and spread of these parasites.

Lack of safe drinking water, proper sanitation, housing aspects and insanitary conditions due to improper disposal of human and domestic waste, lead to a plethora of parasitic infestations.

Although, there are sporadic reports regarding the incidence of these parasites, a systematic and organized investigation on the “Epidemiological Surveillance” of the human intestinal parasites do not appear to have ever been undertaken in the state of Bihar.

The present investigation records result and observations on 5105 human population between the age group infant to 84 years old of Saharsa Municipality based on the study of their stool samples.

The thesis firstly deals with general incidence of intestinal parasites as well as sex – wise, age – wise, religion – wise, food and feeding habit – wise, economic group – wise, ward – wise and season – wise incidence including observation on prevalence of total and specific parasites.

Secondly attempt has been made to find out the various possible sources responsible for the infection of amoebiasis in the human population.

The data so obtained would be subjected to various Statistical analysis and meaningful inferences drawn. It could thus perhaps, be possible to project this part of Bihar i.e. Saharsa in particular, and the state of Bihar in general on the parasitological map of the country, besides furnishing adequate information to the Health Directorate of the state for devising suitable measures for tacking this health hazard of Saharsa Municipality (Koshi Division).

## II. MATERIAL AND METHODS

Single faecal sample of 5105 human population (2840 males 55.65% and 2265 females 44.37%) of Saharsa Municipality were collected on random sampling basis and examined under the clinical microscope usually by direct smear method stained with Lugol's Iodine and formal ether Concentration method (Allen and ridley- 1972; Ridley and Hawgod – 1956) in which 1903 stool samples were infection free (NDA 37.27%) and 3202 (62.73%) were positive for intestinal Parasites. The data obtained were subjected to statistical analyses based on Normal Distribution.

Samples were collected from each word, from both sexes (i.e. males and females) of various age groups, different communities, different economic groups, different food-habits etc. and they will be subjected to statistical Analyses based on Normal distribution and the “Normal Variants’ will be worked out and meaningful inference will be drawn. The study also showed that the prevalence rate of parasites varied in different words according to environment, social and personal hygienic conditions.

### III. RESULTS AND FINDING

Intestinal parasites infection especially with protozoan (*Entamoeba histolytica* & *Entamoeba coli*) is the major health problems due to its peculiar topography, different climatic and poor socio-economic condition and thus this part of Bihar (Saharsa) be projected on parasitological map of the country as well as furnishing the adequate information to the health Directorate of the state devising suitable measures for tackling health hazard of Saharsa Municipality.

62.73% of the studied population was found to be infected with one or more than one species of protozoan and other parasites like Helminth. The protozoan parasites were prevalent in 14.22% of the samples.

#### A. Prevalence of Specific Intestinal Protozoan Parasites in The Studied Population:

Species-wise prevalence of protozoan parasites was *Entamoeba histolytica* (6.86%) and *Entamoeba coli* (3.86%).

#### B. Sex Wise Prevalence of Total and Specific Intestinal Protozoan Parasites:

The prevalence rate of total Protozoan parasitic infections was slightly higher in female (21.16%) than in the male (20.94%) and statistically it was in significant sex difference ( $X^2_{1df} = 0.1347$ ). Female showed significantly higher rate of prevalence with *Entamoeba coli*. The prevalence of *Entamoeba histolytica* does not reveal any significant effect of sex, as reported Singh D.S. (1978).

#### C. Effect of Sex:

Thus, with respect to sex, in case of the prevalence rate of infestations with *Entamoeba coli* the female showed highly significant sex difference over those of the male ones ( $X^2_{1df} = 11.52$ ;  $P < 0.01$ ). But sex failed to contribute significantly towards the incidence of *Entamoeba histolytica* infestations among the studied male and female populations ( $X^2_{1df} = 0.612$ ).

### IV. AGE WISE PREVALENCE OF TOTAL AND SPECIFIC INTESTINAL PROTOZOAN PARASITES

The prevalence of Protozoan parasites showed highly significant in age. *Entamoeba histolytica* was least prevalence in the children and gradually increased to be the highest in the age group 40 – 59. The prevalence of *Entamoeba coli* was the lowest in the children but increased sharply to be the highest in the age group 15 -24 and thereafter, it decreased gradually.

#### A. Effect of age:

An analysis of the data obtained on the prevalence of the total protozoan parasites, children recorded the highest i.e. 23.67%

infections. With advancement in age a significant decrease was obtained reaching to the lowest, i.e. 17.63% among the older people aged 60 years & above. A highly significant effect of different age group was found ( $X^2_{4df} = 42.838$ ,  $P < 0.01$ ).

