# Screening for Intestinal Parasites in Elective Surgery Patients in Endemic Areas: How Relevant Is It? FREE

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## Abstract

### Background:

This study was designed to reevaluate the importance of screening for intestinal parasites in elective surgery patients so as to prevent the complications associated with intestinal parasitism in this group of patients.

### Methods:

The study was carried out in Jos, North Central Nigeria, to determine the prevalence of intestinal parasitism in 130 consecutive elective surgery patients using the direct wet mount and formol ether concentration methods.

### Results:

The overall distribution of intestinal parasites was 31.5%, with the helminthes recording 30.8% while protozoans had 1.5%. Patients for lower abdominal surgery recorded 33.3%, while 24.0% was recorded for the other types of surgery. Hookworms recorded the highest distribution with 17.7% followed by *Ascaris lumbricoides* with 10.8%, *Schistosoma mansoni* and *Strongyloides stercoralis* with 2.3% each, and *Entamoeba histolytica*/dispar and *Trichuris trichiura* with 0.8 % each. The age group of 61 years and above had the highest prevalence of 45.5% followed by the

41–50 year age group with 36.4%. The 11–20 and 51–60 year age groups had the least prevalence at 23.1% each. The females recorded a higher prevalence of 37.5% against 31.0% in males. Farmers had 35.3% while civil servants had the least prevalence of 7.1%. Subjects who defecate in toilet pits had a prevalence of 35.5%, closely followed by those who defecate in bushes and cultivated farmlands with 34.0%. Subjects using the water-closet toilet system recorded only 6.7%. In relation to sources of drinking water, those using water from streams and rivers recorded the highest prevalence of 35.1%, while those using tap water recorded 27.0%.

**Conclusion:**

These results emphasize the importance of screening elective surgery patients, especially in endemic areas for intestinal parasites, so as to prevent possible complications associated with intestinal parasites during and after the surgery.

**Topic:** defecation, ancylostomatoidea, ascaris lumbricoides, parasitic intestinal diseases, nigeria, strongyloides stercoralis, surgical procedures, elective, surgical procedures, operative, schistosoma mansoni, abdominal surgery, entamoeba histolytica, trichocephalus trichiura, potable water

**Subject:** Microbiology

**Issue Section:** Science

This study was designed to reevaluate the importance of screening for intestinal parasites in elective surgery patients so as to prevent the complications of intestinal parasitism in this group of patients. Gastrointestinal parasites continue to cause

significant morbidity and mortality globally, especially in Nigeria and in other less developed tropical and subtropical countries of the world where poor hygiene, ignorance, poverty, and conducive environmental conditions abound.[1,2]

The spectrum of intestinal protozoal infections can range from asymptomatic to invasive disease.[3] The prevalence shows a correlation with the method of fecal disposal and personal hygiene and a 9.0% mortality rate and 27% morbidity rate, while liver abscess and resultant complications from amoebiasis accounted for approximately 40% of deaths.[4,5]

Warren[6] reported that Ascariasis is the most common communicable intestinal parasite, with high rates of infection in rural communities worldwide. Ascariasis is also reported to cause approximately 60,000 deaths worldwide per year, and the incidence in the United States is estimated at 4 million at any given time. General anaesthesia or sub-therapeutic doses of antihelminthics may provoke the worms to migrate. Migrating worms have also been reported to cause intestinal perforation resulting in acute peritonitis. Migration of a single adult worm may obstruct the biliary tract, leading to biliary colic, cholangitis, or gallstone formation. Intestinal obstruction in children is the most commonly attributed fatal complication, resulting in 8000–10,000 deaths per year.[7] Datubo-Brown[8] reported the presence of *Ascaris lumbricoides* in the peritoneal cavity of a 12-year-old boy in [illegible] and associated the small bowel perforation to *Ascaris lumbricoides*.



