PRELIMIANRY SURVEY OF INTESTINAL PARASITES AMONG DRUG ADDICTS IN WERENG DISTRICT OF RIYOM LOCAL GOVERNMENT AREA PLATEAU STATE, NIGERIA

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ABSTRACT

Intestinal parasite infections are one of the major health problems in developing countries of the world. A drug addicts is a person who abuses drug substances that could ccause changes in the person's physiology or psychology when consumed and often times makes such a person to live a care free life predisposing same to various infectious disease conditions. Intestinal parasitism due to protozoa and helminthic infections posses important public health concerns in the tropics and sub-tropics. This study aimed at determining preliminary prevalence of intestinal parasitic infection among drug addicts in Wereng Riyom Local Governmen area, Plateau State, Nigeria. Stool specimens collected from 100 drug addicts at random were analyzed in laboratory by floatation and sedimentation techniques. *Paragominus* spp, *Ascaris lumbricodes, Heterophyterterphytes* spp., Metagonimus *spp, Entamoeb*a *coli* and *E.histolytica* and *Schistosoma mansoni were identified.* An overall 34% prevalence of infection was recorded. The males and females had 28% and 6% prevalence respectively. 30% and 4% prevalence of infection by floatation and sedimentation were recorded. There was no significant difference in intestinal parasitic infections between the male and female drug addicts ($P > 0.05$). Significant differencce ($P < 0.05$) occurred in the prevalence of infections based on techniques. Intestinal parasites of human public health hazard were identified among drug addicts in the study area. Parents, religious leaders, the community and health workers should make deliberate efforts to create awareness on the dangers of abusing drugs towards curbing drug addiction, reduced risk of infection and improved health conditions and survival among the populace.

KEYWORDS: Preliminary survey, Intestinal Parasites, Drug Addicts, Wereng Jos South, Plateau State Nigeria

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INTRODUCTION

Parasites are organisms belonging to one or two major taxonomic groups called Protozoa and Helminthes (worms). Parasitic diseases are important obstacles to development especially in the economically less favored nations of the third world. Intestinal Parasitic diseases result from infection by Protozoa and Helminthes. They have an immense influence on the lives of man and all lower vertebrates, producing a great variety of illnesses. The effect of these illnesses could either be rapidly fatal, acute, severe, chronic, incidental, debilitating intestinal infections, or even asymptomatic (Nyarango *et al.,* 2008). Of particular concern are zoonoses which are a great public health concern and a direct human health hazard that may even lead to death. Intestinal infections continue to challenge clinicians and public health services on a global scale (Rahman *et al.*, 2020). Parasitic infections directly influence the behavior of their intermediate hosts to increase the likelihood of being transmitted to their final host (Prokop and Fedor, 2013).

Intestinal parasite infections are still one of the major health problems in developing countries of the world. Several intestinal parasitic diseases e.g., amoebiasis and giardiasis (caused by intestinal protozoa) or schistosomiasis and soil transmitted helminthiasis caused by parasitic helminths (Khan, 2019). Intestinal parasites are the main cause of human illness in tropical countries. They can cause harm or make their host sick via an infection. Intestinal parasitic illnesses have a worldwide distribution. High levels of human infection are found in India, Africa, Central and South America. The infection rate by intestinal parasites varies among countries, sanitary conditions, socio-economic status and populations as documented. The infections are highly endemic among the poor and socio-economically disadvantaged people living in the tropics and subtropics (WHO, 2010).

According to Global Burden of Disease, about 428 million people were infected with hookworms in 2015 (Global Burden of Disease, 2015, 2016).The two hookworm species that predominantly infect humans are *Ancylostoma duodenale* and *Necator americanus. Ascaris lumbricoides*, the "giant roundworm" of human beings, causes ascariasis, a type of helminthiasis. Helminthiases are some of the neglected tropical illnesses. Ascariasis is common worldwide, mainly in tropical and sub-tropical countries. Approximately 17 % of people in the world are infected by *A. lumbricoides* or another roundworm (Harhay *et al.,* 2010).

Entamoeba histolytica, an anaerobic parasitic protozoan commonly infects human beings and other primates resulting in amoebiasis. It is estimated that *E. histolytica* infects approximately 50 million people worldwide. *E. histolytica* is predominant in people living in tropical regions with deplorable sanitary conditions, institutionalized populations, travelers, male homosexuals and recent immigrants. Mammals like cats and dogs can get infected transiently, though they are not significantly associated to transmission in humans. *Giardia lamblia,* also called *Giardia intestinalis*, is a flagellated endoparasite that invades and multiplies in the small intestine, resulting in giardiasis. If the organism is split and stained, its salient shape resembles the familiar "smiley face" symbol. *Giardia* infects humans, though it is also one of the most predominant intestinal parasites in cats, dogs and birds (Tzanidakis *et al.*, 2014). Mammalian hosts also include dozens of other animals such as cows, beavers, deer and sheep (Heyworth and Martin, 2016).

