

Original research article

## Prevalence of Intestinal Parasites in a Tertiary Care Hospital in Rural Areas of Dahod.

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### Abstract

**Background:** Intestinal parasitic infections are considered to be major public health problem of developing countries. Poor socio- economical condition, improper hygiene leads to the high prevalence of these diseases accounting for high morbidity and mortality.

**Aim and Objectives:** The present study was aimed to identify and investigate the epidemiology of intestinal parasite infections in tertiary care hospital, Dahod, Gujarat.

**Material and Methods:** A total of 664 stool samples were collected and tested between year 2018 to 2020. Stool samples were collected in wide mouth container and it was placed for routine microscopic examination by wet mount technique.

**Results:** A total of 60 samples were found positive for the various parasites by stool microscopic examination contributing a positive rate of 9.03%. Male were more susceptible for infection (66.66%) in comparison with female (33.33%). Majority of cases were seen in age group of 21-30 years (26.66%). The most common parasite found was *A. duodenale* (60%) followed by *Giardia lamblia* (16.6%), *E.histolytica* (8.3%), *H.nana* (6.6%), *E.vermicularis* (5%) and *S.stercoralis* (3.3%).

**Conclusion:** Necessary interventions like sanitation, limitation of open air defecations, health and hygiene education and strict implications of parasitic elimination control programs should be undertaken among the rural population to prevent and control intestinal parasitic infections.

**Key words:** Intestinal Parasites, Stool microscopy, Wet mount.

## Introduction

Intestinal parasitic infection is quite common in and around the world, especially more common in developing countries including India. It has become a serious public health problem and accounts for high morbidity and mortality. <sup>[1]</sup>

As per the WHO report 2004, 150.9 million people in the world are affected with intestinal nematodes infection alone in developing countries, among them south East Asia have reported 37.3 million cases. <sup>[2]</sup>

Helminthic infection during pregnancy leads to low birth weight, protein calories malnutrition. <sup>[3,4]</sup> The most common parasite causing infections globally are *Ascaris lumbricoides* (Roundworm), *Ancylostoma duodenale* (Hookworm), *Trichuris trichiura* (Whipworm) and *Entamoeba histolytica*, showing prevalence of 20%, 18%, 10% and 10% respectively. <sup>[3,4]</sup>

Because of poor sanitary condition, India and other developing country has reported prevalence of parasitic infection ranging from 16.5% to 66%. <sup>[1,4]</sup>

Geographical distribution like hot and humid climate, illiteracy, low income and unavailability of safe drinking water contributes the higher prevalence of intestinal parasitic diseases. <sup>[5,6]</sup>

Children's are at more risk to acquire these infections as they play outdoors in soil, which are often contaminated with the parasites, as a result of open air defecation and improper hygiene. <sup>[7]</sup>

Hence, the present study was conducted to assess the prevalence of intestinal parasitic infections in Dahod, a known tribal area of Gujarat.

## Material and Methods:

This was a retrospective study carried out in the Department of Microbiology, Zydus Medical College & Hospital, Dahod, for a period of three years. (January 2018 to December 2020).

Stool samples were collected in a wide mouthed clean, dry, properly labeled plastic container without preservatives from 664 patients attending IPD & OPD department of Zydus Medical College & Hospital, Dahod, with symptoms suggestive of parasitic infections. Suspected patients with proven parasitic infections involving the gastrointestinal tract were included in this study. Subject unable to comply with requirements of the protocol were excluded. This study was approved by Institutional Ethical Committee, ZMCH, and Dahod.

Stool samples were transported to laboratory within one hours of collection and were processed immediately.

**Macroscopic examination:** Macroscopic examination was done to look for color, consistency, presence of mucus and blood, and presence of parasitic structures such as proglottids, scolices, adult tapeworm, Enterobius, Ascaris, or hookworm.

**Microscopic examination:** For microscopic examination, saline wet mount and Lugol's iodine wet mount was prepared. Saline wet mount was done to detect protozoal trophozoites and Helminthic eggs or larvae and iodine wet mount was done to detect cysts and eggs.

### Formal-Ether Concentration:

One gram of Stool sample was mixed in a 7ml conical tube containing 10% formalin. It was emulsified properly and kept at room temperature for 10 minutes. It was then filtered through gauge piece; filtrate was then collected with 15ml conical centrifuge tube. After addition of 3ml ether to the mixture, it was mixed vigorously. The solution was then centrifuged at 2000 rotation per minute for 2 minutes.

With the help of wooden stick, debris and other fatty material were kept aside and supernatant fluid was decanted. Final sediment was used to prepare wet mount for stool microscopy examination using saline and iodine mount. <sup>[8]</sup>

**Results:**

A total of 60 samples were found positive for stool microscopic examination contributing a positive rate of 9.03% in our set up.

