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PREVALENCE AND DISTRIBUTION OF INTESTINAL PROTOZOA AND HELMINTHIASIS IN A SEMI-URBAN COMMUNITY IN PLATEAU STATE-NIGERIA

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ABSTRACT

Intestinal parasites have continued to cause significant morbidity worldwide with the widest occurrence in tropical Africa and other developing countries. In Nigeria, intestinal helminthes have remained a major health hazard with more endemicity in the rural areas where poor sanitation, personal hygiene and general ignorance of diseases have been shown to enhance spread. The study therefore, investigated the prevalence and distribution of intestinal protozoa and helminthes infections in human subjects of different age groups in Mangu district (09º32''31 N, 09 º04''54 E) Mangu Local Government Area of Plateau State, Nigeria; from a sample size of 610. Stool samples were collected and tested for intestinal protozoa and helminthes. Two hundred and eighty seven (47.1%) samples were positive for single, double or multiple infections while three hundred and twenty three (52.9%) were not infected. There was significant difference between infected and non-infected samples (One way ANOVA: $F(1, 21) = 5.663$, $p < 0.05$), there was a significant difference in rate of infection according to age group (One Sample –T- test: $t=11.417$, $df= 10$, $P<0.001$), type of toilet facility used by subjects (One Sample –T- test: $t=6.526$, $df=2$, $P<0.05$) and occupation (One Sample –T- test: $t= 11.884$, $df= 5$, $P<0.001$). However, there was no significant difference due to different sources of drinking water and sex of the subjects. It is then recommended that environmental sanitation exercise be intensified and supervised by the local Health Authority; also all stake holders concerned should sustain de-warming exercises. These among other interventions will help reduce significantly the prevalence of helminthes and protozoan infestation in the area, hence, abating socio-economic burdens of the citizenry resultant from the epidemic.

1. INTRODUCTION

Intestinal parasites have continued to cause significant morbidity worldwide with the widest occurrence in developing countries. It has been estimated that more than one billion people in the world are infected by Helminths among which are Ascaris lumbricoides, Trichuris trichuria, Hookworms, Schistosomes and the Protozoon Entamoeba histolytica rivaling HIV/AIDS and Malaria[1, 2, 3].The World Health Organization (WHO) has reported that Schistosomiasis alone is the second most prevalent parasitic disease of all times in humans, next only to malaria [4]. Other factors that have been reported as key in the infestation by these parasites are low socio – economic background, climate, cultural practices and water [5, 6, 7, 8, 9]. Human intestinal protozoan and helminthic infections have remained a major health hazard in Nigeria with more endemicity in the rural areas where poor sanitation, personal hygiene and general ignorance of the disease enhance spread [10, 11, 12, 13,

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14]. Research in this area has focused more on the urban rather than rural areas where these parasites thrive most [15, 16, 17]. The aim of the study therefore, was to investigate the prevalence and distribution of intestinal protozoa and helminthes infections in Mangu district, a largely rural area.

2. MATERIALS AND METHODS

2.1 Study Area

Mangu Local Government Area (09º32''31 N, 09 º04''54 E) consists of eleven districts and is situated about 77 Km south east of Jos the Plateau state capital and it covers an area of 1,587.5 Km2 with an estimated population of over 235,000 people. The daily temperatures do not exceed 75 ºF and do not fall below 55 ºF in the coldest months with an average annual rainfall of about 142 mm. Major occupation of the people is farming; other activities like bush burning and mining have led to gully erosion especially in Mangu and Gindiri districts [18].

2.2 Study population and parasitological methods

Research approval was obtained from the Mangu Local Government Health Authority. Before sample collection, subjects were given orientation on what the research was about and how to collect the sample (3g of stool). Samples collected were preserved with 10% formalin before they were transported to the laboratory for examination. The study involved 610 human subjects of different age groups between one to fifty years and above. Bio-data of subjects consisting the following information were collected: sex, age, type of occupation, source of drinking water and type of toilet facilities used. Random sampling technique was used in collecting the samples. Wet Saline [15, 19] and Formal ether concentration [20] techniques were used for stool analysis. Diagnosis was based on the identification of protozoan cyst(s) and or Helminthes ova (or ovum) according to [21].

2.3 Statistical analysis

One-way Analysis of Variance (ANOVA) was used to test the difference between mean number of infected and uninfected samples. One-Sample T- test was used to test the difference between infection rates due to age groups, occupation and type of toilet facilities used. Statistical Package for Social Science version 17 (SPSS, 2006) and Microsoft excel spreadsheet (Microsoft Cooperation, 2007) were used for statistical analysis.

3. RESULTS

Out of 610 stool samples collected and examined, two hundred and eighty seven (47.1%) were infected while three hundred and twenty three (52.9%) were not infected (Fig. 1), there was also significant difference between the samples that were infected and those that were not infected (ANOVA: $F(1, 21) = 5.663$, $p < 0.05$). Infections were with one or more of the following parasites: Hookworm, *Schistosoma mansoni*, *Ascaris lumbricoides*, *Entamoeba histolytica*, *Entamoeba coli*, *Giardia intestinalis, Teania species, Strongyloides stercoralis*, and *Enteriobius vermicularis*. Hookworm had the highest percentage infection rate (27.9%) while Stongyloides stercolaris had the least infection rate (0.4%) (Table 1). Infection rate according to age group was highest between the ages 36-40 followed by the 11-15 (Table 2) and there was a significant difference in rate of infection (Table 3) between subjects of different age groups, usage of different types of toilet facilities (Table 4) and subjects in different occupations (Table 5). Males had higher infection rate than females. Infection rate due to source of drinking was highest in subjects that used rivers, streams and ponds, followed by those who used Pipe borne water while it was lowest in those that used wells.

