http://www.inosr.net/inosr-experimental-sciences/
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INOSR Experimental Sciences 11(1):87-98,2023.

International Network Organization for Scientific Research ISSN:2705-1692

Incidence of Intestinal Helminths among HIV Patients at Kampala International University Teaching Hospital, Uganda.

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ABSTRACT

The study titled Incidence of intestinal helminths among HIV patients was aimed at determining the prevalence of intestinal helminthes among HIV patients attending Kampala International University Teaching Hospital (KIU-TH). 96 HIV positive patients participated in the study. Data collection involved use of pre tested questionnaire and examination of stool samples collected. Samples were examined by wet preparation technique, iodine and formal ether concentration technique. Data obtained was analyzed and illustrated using Microsoft excel. Out of 96 HIV patients that participated in the study 13 (14%) were positive for intestinal helminthes. The most common pathogen found was *Ascaris lumbricoides* with (6)6%, *Trichuris trichiura* with (2)2%, *Strongloides stercolaris* (3)3%, *Hook worm* (1)1%, *Giadia lamblia* (2)2%. Female participants were more than males, out of 49 female participants, 8 (8 %) were positive for intestinal helminths and of the 47 males 5 (5%) were positive. The high prevalence in 30-35 (4%) and 36- 40 (3%) age groups respectively. This could be due to the highest number of those who had never been dewormed in that age group and their big number increased the chances positivity. Routine deworming which is supposed to done every 3 months to all HIV patients, boiling of water for drinking, washing fruits vegetables before serving them, avoid cooking from open places, proper hand washing using soap after using a toilet and before serving food are some of the recommendations to reduce this parasitaemia.

Keywords: HIV, deworming, intestinal helminths, *Ascaris lumbricoides*

INTRODUCTION

A parasite is an organism that entirely depends on another organism, referred to as its host, for all or part of its life cycle and metabolic requirements. Parasitism is therefore a relationship in which a parasite benefits and the host provides the benefit [1,2,3,4,5,6,7]. A parasite cannot live independently. Although a parasite rarely kills the host, in some cases it can happen [8,9,10,11]. The parasite benefits at the expense of the host - the parasite uses the host to gain strength, and the host loses some strength as a result [12,13,14]. Intestinal parasitic infections are amongst the most widespread of all chronic human infections worldwide [15,16,17]. The rate of infection is remarkably high in sub-Saharan Africa, where the majority of human immunodeficiency virus (HIV) and AIDS cases are concentrated [18,19,20]. Intestinal parasite infections are amongst the common infections worldwide. It is estimated that some 3.5 billion are affected and that 450 are ill as a result of these infections the majority being children. These infections are regarded as serious public health problem as they cause iron deficiency, diarrhea, anemia, growth retardation and physical and mental health problem [21,22,23]. As the world enters its fourth decade of acquired immunodeficiency syndrome AIDS, evidence of its impact is undeniable. Infections by opportunistic pathogens including various forms of intestinal helminthes have been a hallmark of AIDS for long. Therefore, Intestinal parasitic infections still remain a cause of morbidity and mortality among HIV patients. No wonder they are among the most widespread of all chronic human infections worldwide [24]. Gastrointestinal

involvement in HIV/AIDS is also, almost universal and significant disease occurs in 50-90% of patients. The rates are remarkably high in sub-Saharan Africa, where the majority of human immunodeficiency virus (HIV) and AIDS cases are concentrated [25,26]. This region is disproportionately burdened by intestinal helminthes and HIV and recent evidence suggests detrimental immunological effects from concomitant infection with the two pathogens [27,28].

Parasitic infections, which have direct life cycle and do not need an intermediate host to infect a new host and are spread via faecal contamination of food and drinks are often referred to as faecal orally transmitted parasites. Infections acquired through direct ingestion of infective eggs or cyst is intimately linked with the level of personal hygiene and sanitation in the Community. The lack of latrines and adequate sewage disposal facilities has been known to contribute to the spread of the infective stages of the parasite thereby bringing about a widespread contamination of food and drinks. Infections can also be acquired through contaminated unwashed fingers, insects, and circulation of bank notes and by wind during dry conditions. Contamination of food with eggs and cysts especially those hawked by food vendors may also serve as a source of infection to consumers of such items [29,30].

Intestinal parasites include *Entemoeba histolytica, Giardia duodenale, Hookworm,Trichuris trichiura, Ascaris lumbricoides* and *Enterobius vermicularis. Ameobiasis* is known to cause about 450 million infections per annum in developing world with an incidence of about 50 million and 100,000 deaths. *Giadiasis* is more common in children and has a worldwide prevalence of about 1– 30 percent, *Ascarasis* is the commonest nematode of man especially in tropical Africa with a prevalence of about 40% and may be as high as 96–100 in the rural communities. The resistant capacity of the eggs and cysts of these parasites is a feature of profound influence on the epidemiology. Eggs of Ascaris can remain viable for up to six years. The control of parasites utilizing the faecal-oral route of transmission depend on the knowledge and factors contributing to the spread of such infection [10,11,13,14]. A cross-sectional study carried out in Kenya showed the prevalence of intestinal helminthes of 25% for Ascariasis, 26% of Hookworm and 29% for Trichuriasis among HIV patients but other studies have indicated even higher percentages [15,16,17,18]. In other studies, the high prevalence has been indicated in HIV patients as compared to HIV negative individuals. A study in Moyo northern Uganda on the prevalence, of intestinal helminthes among school going children was found to be average 42.6% [19,20,21,22,23]. Helminthes are multicellular worms. Nematodes (roundworms), cestodes (tapeworms), and trematodes / flukes are among the most common helminths that inhabit the human gut. There are four species of intestinal helminthic parasites, also known as geohelminths and soil-transmitted helminths: *Ascaris lumbricoides* (roundworm), *Trichiuris trichiuria* (whipworm), *Ancylostoma duodenale*, and *Necator americanicus* [24,25,26,27,28,29,30]. The parasites are a common cause of mortality and morbidity among HIV patients and diarrhea being the commonest symptom. In this study we aim at determining the magnitude of the problem among HIV patients attending KIU Teaching hospital a first measure in implement mitigation measures.