**Table 1: Distribution of Morphological forms of parasites in Stool Microscopic Examination.**

Parasite(Trophozoite/cyst/ Egg/worm/larvae)	Stool microscopic examination- n (%)
Egg of <i>Ancylostoma duodenale</i>	36 (60.00%)
Trophozoite of <i>Giardia lamblia</i>	10 (16.66%)
Egg of <i>Entamoeba histolytica</i>	05 (8.33%)
Egg of <i>Hymenolepis nana</i>	04 (6.66%)
Egg of <i>Enterobius vermicularis</i>	03 (5.00%)
Larvae of <i>Strongyloides stercoralis</i>	02 (3.33%)
<b>Total</b>	60

n- No. of parasites.

Table 1 depicts distribution of various parasites found in stool microscopic examination. 60 % of the positive stool samples were Egg of *Ancylostoma duodenale* (Figure-1) followed with Trophozoite of *Giardia lamblia* (16.66%;Figure-2), Egg of *Entamoeba histolytica* (8.33%;), Egg of *Hymenolepis nana*(6.66%;Figure-3), Egg of *Enterobius vermicularis* (5.00%;Figure-4) and Larvae of *Strongyloides stercoralis*(3.33%;Figure-5).

**Table 2: Age and Gender Wise Preponderance of Patients.**

Age and gender	0-10 YRS	11-20 YRS	21-30 YRS	31-40 YRS	41-50 YRS	51-60 YRS	61 yrs and above	Total
<b>Male</b>	03 (7.50%)	02 (5%)	11 (27.50%)	05 (12.50%)	06 (15%)	08 (20%)	05 (12.50%)	40 (66.66%)
<b>Female</b>	01 (5%)	02 (10%)	05 (25%)	02 (10%)	07 (35%)	02 (10%)	01 (5%)	20 (33.33%)
<b>Total</b>	04 (6.66%)	04 (6.66%)	16 (26.66%)	07 (11.66%)	13 (21.66%)	10 (16.66%)	06 (10%)	60

n- No. of parasites.

Table 2 reveals age and gender wise preponderance of the various intestinal parasites. Male were more susceptible for parasitic infection (66.66%) in comparison with female (33.33%). More number of cases were seen in age group of 21-30 years( 26.66%) and least in age group 0-20 years of age (6.66%).

**Table 3: Relationship Between Age Group and Parasite Isolates.**

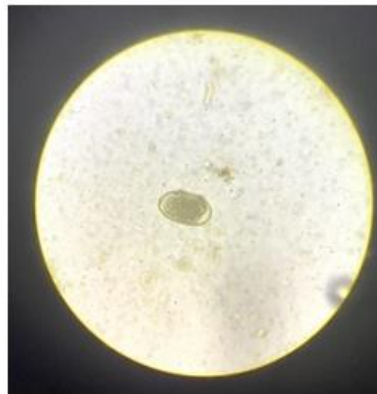
Name of parasite	0-10 yrs	11-20 yrs n	21-30 yrs	31-40 yrs	41-50 yrs	51-60 yrs	60 yrs and above	Total
<i>Ancylostoma duodenale</i>	Not seen	4 (11.11%)	8 (22.22%)	3 (8.33%)	8 (22.22%)	7 (19.44%)	6 (16.66%)	36
<i>Entamoeba histolytica</i>	Not seen	Not seen	Not seen	2 (40%)	2 (40%)	1 (20%)	Not seen	5
<i>Giardia lamblia</i>	1(10%)	Not seen	4 (40%)	2 (20%)	2 (20%)	1 (10%)	Not seen	10
<i>Strongyloides</i>	Not seen	Not seen	Not seen	Not seen	1 (50%)	1 (50%)	Not seen	2

<i>Hymenolepis nana</i>	2 (50%)	Not seen	2 (50%)	Not seen	Not seen	Not seen	Not seen	4
<i>Enterobius vermicularis</i>	1 (33.33%)	Not seen	2 (66.66%)	Not seen	Not seen	Not seen	Not seen	3
<b>Total</b>	4 (6.66%)	4 (6.66%)	16 (26.66%)	7 (11.66%)	13 (21.66%)	10 (16.66%)	6 (10.00%)	60

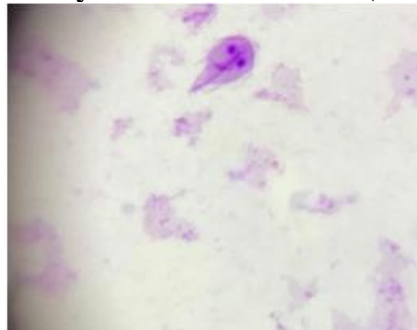
n- No. of parasites.

Table: 3 reveals relationship between Age group and Parasite isolates.

