

# Prevalence of Intestinal Parasitic Infections in Ranchi District, Jharkhand

Uppal Rashmi Kunkal<sup>1</sup>, Ashok Kumar Sharma<sup>2</sup>, Manoj Kumar<sup>3</sup>, A.K.Agrawal<sup>3</sup>, Pinki Kumari<sup>1</sup>, Ankur Kumar<sup>1</sup>

## ABSTRACT

**Introduction:** Intestinal parasitic infestations have a very high prevalence in tropical and subtropical countries. Intestinal parasitic infections are prevalent worldwide and in developing countries may even be more important than bacterial infections. Various organisms have been identified as causing diarrhoeal diseases. Objective was to know the prevalence of Intestinal Parasitic Infections in patients in Ranchi District.

**Material and methods:** Fresh Stool specimens from 260 patients were collected from September 2014 to September 2015 in RIMS, Ranchi. Both macroscopic and microscopic examinations were done. The Microscopic Examination was done by Normal saline preparation and Lugol's Iodine preparation directly from the stool as well as by different concentration methods – (a) Simple salt floatation (b) Zinc sulphate centrifugal floatation (c) Formol-ether sedimentation.

**Results:** The overall prevalence was found to be 40.38% (15.76% by Routine Method and 29.22% by Concentration Method). The overall prevalence was found to be maximum for Taenia, 21.15%. The prevalence of female was higher than male which was found to be 17.07% in female and 15.16% in male by Routine method and 30.00% in female and 28.85% in male by Concentration Method. The highest prevalence was in age group 6-10 yrs, (66.03%) followed by age group 26-30 yrs, (40.54%) and age group 31-35years (38.23%).

**Conclusion:** Multiple approaches including health education, improving the existing sanitary practices and regular preventive chemotherapy are needed to control the burden of Intestinal Parasitic Infections.

**Keywords:** Intestinal Parasitic Infections, Concentration Method, Taenia.

## INTRODUCTION

Intestinal parasitic infestations are prevalent worldwide. Globally as many as 500 million people may harbour *E.histolytica* and several tens of thousands die each year as a consequence of fulminating colitis or amoebic liver abscess<sup>1</sup>. According to the World Health Organization (WHO) estimates, over 1 billion people are infected with roundworm, 740 million with hookworm and 795 million with whipworm (WHO 2012c). Around 200 million people are infected with *Giardia lamblia* and *Entamoeba histolytica* infects about 10% of the global population<sup>2</sup>. *Giardia lamblia* is the commonest intestinal parasite infecting 10-35% of the population. The prevalence of *Entamoeba histolytica* varies from 1-55%. The parasite can cause severe diseases like amoebic dysentery and amoebic liver abscess<sup>3</sup>.

Many of the viral and bacterial infections of GIT have been efficiently controlled by anti-microbial drugs and vaccines

but no concrete achievement has been made in the field of immunisation against intestinal parasitic infections<sup>4</sup>. Furthermore, because of the maverick ways used by parasites to reach their destination, it is difficult to offer prophylactic therapy against them. Hence, even today intestinal parasitic infections are on the top of the list of all intestinal disorders.<sup>5</sup> Study objective was to know the prevalence of Intestinal Parasitic Infections in patients in Ranchi District.

## MATERIAL AND METHODS

This study has been approved by Institutional Ethics Committee, Rajendra Institute of Medical Sciences, Ranchi. Stool specimens from 260 patients were collected and examined in the Laboratory of Department of Microbiology RIMS, Ranchi from September 2014 to September 2015. Specimens were collected in a clean, dry, wide-mouthed container.

**Inclusion criteria** - Patient's data such as age, sex, address, occupation, income, religion, education etc was recorded at the time of collection of the specimen. Information regarding sanitary facilities, Past history of gastrointestinal illness, dietary habits, use of footwear etc. was also noted.