According to WHO (2011), the main routes of entry of intestinal parasites into the human body are ingestion, skin penetration, inhalation and auto-infection. Transmission of protozoa that lives in a human intestine to another human typically occurs through fecal-oral route (for example, contaminated food or water or person to person contact).

Ingestion of available infective protozoa cysts occurs in amoebiasis caused by *Entamoeba histolytica.* Giardiasis which is caused by *Giardia lamblia* and also in infection caused by *Isospora belli, Cryptosporidium paruum, Sarcosystis hominis* and the ciliate called *Balantidium coli* are acquired by ingestion of the infective cysts. Furthermore, intestinal infection caused by *Trichomonas hominis* involves the ingestion of live trophozoites, which serve as the infective stage. Ingestion of viable, infective embryonated eggs eater with contaminated food or drink occurs in ascariasis caused by *Ascaris lumbricoides*, trichuriasis caused by *Trichuris triuchiria* and occasionally, enterobiasis caused by *Enterobius vermicularis, Hymenolepiasis* caused by *Hymenolepis nana,* and *cysticercosis caused by Taenia solium* (tapeworms) (Klaver *et al .,* 2013).

Skin penetration by the infective filariform larve of hookworms (*Ancylostoma duodenele* and *Necator americanus)* and those of S*trongyloides stercoralis* lead to hookworm infection (ancylostomiasis and necatorasis) and strongybidiasis, penetration of the infective cerceriae of schistosome species leads to a disease called schistosomiasis (Tyoalumun *et al*, 2016). Inhalation of visible embryonated eggs of A*scaris lumbricoides* and *Enterobius vermicularis* result in ascariasis and enterobiasis. It is postulated that involvement of the respiratory tract may result in person-to-person transmission by *Cryptosporidium* occytes, the infectious and environmentally stable form of the parasites, by direct inhalation of aerosolized droplets or by fomites contaminated by coughing (WHO 2010). Auto-infection is a common mode of infection with strongyloidiasis and with *Enterobius vermicularis* causing enterobiasis and cysticercosis caused by T*aenia solium* and with hymelopiasis caused by H*ymenolepsis nana* and in cryptosporidiosis caused by *Cryptosporidium parva* and in the diarrhea caused by *Sarcocysis hominis*. In addition, transmission of intestinal helminthic infections in epidemic areas is depended on many factors, including on the species of helminthes in the area, seasonality of transmission and infection rate (Muhoho, *et al* 2014). Ziegelbaver *et al.,* (2012) reported that intestinal parasitic infections can be related to soil-transmitted helminth infection especially in developing countries with poor sanitation facilities.

A drug is any substance that causes a change in an organism's physiology or psychology when consumed. Drugs are typically distinguished from food and substances that provide nutritional support. Drugs are substances which, when taken can limit cognition, perception, mood, behavior and overall body function. It can also produce a change in biological functions through its chemical actions. A drug is used for reasons such as curing or alleviating pain and diagnosing ill-health and is seen as a common process in many communities. The chronic use of drugs can cause serious damage, sometimes irreversible physical and social damage (either temporarily or for a long period of time). Internal damage could result as well. The misuse of medication, self-medication and the use of illegal substance is called Drug Addict. Some of these substances in the form of medication give pleasure to the user and some brain nerves becomes the end user (which is known as pleasure pathways). The user at first may enjoy it and will want to experience the sensation again. A person who

allows himself/herself to be controlled by a psychoactive substance is called a "Drug Abuser". A drug abuser brings forth a condition called neurological function and his/her moods, perception, consciousness and energy change and the drugs can take over his/her normal functioning and well-being. The negligent use of any substance mostly the ones that have effect on one's consciousness like alcohol, cocaine, codeine, and methamphetamines result in discomfort and malfunction. The following habits were noted by those who abuse substance – They exhibit watery eye and nose, become abnormally talkative or unusually quiet, experience unpredictable temper, their concentration is lapse and they have loss of interest in education (Okafor, 2020).