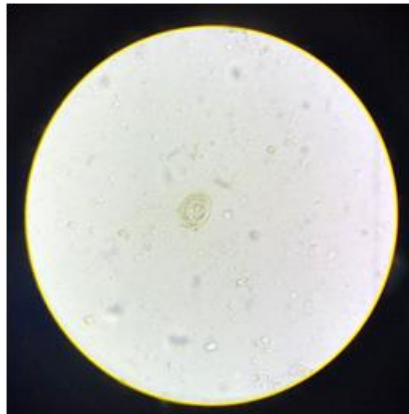
It was observed that *Ancylostoma duodenale* was more common in age group of 21-30 years (22.22%) and 41-50 years (22.22%), *Entamoeba histolytica* in age group of 31-40 years (40%) and 41-50 years (40%), *Giardia lamblia* in age group of 21-30 years (40%), *Strongyloides stercoralis* in age group of 41-50 years (50%) and 51-60 years (50%), *Hymenolepis nana* in age group of 0-10 years (50%) and 21-30 years (50%), *Enterobius vermicularis* in age group of 21-30 years (66.66%).



**Figure 1: Egg of *Ancylostoma duodenale*. (40x Iodine mount.)**



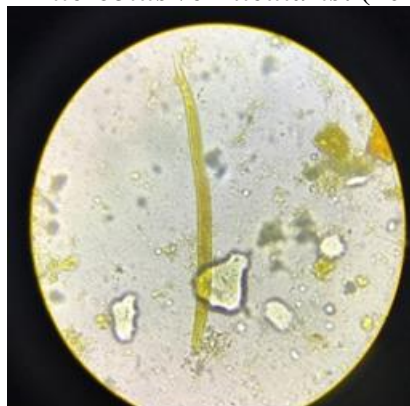
**Figure 2: Trophozoite of *Giardia lamblia*. 100x Oil immersion (Giemsa stain.)**



**Figure 3: Egg of *Hymenolepis nana*. (40x Saline mount.)**



**Figure 4: Egg of *Enterobius vermicularis*. (40x Saline mount.)**



**Figure 5: Filariform Larvae of *Strongyloides stercoralis*. (40x Iodine mount.)**

#### **Discussion:**

Demonstration of trophozoite, cyst, egg, larvae or worm in stool microscopy examination remains the standard method for the identification of various parasitic diseases. [9] Approximately fifty percent of the world population lives under the high risk of parasitic infection as a result of nutritional deficiency, improper hygiene and poor socio-economical condition. [10]

Present study incorporate, a total of 664 stool samples for parasitic infection including intestinal protozoa and helminths in area of Dahod district, Gujarat. Out of them 60 samples were found positive with the positivity rate of 9.03%.

Other studies from Surat and Srinagar India have shown a prevalence rate of intestinal parasitic infection ranging from 5.56% to 46.7%. [11,12]

Singh R et.al had found 6.68% prevalence rate of intestinal infection in Rohtak Haryana [13] which is in concordance with present study. The probable reason behind the prevalence rate less than 10% indicate improved sanitary practices, personal hygiene, social awareness and health education in the respective geographical area.

The present study reveals higher prevalence rate in Male population (66.66%) than female (33.33%). Similar findings of high male preponderance were reported in earlier studies. [6,14,15] However in some of the studies have also reported high prevalence rate in female population. [11,13,16] Gender based difference in intestinal parasitic infection doesn't have any significant correlation as both male and female live and working in a similar environment.

Prevalence of intestinal parasites were found more in age group of 21-30 years( 26.66%) and least in age group 0-10 years of age (6.66%), other study have reported overall prevalence of 34.17% and 13.38% in the respective age groups. [17]

High prevalence in adult age group could be due to more outdoor activities.

Ancylostoma duodenale was the most common isolate 36(60%), followed by Giardia lamblia 10(16.6 %) was reported in the present study, while other studies showed either Entamoeba histolytica or Giardia lamblia as the commonest isolates. [11,12,13,14,18]

Highest prevalence of Ancylostoma duodenale infection may be due to habit of walking barefoot in the fields as the infection spread via penetration of the skin. However few other studies have showed mixed parasitic infection [20], none of the stool sample was found for mixed parasitic infection in the present study.

### Conclusion:

The present study reveals overall prevalence of intestinal parasitic infection to less than 10% in Dahod district. Even though Dahod is a notified tribal area, people residing of this place are relatively educated in terms of hygiene, which clearly reflect low prevalence. The present study certainly cannot deny from the fact that intestinal parasitic infections are a major public health problem. It can be controlled only by sanitation, limitation of open air defecations, health and hygiene education and strict implication of national and international parasitic elimination control programs.

### Limitations:

The present study was analysed based on the consideration of single stool specimen which was collected in routine indoor and outdoor facility of the tertiary care hospital. Further follow up of the patients by repeat sampling should be done to increase specificity of stool microscopy examination.

### Conflict of interest:

There is no conflict of interest.

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