**Exclusion Criteria** - Stools were collected without contamination with patient's Urine. It was confirmed that the patient had no history of ingestion of Kaolin, Magnesia, Powdered aluminum, barium, bismuth salts, iron, oil or oily emulsion and antibiotics.

**Each stools specimen was examined by the following techniques:**

1. Macroscopic examination.
2. Direct Microscopic examination by:
  - a) Saline preparation
  - b) Iodine preparation.
3. Microscopic Examination after various concentration techniques like:
  - a) Simple salt floatation.
  - b) Zinc sulphate centrifugal floatation.
  - c) Formol-ether concentration.

<sup>1</sup>Junior Resident Academic, <sup>2</sup>Assistant Professor, <sup>3</sup>Associate Professor, Department of Microbiology, RIMS, Ranchi, India

**Corresponding author:** Dr. Manoj Kumar, Associate Professor, Department of Microbiology, RIMS, Ranchi, Bariatu-834009, India

**How to cite this article:** Uppal Rashmi Kunkal, Ashok Kumar Sharma, Manoj Kumar, A.K. Agrawal, Pinki Kumari, Ankur Kumar. Prevalence of intestinal parasitic infections in Ranchi District, Jharkhand. International Journal of Contemporary Medical Research 2017;4(11):2321-2323.

The Microscopic Examination was done by Normal saline preparation and Lugol's Iodine preparation directly from the. The negative samples were examined again by the concentration methods.

### 1) Macroscopic Examination

The consistency, colour, and nature of the faeces was recorded. Stools were checked for the presence of bloody-mucous discharge. Search was made for the presence of worms like Ascaris, Enterobius, Hookworm and Proglottids of Taenia, either with the naked eye or with the aid of hand lens.

### 2) Direct Microscopic Examination

#### a) Saline preparation:

This was made by emulsifying 1 to 2 mg of the stool material in a drop of normal saline(0.9%).

#### b) Iodine preparation:

This was made by emulsifying 1-2mg of the stool material in one to two drops of Iodine solution.

### 3) Concentration Techniques

The following concentration techniques were done:

#### a) Simple Saturated Salt floatation technique:

About 1ml of faeces was taken in a 20ml. capacity container. A few drops of Saturated salt solution (Specific gravity of 1.200) was added to it and stirred with the help of a stick to make an even emulsion. After this, more salt solution was added till the container was nearly full, stirring being continued throughout the process. Then the flask was placed on a level surface. The final filling was done with a dropper until a convex meniscus was formed. A glass slide was carefully placed over the top of the container. The preparation was allowed to stand for 30 minutes after which the glass slide was quickly lifted and turned over gently so as to avoid spilling of the liquid. A coverslip was placed over it and examined under the microscope.

#### b) Zinc-sulphate centrifugal floatation:

A fine faecal suspension was made by taking 1g of stool and adding 10 ml of lukewarm distilled water. The coarse particles were removed by straining through a wire gauge. The filtrate was collected into a centrifuge tube and centrifuged for 1minute at the rate of 2,500 revolutions per

minute. The supernatant fluid was discarded and distilled water was added. It was shaken well, centrifuged and the process was repeated 2-3 times till the supernatant was clear. Then the last supernatant was poured off and 3-4ml of 33% Zinc sulphate solution of specific gravity 1.80 was added. The sediment was stirred and the tube was further filled with Zinc sulphate solution upto the top. Then it was centrifuged again for at least 1 minute at 2,500 r.p.m. The surface film was then removed by a platinum wire loop onto a clean glass slide, a coverslip was put on and the specimen was examined.

#### c). Formol – Ether Concentration Technique

One gram of faeces was emulsified in 7ml of 10% formalin and Kept for 10minutes for fixation. It was then strained through a wire gauge and the filtrate collected in a centrifuge tube. 3ml of ethyl acetate was added to it and the mixture was shaken vigorously for one minute. It was centrifuged at 2,000 r.p.m for 2 minutes and then allowed to settle. The debris was loosened with a stick, the upper part of the test tube was cleared of fatty debris and the supernatant fluid was decanted, leaving 1 or 2 drops of the deposit. The deposit was shaken and poured onto a glass slide. A coverslip was placed over it and the specimen was examined.

