



## **Intestinal Parasitic Infections among Patients of Psychiatric Hospital Rumuigbo, Rivers State, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors NCE and DOE designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AEA and NCE managed the analyses of the study and the literature searches. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/IJTDH/2019/v37i230163

#### Editor(s):

(1) Dr. Triveni Krishnan, Division of Virology, National Institute of Cholera and Enteric Diseases, India.

#### Reviewers:

(1) Ngah Zasmy Unyah, Universiti Putra Malaysia, Malaysia.

(2) Kojom Foko Loick Pradel, University of Douala, Cameroon.

Complete Peer review History: <http://www.sdiarticle3.com/review-history/50012>

**Original Research Article**

**Received 04 May 2019**

**Accepted 12 July 2019**

**Published 20 July 2019**

### **ABSTRACT**

This study was carried out to determine the prevalence of intestinal parasitic infections among patients of psychiatric hospital Rumuigbo, Rivers State, Nigeria between June to September, 2017. Stool specimen were collected and analyzed from 203 patients for ova, larvae or cysts of intestinal parasites using direct wet mount and formol-ether concentration techniques. Of these, 78 (38.4%) were infected. Five parasitic infections were identified of which *Ascaris lumbricoides* had the highest prevalence (39.7%). Others included hookworm (8.4%), *T.trichuria* (4.4%) and 2 protozoans: *Entamoeba histolytica* (7.4%) and *G. lamblia* (3.0%). The occurrence of these parasites varied significantly ( $p < 0.05$ ). Patients suffering from Schizophrenia had the highest prevalence of infection 33 (78.6%) followed by patients with Substance Abuse Disorder 11(37.9%), while the least prevalence was found among patients suffering from Anxiety disorder. Parasitic infection was most frequent among patients aged 18-27 years and higher among males 45 (47.9%) than the females 33 (30.3%).Prevalence of these parasitic infections varied significantly among sexes and age groups. This study has documented a higher prevalence of intestinal parasite amongst the mentally challenged in our society, re-emphasizing the need for intermittent de-worming among all the patients.

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**Keywords:** Intestinal parasites; infection; preponderance; psychiatric patients; Rivers State.

## 1. INTRODUCTION

Intestinal parasitic infection is one of the neglected tropical diseases (NTD) that thrive where there is poverty. Parasitic infections are major problem in rehabilitation centers for mentally handicapped individuals [1]. Intestinal parasitic infections persist where inadequate sanitation, insufficient health care facilities and overcrowding exist. Being mentally handicapped is believed to be another risk factor for intestinal parasitic infections as most people with such disabilities cannot be trained for proper health behaviors [2,3]. Also, in the developing countries, the spread and increasing prevalence of parasitic infections may be attributed to favourable climatic factors for the development of the infective stages of common parasites [4]. Many studies on prevalence of intestinal parasitic infection among patients of psychiatric institutions have been reported by researchers in other climes; Italy, Ghana, Iran and Egypt [2,5,6,7,8]. In Nigeria several studies have been conducted on the prevalence of parasitic infections in different parts of the country [9,10,11,12]. Information on psychiatric patients in Nigeria in relation to parasitic infections associated with them is fragmentary. Nwaneri *et al.* [13], studied intestinal helminthiasis in children with chronic neurological disorders in Benin City and concluded that infection was higher in children with chronic neurological disorders compared with their healthy counterparts. Since there is paucity of information on psychiatric patients in Nigeria in relation to parasitic infections, the present work was therefore aimed at providing information on the prevalence of gastrointestinal helminths among psychiatric patients in Rumuigbo psychiatric hospital in Rivers State, Nigeria.

## 2. MATERIALS AND METHODS

### 2.1 Study Design

An institution based descriptive cross sectional study was conducted among 203 (109 females and 94 males) psychiatric patients admitted (institutionalized) as well as temporary visitors (non-institutionalized) who consented, were enrolled in the study. These patients attended Rumuigbo Psychiatric Hospital in Obio/Akpor Local Government Area during the period of June to September 2017. The hospital had patients with different diagnosis which include Depression, Bipolar Affective Disorder,

Schizophrenia, Epilepsy, Substance Disorder, Personality Disorder and Anxiety Disorder. During the period of this study, there was no patient with Epilepsy. All patients on admission in the wards during the study period were included in the study, but those who were on anti-parasitic drugs were exempted from the selection process. The facility had about 437 patients as at the time of study.