The users of drugs in the study area are youths who incidentally make up to 75% of the total population of the area. This is made up of those in the age between 15 to 45 yeas which are made up of the delicate group of people and need to be properly taken care of. This makes it a problem for the society as they take to unwholesome life style that threat the society at large. They engage in criminal activities that runs due to disputes, and other activities that run country to normal family life, teenage pregnancies and high dropout rates are on the rise and abortion is the order of the day (Ibrahim *et al.,* 2016).

Drug addict seems to be as a result of many things. Some of them abuse drug to gain courage to do disgraceful and shameful things which they cannot ordinarily do under their normal sense. Many drug addicts through their friends or parents take them. Some abuse it out of curiosity or an experimental bases while some do so to escape from stress and problems and some from broken homes easily fall prey to bad companies so they get involved in drug to show their rejections of some standard and values of the society. Yet others abuse drug out of feeling of loneliness and other personal problems, some because of lack of money. A failure in love affairs or personal problems can drive one to drug addict. Others because they fail to achieve their lives ambitions (Jibrin, 2017).

CONTROL OF INTESTINAL PARASITES

Improvement of sanitation, clean/safe water supply, food hygiene and health education coupled with treatment of infected individuals reduces intestinal parasites' transmission in the long term. Health education creates awareness on personal hygiene and healthy behavior to reduce transmission of intestinal parasites and re-infection. Communities need to be educated on proper latrines /toilets use, regular washing hands, protection of water supplies from faecal contamination, proper cooking and handling of food. One can contract intestinal parasitic infection by eating food or drinking water contaminated with intestinal parasites' cysts or trophozoites. Food related practices that may contaminate food with intestinal parasites are; Improper cooking where the food is halfway cooked, failure to wash hands thoroughly with soap and warm running water for about 10 seconds after using toilet, eating raw vegetables and eating street foods especially in public places (WHO 2011; Ngonjo *et al*., 2012; Tzanidakis, 2014; Ibukunoluwa and Daniel, 2021).

MATERIALS AND METHODS

STUDY AREA

Wereng is one of the districts under Riyom L.G.A. It has area of 807km² and a population of 131,557 at the 2006 census which is predominantly Berom. It experiences mild hot weather between February to early April of every year. While cold weather is being experienced from ending April with rainfall throughout the raining season, and the

harmattan period from November to ending January. Bushes mountains and economic trees. The main occupation practiced by the natives of Wereng district of Riyom Local Government Area of Plateau State is farming done on subsistent level, and in mining activities (NIPOST, 2009).

ETHICAL ISSUES

Verbal permission and approval to carry out this research was obtained from the community leaders of Wereng District. Participants' informed consent to or not participate in the study was also sought.

FAMILIARIZATION VISIT

Prior to sampling, familiarization visit was made to the study area for enlightenment campaign. Indigenous dialect of the people in the area was used to explain further for the people to be well informed about the research. Assurance of confidentiality on the outcome of research findings was also made.

STUDY POPULATION AND SAMPLING

The target population was drug addicts in Wereng District of Riyom Local Government Area Plateau State. 100 individuals were sampled for faecal specimens. The study sample was drawn at random from the drugs addicts in Wereng District of Riyom Local Government Area. Sampling technique was adopted from Wang (2018). Stools were collected by using clean screw top containers. Each sample container was well labelled, kept in coo

LABORATORY ANALYSIS

FLOATATION TECHNIQUE PROCEDURE

Floatation technique using saturated salt solution method of Wang (2018) adopted by Daniel., (2021). One gram of soil sample was mix with 10ml saturated salt solution (sss) in a universal container using an application stick. It was sievedand the suspension was pouredback into the container.It was filled to the brim. A clear glass slide was place on top of the universal

container and allowed to stand for 10minutes.The slide wasviewed under the microscope using x10 objective.

SEDIMENTATION TECHNIQUE PROCEDURE

The simplest form of sedimentation is to fill a jar or tank with water, leave alone for a long enough time for particles to settle and then decant off the resulting water without the sediment. In practice this is rarely viable in treating water for townships, and therefore sedimentation tanks are operated continuously.