## RESULT

The prevalence was found to be 15.76% by Routine Method and 29.22% by Concentration Method. The overall prevalence was found to be 40.38% by both the methods (table-1).

The Table shows the overall prevalence by both Routine Examination and Concentration Method. The highest prevalence was found to be for Taenia 21.15% (55) followed by E.histolytica 10.7% (28). The lowest prevalence was found to be for A.lumbricoides 1.53% (4) (table-2).

The overall prevalence of female was higher than male in both the methods. By Routine method, it was found to be 17.07% in female and 15.16% in male. By Concentration Method, it was found to be 30.00% in female and 28.85% in male (table-3).

Out of total 260 samples examined, the overall highest prevalence was found in the age group 6-10yrs i.e.66.03% followed by age group 26-30yrs (40.54%) (table-4).

| Stool Samples received in RIMS | Method        | Total Number of samples | Total number of positive samples | Percentage |
|--------------------------------|---------------|-------------------------|----------------------------------|------------|
|                                | Routine       | 260                     | 41                               | 15.76%     |
|                                | Concentration | 219                     | 64                               | 29.22%     |

**Table-1:** Showing overall Prevalence of Intestinal Parasitic Infections by Routine Examination and Concentration Method

| Method        | protozoa       |                 | Helminthes   |            |                 |             |
|---------------|----------------|-----------------|--------------|------------|-----------------|-------------|
|               | E. histolytica | G. intestinalis | Taenia       | H. nana    | A. lumbricoides | Hookworm    |
| Routine       | 5<br>1.92%     | 2<br>0.76%      | 33<br>12.69% | 2<br>0.76% | 1<br>0.38%      | 5<br>1.92%  |
| Concentration | 23<br>10.50%   | 13<br>5.93%     | 22<br>10.04% | 5<br>2.28% | 3<br>1.36%      | 14<br>6.39% |
| Total         | 28<br>10.76%   | 15<br>5.76%     | 55<br>21.15% | 7<br>2.69% | 4<br>1.53%      | 19<br>7.30% |

**Table-2:** Showing overall Prevalence of Intestinal Parasitic Infections by Routine Examination and Concentration Method

| Method        | Percentage of positive cases in male | Percentage of positive cases in female |
|---------------|--------------------------------------|--|
| Routine       | 15.16%                               | 17.07%                                 |
| Concentration | 28.85%                               | 30.00%                                 |

**Table-3:** Showing overall Prevalence of Intestinal Parasitic Infections with respect to sex by Routine Examination and Concentration Method

| Age gp. in years | Total no. of examined cases | Total no. of positive cases | Percentage |
|------------------|-----------------------------|-----------------------------|------------|
| 0-5yrs           | 2                           | -                           | -          |
| 6-10yrs          | 53                          | 35                          | 66.03%     |
| 11-15yrs         | 35                          | 12                          | 34.28%     |
| 16-20yrs         | 3                           | -                           | -          |
| 21-25yrs         | 19                          | 5                           | 26.31%     |
| 26-30yrs         | 37                          | 15                          | 40.54%     |
| 31-35yrs         | 34                          | 13                          | 38.23%     |
| 36-40yrs         | 54                          | 17                          | 31.48%     |
| 41-45yrs         | 15                          | 5                           | 33.33%     |
| 46-50yrs         | 8                           | 3                           | 37.50%     |

**Table-4:** Showing overall Prevalence of Intestinal Parasites Infection in different age group by both Routine and Concentration Method