### 2.2 Study Area

Obio/Akpor is a local Government located on the metropolis of Port Harcourt, Rivers State. The local Government occupies about 260 km<sup>2</sup> and has an estimated population of 878,890 persons as at the 2006 census. Rumuigbo is a community in the Local Government Area with geographical coordinates of 4.8548° N and 6.9934° E. The community enjoys a warm weather condition and has a serene environment with temperature ranging from 26°C to 27.8°C. It is a cosmopolitan area with many hospitals and schools. The people of this area are majorly traders.

### 2.3 Sample Collection

Ward nurses or guardians (for the in-patients and out-patients respectively) were provided with a clean, transparent, sterile bottle and a sheet of newspaper. Each sample bottle was properly labelled with Name, Age and Sex of the patient and the procedure for introducing stool into the bottle was thoroughly explained. Consistency of the stool was also checked to determine whether there were any diarrheic stools or stool with unusual consistency. Stool samples were then fixed with 10% formalin and transported to the study laboratory on ice. The parasites were examined by direct wet mount and formol-ether concentration [14]. The formol-ether concentration method was closely followed for laboratory examination of stool specimens.

### 2.4 Data Analysis

Stool specimens were stratified according to age, sex and different diagnosis. Data was analysed using standard statistical tests, including Pearson's Chi square test. Values were considered statistically significant at  $p < 0.05$ .

## 3. RESULTS

Of the 203 Psychiatric patients examined 78 (38.4%) were infected with one type of parasitic infection or the other. A total of 5 parasitic

infections were encountered. These parasites include 3 intestinal helminthes namely; *Ascaris lumbricoides*, hookworm and *T. trichuria*, 2 protozoans: *Entamoeba histolytica* and *G. lamblia*. The occurrence of these parasites varied significantly ( $p < 0.05$ ). The most frequent parasites identified were *Ascaris lumbricoides* in 31 cases (39.7%) especially among patients with schizophrenia followed by hookworm in 17 cases (8.4%) and *G. lamblia* 6(3.0%) were the least (Table 1). In relation to the psychiatric diagnosis of the patients, patients with Schizophrenia had the highest infection rate 33(78.6%) followed by patients with Substance Abuse Disorder 11(37.9%). A prevalence of 34.0%, 25.0%, 20.6% and 17.4% were recorded for Bipolar affective disorder, Depression, Personality disorder and Anxiety disorder respectively. The present work showed no statistically significant differences among different age groups, where the highest rate of infection (52.5%) was detected among those aged 18-27 years while the lowest rate was found among the age group >48 years. Highest prevalence of *T. trichuria* was also found among the age group of >48 years while *Entamoeba histolytica* was highest among 28-37 years patients (Table 2). Of the 11 patients among the age bracket 18-27 years afflicted with schizophrenia 10 (90.9%) had intestinal parasites, this was the highest in the study followed by those between 28-37 years. No infection was found among the patients suffering from anxiety disorder and within the age bracket of 28-37 years and >48 years (Table 3). Infection prevalence in every age group showed a decrease in infection rate on aging. Although males (47.9%) had higher rate of infection than females (30.3%), no statistical significance was found ( $P > 0.05$ ). *Ascaris lumbricoides* had the highest prevalence in both males (42.2%) and females (11.0%), (Table 4). The diagnostic prevalence in relation to sex revealed that the highest percentage of infection was observed among the male patients 23 (100%) who were afflicted with schizophrenia while the lowest was recorded among the males and females with anxiety disorder (Table 5). Of the infected individuals, out-patients had the highest infection prevalence of 31 (40.8%) while the in-patients recorded the lowest 47 (37.0%). However, there is no significant difference between the infection rates (Table 6).

#### 4. DISCUSSION

The present investigation was one of the first institutional based studies on intestinal parasites

among patients of psychiatric hospital Rumuigbo, Rivers State. The study documented a relatively high (38.4 %) prevalence of intestinal parasites. This was higher than 8.5% reported among the mentally retarded in Egypt [15], 29.5% reported among Institutionalized Mentally Disabled Individuals in Rasht, Northern Iran [7], 13.5% among patients of a Ghanaian psychiatry hospital [5] and 20.4% reported among mentally disabled children and adults of Urmia, Iran [16]. But lower than 43.5% was reported among mentally disabled individuals in Alexandria, Egypt [8], 68% was reported in chronic psychiatric patients in Sina Hospital Shahre-Kord, Iran [17]. Reasons for variation may be Location, sanitation, hygiene.