In Damascus, out of 300 adults referred for complications of ascariasis between 1988 and 1993, 98% had abdominal pain, 4.3% acute pancreatitis, 1.3% obstructive jaundice, and 25% worm emesis. More than 80% of these patients had a previous cholecystectomy.[7] The larvae of *Strongyloides stercoralis* can penetrate the bowel wall carrying coliform bacteria with them, leading to peritonitis and gram-negative septicemia.[9] Infection with *S. stercoralis* can result in hyperinfection syndrome in some

infected individuals, resulting in 50%–70% mortality.[10]

The prevalence of intestinal parasitism in the study carried out in Jos metropolis in 1000 primary school children aged 5 years to 15 years was 30.9%, with ascariasis having the highest prevalence at 10.4%.[11]

**Table 1** Prevalence of Intestinal Parasitism in Elective Surgery Patients in Jos, Nigeria (n=130)

| Parasite | Number Positive | % Infected |
|---|---|---|
| Hookworm | 23 | 17.7 |
| *Ascaris lumbricoides* | 14 | 10.8 |
| *Schistosoma mansoni* | 3 | 2.3 |
| *Strongyloides stercoralis* | 3 | 2.3 |
| *Trichuris trichiura* | 1 | 0.8 |
| *Entamoeba histolytica*/dispar | 1 | 0.8 |
| *Entamoeba coli* | 1 | 0.8 |

$\chi^2$=87.53; P<0.05

**Table 2** Prevalence of Intestinal Parasitism in Relation to the Nature of Surgery in Jos, Nigeria

| Nature of Surgery | Number Examined | Number Positive | % Infecte |
|---|---|---|---|
| Lower abdominal* | 105 | 35 | 33.3 |
| Others** | 25 | 6 | 24.0 |

$\chi^2$=25.08; P<0.05

* *Lower abdominal—herniorrhaphy, prostatectomy, abdominal surgery, appendectomy, urethroplasty, exploratory laparotomy, VVF repair.*

** *Others—eye, nose, throat, ear, appendages, skin grafting.*

**Table 3** Prevalence of Intestinal Parasitism in Relation to Age Groups of the Patients in Jos, Nigeria

| Age Group (Years) | Number Examined | Number Positive | % Infecte |
|---|---|---|---|
| 11–20 | 26 | 6 | 23.1 |
| 21–30 | 48 | 17 | 35.4 |
| 31–40 | 21 | 6 | 28.6 |
| 41–50 | 11 | 4 | 36.4 |
| 51–60 | 13 | 3 | 23.1 |
| 61+ | 11 | 5 | 45.5 |
| Total | 130 | 41 | 31.5 |

$\chi^2$*=19.15; P<0.05*

**Table 4** Prevalence of Intestinal Parasitism in Elective Surgery Patients in Relation to Gender

| Parasites | Males (n=42) | | Female |
|---|---|---|---|
| | Number Positive | % Positive | Numbe |
| Hookworm | 5 | 11.9 | 18 |
| *Ascaris lumbricoides* | 4 | 9.5 | 10 |
| *Strongyloides stercoralis* | 0 | 0 | 3 |
| *Trichuris trichiura* | 0 | 0 | 1 |
| *Schistosoma mansoni* | 2 | 4.8 | 1 |
| *Entamoeba histolytica*/dispar | 1 | 2.4 | 0 |

| | | | |
|---|---|---|---|
| *Entamoeba coli* | 1 | 2.4 | 0 |
| Total | 13 | 31 | 33 |

$\chi^2 = 19.15; P < 0.05$

On several occasions, surgeons had brought adult worms to the laboratory for identification. We therefore decided to reevaluate the importance of routine screening of elective surgery patients for intestinal parasitism, so as to prevent the complications associated with such parasites in patients during and after the surgery.

## Materials and Methods

Fecal samples were collected from 130 elective surgery patients (aged 11 years to 80 years) in Jos University Teaching Hospital and ECWA Evangel Missionary Hospital in Jos between September 2009 and November 2009. Relevant information on age, gender, information on patient's assessment of the home sewage disposal facilities, and sources of drinking water supplies were collected using a pre-tested structured questionnaire.

The patients were categorized into groups consisting of those who had lower abdominal surgery (herniorrhaphy, prostatectomy, abdominal surgery, appendectomy, urethroplasty, exploratory laparotomy, and vesicle vaginal fistula repair) and others (surgeries on the eye, nose, throat, appendages, and skin grafting).

The fecal samples were examined using direct saline and iodine preparations and the formol-ether concentration method as modified by Allen and Ridley.[12] The results were subjected to statistical analysis with a significance level at $P=0.05$.