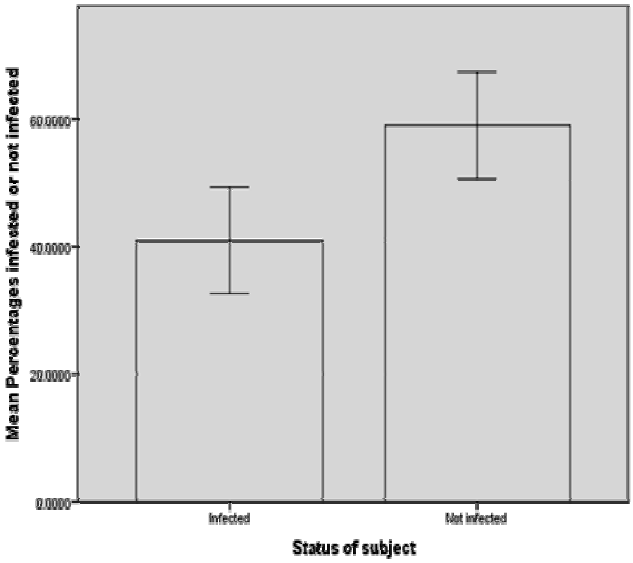

Figure 1: Occurrence of intestinal parasites in the study population

Table 1: Distribution of intestinal parasite species in the study population

Species	Total number examined	Number infected with species	Infection rate (%)
Hookworm	610	80	27.9
Schistosoma mansoni	610	27	9.4
Ascaris lumbricoides	610	29	10.1
Entamoeba histolytica	610	62	21.6
Entamoeba coli	610	36	12.5

Giardia intestinalis	610	44	15.3
Teania species	610	4	1.4
Strongyloides stercoralis	610	2	0.4
Enteriobius vermicularis	610	3	1.1
Total	610	287	47.1

Table 2: Infection rate due to Age groups

Age groups	Number Examined	Number Infected	Infection Rate (%)
0-5 years	72	24	33.3
6-10 years	64	23	35.9
11-15 years	61	39	63.9
16-20 years	81	39	48.1
21-25 years	54	22	40.7
26-30 years	47	25	53.1
31-35 years	21	12	57.1
36-40 years	90	59	65.6
41-45 years	44	22	50
46-50 years	37	10	27
> 50 years	39	12	30.8
	610	287	47.1

Table 3: Level of significance of infection rates (One sample T-test)

Infection rate due to	N	Mean	SD	SE	t	df	P
Age groups	11	45.95	13.35	4.025	11.417	10	<0.05
Type of toilet facility	3	43.67	11.59	6.692	6.526	2	<0.05
Type of occupation	6	50.67	10.443	4.264	11.884	5	<0.05

Table 4: Infection rate due to type of occupation

Occupation	Number examined	Number infected	Infection Rate (%)
Civil servants	69	42	60.9
Traders	106	41	38.7
Farmers	43	24	55.8
Students	156	79	50.6
Applicants	58	35	60.3
Others	178	66	37.1
Total	610	287	47.1

Table 5: Infection rate due to Toilet type

Toilet type	Number examined	Number infected	Infection Rate (%)
Pit latrine	288	122	42.4
Open bush	253	142	56.1
Water cistern	69	23	33.3
Total	610	287	47.1

4. DISCUSSION

It is very alarming to have an infection rate of 47.1% which is about half of the total sample collected, it is especially so considering the health implications viz-a-viz socio-economic realities in such a community. Similar reports have been made about communities in the neighboring Kaduna state e-g [11, 15, 14]. The high rate of infection in those who used the open bush and the statistical significance in the rate of infection due to type of toilet facility used is worthy of note. This may be as a result of the rural nature of the communities, hence, poor sanitation and personal hygiene, also indiscriminate defecation as reported by several authors (for example: [15, 18, 22, 3]. High infection rate in age groups between 11 and 40 years corroborates reports by [23, 3, 24]. There was also high infection rate among civil servants and applicants. This result may be due to the outgoing nature of these age and working groups for livelihood supports and other socio-economic activities, hence, constant contact and exposure to contaminated soil. This has been similarly reported by [25, 26]. From the foregoing, it is obvious that the Local Health Authority needs to step up its level of environmental sanitation and sanitation monitoring and enforcement exercises. These should be in a sustained manner with Sanitation officers monitoring not only the townships but also the rural areas that constitute the largest part of the district. The Local Health

Authorities can seek and or work in collaboration with schools as suggested by [23], and Non-Governmental Organizations to provide health talks and general de-warming exercises [27]. It is worthy of note here that health talks using the electronic media for example the Radio, can be a veritable tool in spreading information to a wide extend of coverage to rural areas in good time. A periodic investigation of the parasitic status of the populace will be a strategic tool for monitoring and evaluation of the level of success made in combating the infestations.

5. CONCLUSION

Insect fauna of Green Pea crop in district Mansehra carries 22 different insect species were collected belonging to 6 orders, 11 families and 22 genera. Insect fauna include two pest species, 5 predator species and 14 pollinator species. Pea leaf minor was found more injurious. It is concluded that the insect fauna especially predator and pollinator insect fauna is comparatively rich.

6. CONFLICT OF INTEREST

All authors have declared that there is no conflict of interest regarding publication of this article.

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