*Ascaris lumbricoides* and hookworm were the most prevalent in the study but different from Poudyal et al. [18], and Shaikh et al. [19], who in their studies documented protozoa (*G. lamblia*) the most prevalent. Also, Hazrati et al. [15] reported *Enterobius vermicularis* eggs as the highest occurrence in their study while Shokri et al. [20] showed high frequency of *Strongyloides stercoralis* followed by *Entamoeba coli*, but no infection with *Ascaris lumbricoides* was observed. Another study carried out in Isfahan among mentally retarded students showed the frequency of infection with *O. vermicularis* (20.7%) and *H. nana* (1.3%) respectively. The patients do not cooperate with the hygienic measures offered to them due to their mental state. They sometimes eat with unwashed hands due to the absence of hand washing facilities in the ward. They engage in unhygienic behaviours like keeping long nails, which they may object to have them trimmed due to their aggressive behaviours, picking up food particles from the floor, few patients were seen walking with barefoot within the premises. Intestinal parasitic infections especially from *Ascaris lumbricoides*, hookworm and *T. trichuria* have an important impact to nutritional status including anemia and other related conditions. High frequency of *Ascaris lumbricoides* in our study group suggests that it must be considered as a health threatening agent in this institute. The study also revealed that the overall prevalence of intestinal parasitic infection was highest between the ages 18-27 years, even though the observed difference in age was not statistically significant. This study contradicts the work of Shehata and Hassanein [8] who reported highest prevalence in the ages less than 12 years. Even though WHO confirmed that greater severity of the infection is found in the younger children, this

**Table 1. Distribution of gastrointestinal parasites based on patients diagnosis at Rumuigbo**

Diagnosis	No. Examined	No. Infected (%)	Species of parasites (%)				
			<i>A. lumbricoides</i>	<i>E. histolytica</i>	<i>G.lamblia</i>	Hookworm	<i>T. trichuria</i>
Depression	28	7 (25.0)	4 (14.3)	1 (3.6)	-	1 (3.6)	1 (3.6)
Biopolar Affective Disorder	47	16 (34.0)	7 (14.9)	3 (6.4)	3 (6.4)	2 (4.2)	1 (2.1)
Schizophrenia	42	33(78.6.)	16 (38.1.)	6 (14.3)	2 (4.8)	7 (16.7)	2 (4.8)
Epilepsy	-	-	-	-	-	-	-
Substance Abuse Disorder	29	11 (37.9)	2 (6.9)	3 (10.3)	-	4 (13.8)	2 (6.9)
Personality Disorder	34	7(20.6)	1 (2.9)	2 (5.9)	1 (2.9)	2 (5.9)	1 (2.9)
Anxiety Disorder	23	4(17.4)	1(4.3)	-	-	1 (4.3)	2 (8.7)
Total	203	78 (38.4%)	31 (39.7)	15 (7.4)	6 (3.0)	17 (8.4 )	9 (4.4)

**Table 2. Prevalence of gastrointestinal parasites based on patients age at Rumuigbo**

Age	No. examined	No. infected (%)	Species of parasites (%)				
			<i>A. lumbricoides</i>	<i>E. histolytica</i>	<i>G.lamblia</i>	Hookworm	<i>T. trichuria</i>
18 – 27	59	31 (52.5)	14 (23.7)	5 (8.5)	3 (5.1)	7 (11.9)	2 (3.4)
28 - 37	64	23 (35.9)	9 (14.1)	6 (9.4)	-	6 (9.4)	2 (3.1)
38 - 47	52	17 (32.7)	6 (11.5)	3 (5.8)	2 (3.8)	3 (5.8)	3 (5.8)
>48	28	7 (25.0)	2 (7.1)	1 (3.6)	1(2.1)	1(3.6)	2 (7.1)
Total	203	78 (38.4)	31(15.3)	15 (7.4)	6 (3.0)	17 (8.4)	9 (6.9)

Table 3. Diagnostic prevalence of intestinal parasites based on age at Rumuigbo

Diagnosis	8 – 27 years		28 – 37 years		38 – 47 years		≥ 48 years		Total	
	No. examined	No. infected (%)	No. examined	No. infected (%)	No. examined	No. infected (%)	No. examined	No. infected (%)	No. examined	No. infected (%)
Depression	7	3 (42.9)	6	1 (16.7)	10	2 (20.0)	5	1 (20.0)	28	7 (25.0)
Bipolar Affective Disorder	14	8 (57.1)	15	3 (20.0)	10	4 (40.0)	8	1 (12.5)	47	16 (34.0)
Schizophrenia	11	10 (90.9)	16	14 (87.5)	9	6 (66.7)	6	3(50.0)	42	33 (78.6)
Epilepsy	-	-	-	-	-	-	-	-	-	-
Substance Abuse Disorder	16	7 (43.8)	7	2 (28.5)	4	1 (25.0)	2	1 (50.0)	29	11 (4.5)
Personality Disorder	7	2 (28.6)	15	3 (20.0)	8	1 (12.5)	4	1 (25.0)	34	7 (2.5)
Anxiety Disorder	4	1 (25.0)	5	-	11	3 (27.3)	3	-	23	4 (0.5)
Total	59	31 (52.5)	64	23 (35.9)	52	17 (32.7)	28	7 (25.0)	203	78 (38.4)