## Results

Of the 130 patients examined, 41 (31.5%) had intestinal parasitism. Hookworm had the highest prevalence of 17.7%, closely followed by *Ascaris lumbricoides* (10.8%). Others were *Schistosoma mansoni* (2.3%), *Strongyloides stercoralis* (2.3%), *Trichuris trichiura* (0.8%), *Entamoeba coli* (0.8%), and *E. histolytica*/dispar 0.8% ($\chi^2$=87.53; $P$<0.05) (Table 1). Patients receiving lower abdominal surgery had a prevalence of 33.3% against those with other forms of surgery with 24.0% ($\chi^2$=25.08; $P$<0.05) (Table 2).

Table 3 shows the prevalence in relation to the age groups. The patients older than 61 years recorded the highest prevalence of 45.5% as against those of 51–60 and 11–20 years, who each recorded 23.1% ($\chi^2$=19.15; $P$<0.05). The prevalence in relation to the gender is shown in Table 4. The females were more significantly infected with a prevalence of 37.5%, while the males had 31.0% ($\chi^2$=19.15; $P$<0.05).

Table 5 shows the prevalence in relation to the occupation of the patients. Farmers recorded the highest prevalence of 35.3% while civil servants had the least with 7.1% ($\chi^2$=25.71; $P$<0.05). Regarding the prevalence in relation to toilet facilities (Table 6), patients using the water closet had the least prevalence of 6.7%, while those using pit toilets or defecating indiscriminately in bushes and farmlands recorded 35.5% and 34.0%, respectively ($\chi^2$=18.19; $P$<0.05). Table 7 shows the prevalence of intestinal parasitism with respect to sources of drinking water. The patients who fetch drinking water from streams had the highest prevalence of 35.1%, while those using tap water recorded 27.0%. This is not statistically significant ($\chi^2$=1.85; $P$>0.05).

## Discussion

The study has indicated a relatively high prevalence (31.5%) of intestinal parasitism, composed mainly of intestinal helminthes in screened elective surgery patients. Previously, we normally screened all the elective surgery patients for intestinal parasitism, and positive patients were adequately treated prior to surgery. Unfortunately, for no cogent reasons, this practice gradually stopped. We therefore tried to justify the need to resume the screening of elective surgery patients, especially for those receiving lower abdominal surgery. This will eventually prevent the complications associated with intestinal parasitism, either during or after surgery.

Some of the encountered helminthes in this study have severe complications, especially in surgical patients. For example, *Ascaris lumbricoides*, which usually inhabits the small intestine, may often migrate from its natural habitat. This migration is often due to unrelated fever or to drugs taken by the host that irritate but do not have a lethal effect on the worm. Complications that may arise from such wanderings range in severity from simple regurgitation and vomiting of the worm to more severe invasion of the bile ducts, the liver, and abdominal cavity by active perforation of the intestinal wall. This may subsequently result in fatal peritonitis. The parasite can also obstruct the appendix, especially in severe infections.[7–9]

The age-related prevalence that showed that all the age groups were infected is attributed to poor hygienic practices, common to all age groups in poor rural populations. The indiscriminate defecating in cultivated farmlands with low growth vegetables and fruits contributes significantly to the high prevalence of intestinal parasitism in the endemic areas. The habit of

cultivating on infected farmlands without rubber boots and even using the heels of their feet to plant seeds is also a contributory factor. It must also be noted that ignorant food vendors contribute to the high prevalence of intestinal parasitism in our communities, as the local ordinances to monitor and control their activities are not effectively enforced. The public health significance of intestinal parasites in endemic areas should be adequately emphasized and the control measures using a multi-pronged approach are necessary so as to reduce the incidence of intestinal parasitic infections in these areas.

It is interesting to note that there was no difference in relation to sources of drinking water. The tap water is either not properly treated or not treated at all. In a number of instances, broken water pipes are not repaired immediately, and human and animal excreta, possibly laden with the infective stages of these parasites, are washed into the water pipes by flood. The hand-dug wells for water supplies are sunk indiscriminately without consideration of the safety distance from soak-away systems; thus, water supplies are prone to sewage contamination.

A few of the isolated parasites in the study, especially *Ascaris lumbricoides* and hookworm, can directly or indirectly affect the surgical patient. Apart from the erratic wandering of the worm as earlier indicated, large numbers of hookworm can result in anemia. Parasites such as *Entamoeba histolytica* and *Giardia lamblia* may cause anemia by precipitating malabsorption or diarrhea. This will certainly affect the recovery rate of the post-surgical patient, prolonging the duration of admission with increased risk of nosocomial infection and extra cost. All of these can be avoided or reduced if the elective surgery patients are routinely screened for intestinal parasites, especially in endemic areas.