## DISCUSSION

The overall prevalence was found to be 40.38% by both the methods. In a study done in a tribal area of Southern India by Kaliappan et al<sup>6</sup>, the overall prevalence was found to be 39%. The overall prevalence was found to be maximum for Taenia, 21.15%. Other studies conducted by Saxena et al<sup>7</sup> (1982) and Rao et al<sup>8</sup> (1971), Taenia showed the lowest prevalence which is contrary to this result. This may be due to the difference in eating habits e.g. ingestion of uncooked and contaminated food especially beef and pork or sometimes due to difference in time, place and methods of examination used. The overall prevalence of female was higher than male in both the methods. By Routine method, it was found to be 17.07% in female and 15.16% in male. By Concentration Method, it was found to be 30.00% in female and 28.85% in male. This may be due to the fact that females are more engaged in outdoor works and some also working in the agriculture farms in the rural area. The study done by Marothi et al, Patel et al and Sengupt and Bhattacharya<sup>9</sup> (1985), reported similar rates in both the sexes whereas Brar and Singh (1980)<sup>10</sup>, found a higher prevalence rate for males 39.2%. than for females 29.81%. Among different age groups, the highest prevalence was found in age group 6-10 yrs, (66.03%). Brar and Singh (1980) reported 51.28% prevalence in this age group (6-10 yrs) and Chowdhury and Schiller<sup>11</sup> (1968) also reported highest prevalence in this age group. This can be explained by the fact that children of this age group are school-attending, hence more exposed to outdoor life.

## CONCLUSION

As Jharkhand is still a developing state in India, this high prevalence rate of intestinal parasite may be because of

poverty, low literacy rate, malnutrition and unhygienic conditions. So, all the developmental schemes as well as health schemes implemented by the government should be thoroughly monitored. There is a need of educational health programme and periodic de-worming in primary schools. The concentration methods should be performed routinely for the examination of parasites in stool in all the health centres.

## REFERENCES

1. WHO 1990, Model prescribing information, Geneva. "Drugs used in parasitic diseases", PP:
2. Sethi, R. Sehgal, N. Malla, M.L. Dubey and R.C. Mahajan. Changing trends of intestinal parasitic infections in Chandigarh (Northern India): Hospital Based Study. *Ind. J. Medi. Microbiol.* 2000;18:106-109.
3. Kartar Singh, R. Sehgal, Verendra Singh, N.K. Ganguly, B.C. Mahajan. Prevalence of Amoebiasis and Giardiasis in community and response to treatment" *Ind. J. Med Microbiol.* 1994; 12: 50-53.
4. Paniker Jayaram C.K. Textbook of medical parasitology. 1991; Pages Preface 1-8, 122-123, 207-220.
5. Sengupta J. and Bhattacharya K. Distribution of parasitic infestation among hospital patients in Bankura 1962-1969. *In. J. Pub. Health* 1975;2: 69.
6. S. P. Kaliappan, Santosh George, Mark Rohit Francis et al, Prevalence and clustering of soil-transmitted helminth infections in a tribal area in southern India, *Tropical Medicine and International Health* 2013;18:1452-1462.
7. Saxena S.N. Intestinal parasites prevalent in Kasauli (Himachal Pradesh) areas. *Ind. J. Pub. Health.* 1982;2: 100.
8. Rao C.K., Krishnawami A.K., Gupta S.R., Biswas H. and Raghavan H.G.S. Prevalence of amoebiasis and other intestinal parasitic infections in a selected community. *In. J. Med. Res.* 1971; 59: 1395.
9. Sengupta J. and Bhattacharya K. Distribution of parasitic infestation among hospital patients in Bankura 1962-1969. *In. J. Pub. Health* 1975;2: 69.
10. Brar R.K. and Singh S. Prevalence of intestinal helminthic infections. *Ind. J. Pub. Health* 1980;14: 157.
11. Chowdhury A.B. and Schiller E. A survey of parasitic infection in a rural community near Calcutta. *Amer. J. Epidem.* 1968; 87: 229.

**Source of Support:** Nil; **Conflict of Interest:** None

**Submitted:** 03-11-2017; **Accepted:** 05-12-2017; **Published:** 16-12-2017