Table 4. Prevalence of Gastrointestinal parasites based on sex at Rumuigbo

Sex	No. examined	No infected (%)	Species of parasite (%)				
			<i>A. lumbricoides</i>	<i>E. histolytica</i>	<i>G. lamblia</i>	hookworm	<i>T. trichuria</i>
Female	109	33 (30.3)	12(11.0)	6 (5.5)	4(3.7)	6(5.5)	4(3.7)
Male	94	45 (47.9)	19(42.2)	9(9.6)	2 (2.1)	11(11.7)	5(5.3)
Total	203	78(38.4)	31(15.3)	15(7.4)	6 (3.0)	17 (8.4)	9(4.4)

**Table 5. Diagnostic prevalence of intestinal parasites based on sex at Rumuigbo**

Diagnosis	Female		Male		Total	
	No. examined	No. infected (%)	No. examined	No. infected (%)	No. examined	No. infected (%)
Depression	15	3 (20.0)	13	4 (30.8)	28	7 (25.0)
Bipolar Affective Disorder	29	9 (31.0)	18	7 (38.9)	47	16 (34.1)
Schizophrenia	19	10 (52.6)	23	23 (100)	42	33 (78.6)
Epilepsy	-	-	-	-	-	-
Substance Abuse Disorder	14	4 (28.6)	15	7 (46.7)	29	11 (37.9)
Personality Disorder	16	4 (25.0)	18	3 (16.7)	34	7 (20.6)
Anxiety Disorder	16	3 (18.8)	7	1 (14.3)	23	4 (17.4)
Total	109	33 (30.3)	94	45(47.9)	203	78 (38.4)

**Table 6. Prevalence of gastrointestinal parasites based on units at Rumuigbo**

Units	No examined	No infected (%)	X	P-value
Inpatients unit	127	47 (37.0)		
Outpatients unit	76	31 (40.8)		
Total	203	78 (38.4)	2.0	0.157

could be attributed to the different host responses and other related factors such as the nutritional status as well as development of immunity in older people [21]. Based on sex, *Ascaris lumbricoides* accounted for the highest frequency and this was found among the males, Though there was no significant association of infection with sex, males show higher level of exposure to infection which corresponded with the reports of Lee et al. [22], who found out the rate of infection in men to be twice as it was in women who were mentally handicapped in an institute. Overcrowding which is common in the facility could cause rapid spread and outbreaks of diseases. In the same vein, Diagnostic representations of these infections in relation to sex were observed. All the males who were afflicted with Schizophrenia accounted for the highest parasitic rate 23 (100%). Also, the females who were accounted for the highest parasitic rate 10(52.6%) were diagnosed with Schizophrenia. Females with mental disorders are usually more affected with Schizophrenia followed by Bipolar Affective Disorder, which is a factor associated with reproductive life events particularly childbirth [23]. The institutionalized patients showed lower prevalence of parasitic infection than the non-institutionalized patients. This present study is in agreement with Shehata and Hassanein [8] who documented a higher prevalence among non-institutionalized (44.6%) than in institutionalized patients (42.6%). This may be attributed to the clean and fenced environment as well as care they receive in the

institution However, a much lower prevalence was found in the study by Shokri et al. [20] who found a parasitic prevalence of 2.3% among institutionalized mentally retarded individuals. In contrast to this study, Sirivichayakul et al., [24] reported a higher prevalence among institutionalized (57.6%) than non-institutionalized people (7.5%).

## 5. CONCLUSIONS

The prevalence of intestinal parasites among the mentally challenged at the Rumuigbo Psychiatric hospital is relatively high. This is therefore a wakeup call for the government and caregivers to put in more effort to reduce the parasitic load by improving the health care system in the institution.

## CONSENT AND ETHICAL APPROVAL

Permission was sought from the Research Ethics committee of University of Port Harcourt and from management of the hospital. Participation was voluntary and written consent was taken in accordance with the ethical committee's guidelines. Consent for patients in no mental or physical capacity to do so was obtained from caregivers or relatives.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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