**Table 5** Prevalence of Intestinal Parasitism in Relation to the Occupation of the Elective Surgery Patients

| Occupation | Number Examined | Number Positive | % Positive |
|---|---|---|---|
| Farmers | 51 | 18 | 35.3 |
| Civil servants | 14 | 1 | 7.1 |
| Traders | 20 | 7 | 33.3 |
| Students | 6 | 2 | 33.3 |
| Artisans | 39 | 13 | 33.3 |

$\chi^2$=25.71; P<0.05

**Table 6** Prevalence of Intestinal Parasitism in Elective Surgery Patients in Relation to Toilet Facilities

| Toilet Facility | Number Examined | Number Positive | % Pos |
|---|---|---|---|
| Pit | 62 | 22 | 35.5 |
| Water closet | 15 | 1 | 6.7 |
| Bushes and farmlands | 53 | 18 | 34.0 |

$\chi^2$=18.19; P<0.05

**Table 7** Prevalence of Intestinal Parasitism in Elective Surgery Patients in Relation to Sources of Drinking Water

| Sources of Water | Number Examined | Number Positive | % Positive |
|---|---|---|---|
| Streams | 37 | 13 | 35.1 |
| Tap water | 37 | 10 | 27.0 |
| Hand-dug wells | 56 | 17 | 30.4 |

$\chi^2$=1.85; P>0.05

In conclusion, this study has shown a high prevalence of 31.5% of intestinal parasitism in elective surgery patients, and a prevalence of 33.3% in those for lower abdominal surgery. Therefore, we concluded that the practice of screening elective surgery patients for intestinal parasitism should be re-introduced, especially in endemic areas. This will eventually prevent complications and prolonged hospital stays for patients, with the attendant consequences.

## References


1 Koopman JS . Diarrhea and school toilet hygiene in Cali, Colombia. *Am J Epidemiol*. 1978;107:412–420.
Google Scholar Crossref PubMed

2 Oyerinde JPO Adegbite-Hollist AF Ogunbi O . The prevalence of intestinal parasites of man in the metropolitan Lagos. *Nig J Nat Sci*. 1980;3:147–155.
Google Scholar

3 Collins PA Wright MS . Emerging intestinal protozoa: A diagnostic dilemma. *Clin Lab Sci*. 1997;10:273–278.
Google Scholar PubMed

4 Hoffner RJ Kilaghbian T Esekogwu VI et al. Common presentations of amebic liver abscess. *Ann Emerg Med*. 1999;34:351–355.
Google Scholar Crossref PubMed

5 Smith LA . Intestinal protozoa disease, still around and still dangerous: *Giardia lamblia* and *Entamoeba histolytica*. *Clin Lab Sci*. 1997;10(5):279–286.
Google Scholar PubMed

6 Warren KS . Helminthic diseases endemic in the United States. *Am J Trop Med Hyg*. 1974;23:723–730.
Google Scholar Crossref

7 Crompton DWT . Gastrointestinal nematodes—Ascaris, hookworm, trichuris and enterobius. In: Cox FEG Topley WWC Wakelin D, eds. *Topley and Wilson's Microbiology and Microbial Infections: Volume 5: Parasitology*. London, U.K: Hodder Arnold; 1998:561–580.
Google Scholar

8 Datubo-Brown DD . Bowel perforation by Ascaris lumbricoides. *Post Graduate Doctor Africa*. Vol. 8, No. 7.

9 Milder JE Walzer PD Kilgore G et al. Clinical features of Strongyloides stercoralis infection in an endemic area of the United States. *Gastroenterology*. 1981;80:1481–1488.
Google Scholar PubMed

10 Davidson RA Fletcher RH Chapman LE . Risk factors for strongyloidiasis. A case-control study. *Arch Intern Med*. 1984;144:321–324.
Google Scholar Crossref PubMed

11 Elekwa DE Ikeh EIA . A survey of the incidence of intestinal parasites amongst primary school children in relation to socio-economic factors in Jos, Nigeria. *Nig Med Pract*. 1996;31:60–62.
Google Scholar

12 Allen AV Ridley DS . Further observations on the formol-ether concentration technique for faecal parasites. *J Clin Pathol*. 1970;23:545–546.
Google Scholar Crossref PubMed