The prevalence rate of infection with *Entamoeba histolytica* was found to be the lowest among the children group (5.12%) and with advancing age, parasites recorded to increase gradually among the persons up to 60 years of age, with the highest i.e. 8.20% in the age group V (40 yrs. – 59 yrs.). This was followed by another decrease in the older people beyond 60 years. Statistically, highly significant age group difference on the incidence of this parasites was noticed  $X^2_{4df} = 31.074$ ,  $P < 0.01$ .

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### V. RELIGION WISE PREVALENCE OF TOTAL AND SPECIFIC INTESTINAL PROTOZOAN PARASITES

The total studied population comprised of five religious groups, viz., Hindus, Muslims, Christians, Jains and Sikhs. Hindus, being the most predominant group (83.46%), Muslims a minority community constitute only 13.48%, the Christians also a minority community constitute 1.17%, the Jains 0.04% the Sikhs most of whom migrated to Saharsa constitute 0.11% of the total population of Saharsa Municipality. The prevalence of *Entamoeba histolytica* and *Entamoeba coli* was significantly higher in Sikhs as reported Sinha, L. K. (1980) and Verma, K. K. (1985).

#### A. Effect of Religion:

- The total Protozoan parasitic infections, the highest, that is, 27.18% was observed in the Sikh population and the lowest, that is, 16.63% among the Christian community. Next to Sikh ranked Hindu (21.42%), Jains (19.14%) and Muslims (18.85%) in order of magnitude of infections. Religious group differences in this case was found to influence the incidence of Protozoan infection highly significantly ( $X^2_{4df} = 30.218$ ,  $P < 0.01$ ).

- As regards species wise prevalence of specific parasites, *Entamoeba histolytica* infection was found to be the highest in the Sikh (9.15%). Next to it in order of magnitude of infection, ranked Muslims (7.01%); Hindus (6.99%); Jains (5.72%) with the Christian community showing the least (4.15%) prevalence.
- *Entamoeba coli* infection was the most prevalent in the Sikhs (4.36%) and the least (3.17%) was recorded in the Muslims community. Next to Sikhs ranked Jains (4.24%), Hindus (3.89%) and Christians (3.29%). Highly significant difference among different religious group was noted ( $X^2_{4df} = 575.1596$ ,  $P < 0.01$ ).

#### VI. FOOD - HABIT WISE PREVALENCE OF TOTAL AND SPECIFIC INTESTINAL

With respect to food habits, the prevalence rate with total and specific Protozoan infections in the vegetarian and non-vegetarian groups has been studied. Through the prevalence rate of *Entamoeba histolytica* was higher in the non-vegetarians. It is similar to Prasad, R (1983) and Singh, D. N. (1991).

##### A. Effect of Food:

Among the specific parasites, through *Entamoeba histolytica* infestations was slightly higher in non-vegetarian individuals (6.97%) than the vegetarian individuals (6.35%) but statistically, effect of food was observed to be non-significant ( $X^2_{1df} = 1.725$ ). In contrast to this, the prevalence rate of *Entamoeba coli* was found to be more prevalent in the vegetarian group (4.08%) than in the non-vegetarian group (3.81%) but they all showed non-significant effect of diet ( $X^2_{1df} = 0.547$ ).

#### VII. ECONOMIC GROUP WISE PREVALENCE OF TOTAL & SPECIFIC PROTOZOAN PARASITES

The present finding showed that economic status is also an important factor governing the prevalence of parasitic infection. The prevalence of *E. histolytica* and *E. coli* was highly significantly more in the low income group.

#### VIII. WARD WISE PREVALENCE OF TOTAL AND SPECIFIC INTESTINAL PROTOZOAN PARASITES

The data obtained regarding incidence of intestinal protozoan parasites in human population, distributed in 41 Municipal wards of Saharsa municipality. The environmental, social and personal conditions prevailing in different ward had highly significantly influenced the prevalence rate of *Entamoeba histolytica* and *Entamoeba coli* infestations as reported by Sinha, L. K. (1980) and Verma, K.K.(1985).

#### IX. SEASON-WISE PREVALENCE OF TOTAL AND SPECIFIC INTESTINAL PROTOZOAN PARASITES

In India, twelve months in one year have been classified into four seasons by the meteorological observatory, Pune (India). They are: -

- Hot weather season- March to May
  - South- West Monsoon Season- June to September
  - Post Monsoon Season- October and November and Winter Season - December to February
- The prevalence rate of *Entamoeba histolytica* and *Entamoeba coli* showed highly significant effect of seasons. Among them only *Entamoeba histolytica* maintained consistency in their prevalence during the study period, being more in the show consistency in their prevalence.

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