STATISTICAL ANALYSIS

Data was subjected to Chi square using SPSS version 24

RESULTS

Table 1: Intestinal Parasites Identified among Drug Addicts by Techniques

	Techniques			
	Floatation	**No Positive**	**Sedimentation**	**No Positive**
PARASITES				
Paragominus spp	1		0	
Ascaris lumbricoides	7		0	
Heteraphyterterphtes	2		0	
Metagonimus spp	1		0	
Entamoeba coli	13		0	
Entamoeba histohytica	1		0	
Ancylostoma duodenelis	5		0	
Schistosoma mansoni	0		4	
Total	**30**		**4**	

TABLE 2: Prevalence of intestinal Parasites among Drug Addicts in Relation to Sex and Techniques

		Techniques		
Sex	**No (%) Examined**	**Floatation No (%) Pos**	**Sedimentation No (%) Pos**	**Total (%) Pos**
Male	80 (80)	25 (31.25)	3 (3.75)	28(35.00)
Female	20 (20)	5 (25.0)	1 (5.00)	6(30.0)
Total	**100 (100)**	**30 (30.00)**	**4 (4.0)**	**34(34.0)**

$P > 0.05$ for sex

$P < 0.05$ for techniques

DISCUSSION

The 34% overall prevalence of infection among drug addicts in this study is high. The infections reported among both sexes in this study, is similar to the record of Tyoalumun *et al .,* (2016). Al-malki: (2014) also observed intestinal parasitic infection in both sexes among pupils with male pupils recording slightly higher percentage infection than females. The slightly higher percentage of infection among the males than the females was attributed due possibly to the fact that boys are rarely taken to hospital to seek treatments for what their parents consider minor ailments such as stomach ache and hence had slightly higher chance of testing positive for intestinal parasite. The result of this study however contrasts the observation of Amer *et al.,* (2018) who recorded high prevalence of intestinal parasitic infections among the females than the females. Vincent *et al.,* (2019) pointed out that high intestinal parasitism among both the males and the females are likely to be linked to the everyday activities of the people irrespective of gender. Nonetheless, they stated that men are more likely to interact with contaminated environment (food, water, Alcohol etc) then women in the course of their activities. In this study, the high prevalence among the males than the females could be attributed to numerical variations in the the sample collected. In addition, drug addiction is likely inclined more with the males compared to females. In this study, however, despite the differences between the numbers of the males and females examined, there was no significant differencce in the prevalence of infection based on sex as similarly observed by Tyoalumun *et al* (2016) attributed the high prevalence among males compared to females to the fact that males in general, demonstrate poor hygiene practices than their female counterparts. A similar research carried out among school students in Mbeere North, Njoro district in Kenya by Kinuthia (2012) high prevalence of infection among the males than the females. Although prevalence of infection based on age was not recorded due to lack of cooperation from study participants to reveal their age, study participants by superficial observation fell between the ages 10 - 18 years. Kinuthia (2012) reported high prevalence of intestinal parasites infection among ages 14-18 years.

The identification of the ova of *Paragominus* spp, *Ascaris lumbricodes*, *Heterophyterterphytes* spp., *Metagonimus s*pp, *Entamoeba coli* and *E.histolytica* and *Schistosoma mansoni* among drug addicts in the study area is an indicator of human public health hazard. These parasites are mostly zoonotic in nature. Similar observation was made by Janouskova *et al.*, (2022). Similarly, Daniel *et al.,* (2021) working on identification of parasites in solid waste dumpsite in K-Vom, identified hookworm, Entamoeba histolytica and Strongyloides stercoralis, which are soil transmitted parasites. The identification of these parasites among this category of individuals could be related to the care free livelihood exhibited by such kind of individuals. This could also enhance public health risk.

The high prevalence of infection by floatation technique could be attributed to fact that floatation solution have variable efficacy for individual parasite species. Floatation solutions also have higher specific gravity than the organisms to be floated so that the organisms rise to the top and the debris sinks to the bottom. The main advantage of this technique is to produce a cleaner material than the sedimentation technique (CDC 2018; https://www.cdc.gov >specimenproc (Accessed 8th May, 2023). Although floatation technique have the disadvantages of collapsing the walls of eggs and cysts, thus hindering identification and also do not allow some parasite eggs do not float, this study showed that intestinal parasites are more

likely to be identified with floatation technique than with sedimentation techniques.

CONCLUSION AND RECOMMENDATION

Our study is the first to determine the prevalence of intestinal parasitic infections in drug addicts in Plateau State, Nigeria. Intestinal intestinal parasites of public health importance were identified among drug addicts in the study area. Deliberate efforts by parents, religious leaders, the community and health workers to create awareness on the dangers of abusing drugs towards curbing drug addiction, reduced risk of infection and hence, improved health conditions and survival among the populace in the study area is recommended.

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AUTHORS' CONTRIBUTIONS

Daniel Lois Nanzing and Pam Chundung Sale conceived and designed the study title

Pam Chundung Sale carried out field sampling

Daniel Lois Nanzing critically scrutinised and edited the manuscript

Authors critically revised the manuscript and approved the final version.

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