Problem statement

In Uganda prevalence of intestinal parasites is estimated between 9% and 40%. Intestinal parasitic infections are amongst the most widespread of all chronic human infections worldwide. The rate of infection is remarkably high in sub-Saharan Africa, where the majority of human immunodeficiency virus (HIV) & AIDS cases are concentrated. Intestinal Helminthes tend to lower immunity in these individuals resulting into rapid progression to AIDS and yet these parasites can easily be diagnosed and effective treatment measures put in place.

The magnitude of intestinal parasitic infection in human immunodeficiency virus HIV/AIDS patients requires careful consideration in the developing world. This study determined the prevalence of intestinal helminthes infection in HIV/AIDS patients at KIU Hospital, South West Uganda, between April and July 2015.

Justification

Intestinal helminthes are still among the most human infections especially those with HIV and AIDS in Uganda yet this can be reversed through early detection and improved diagnostics which are quite affordable. There is a need to investigate this situation among the vulnerable poor rural community HIV patients such as those in attending HIV clinic at KIU-TH Bushenyi District Uganda. Such establishment is beneficial for the public health service to justify need for the means of control, strategies and policies in terms of reducing intestinal parasitaemia.

Aim

The aim of the study was to determine the prevalence of intestinal helminthes among HIV patients attending HIV clinic at KIU Teaching Hospital, Bushenyi District Uganda.

Specific objective

a) To identify the most prevalent species of intestinal helminthes affecting HIV/AIDS patients.
b) To determine the proportion of HIV/AIDS patients with intestinal helminthes.
c) To determine the age group and gender most affected by intestinal helminthes.

Research questions

1. What is the prevalence of intestinal helminthes among HIV patients attending KIU Teaching Hospital?
2. What is the social demographic pattern of intestinal helminthes among HIV patients attending KIU Teaching hospital?

Hypothesis

Intestinal helminthes are still among the most common human infections especially in those with HIV and AIDS in Uganda and yet this can be reversed through early detection and improved diagnostics which are quite affordable.

Scope of the study

The research encompassed all those HIV patients who attend ART clinic from April – July 2015 and are willing to participate in the study.

Significance of the study

- The study has provided more information on the prevalence of intestinal helminthes among the HIV patients, KIU management and the government health officials so as facilitate intervention strategies.
- Has provided necessary prevention methods on epidemiology of intestinal helminthes and control measures.
- The study found out the infected people and they were advised to seek treatment.

METHODOLOGY

Study design

Across-sectional prospective study was carried out to determine the prevalence of Intestinal parasitic infections among HIV patients attending KIU Teaching Hospital, Bushenyi District Uganda This was carried out between the months of April and June 2015.

Study site

The study was carried out at KIU-TH Bushenyi District.

Target population

The study included all those HIV patients who attended ART clinic irrespective of their age.

Sample size

The sample size will be determined by the formula [9].

$n = t^2 p\, q/d^2$ Where;

n = Sample size.

p = Prevalence of Intestinal Helminthes among HIV Patients in the study population. Since it is not known in this study population 50% that corresponds to 0.5 will be taken.

t = the score on normal standard curve that corresponds to a confidence level 95% taken as 1.96.

d =allowable error, which in this study the researcher is willing to take 10% corresponding to 0.1

q =1-p = 1-0.5 = 0.5

Therefore,

$$n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.1)^2}$$

n = 96

Therefore, 96 samples were collected for this study.

Sampling procedure

HIV patients who consented to participate in the study were sampled during the sampling period and designed questionnaires was used.

Inclusion criteria

- HIV patients on ARVs who attended KIU Teaching Hospital in the month of April to July 15
- HIV sero positive patients who were in good state of mind
- HIV sero positive patients who consented to take part in the study and sign consent forms.

Exclusion criteria

- Individuals who did not attend KIU Teaching Hospital between April and June 2015
- Individuals who did not consent and sign consent forms
- HIV negative individuals.

Ethical consideration

The investigator obtained an approval from the Departmental of Medical Laboratory sciences of Kampala International University Western Campus. Consent was also sought from the respondents before they are registered to participate in the study. Patient data were treated with strict confidentiality. Only initials and not names will be used and records kept under key and rock.

Sampling technique

This was random sampling. Patients were sent to the laboratory by the clinician together with their laboratory request forms bearing patients demographics such as Name, Sex, age. The records were entered in laboratory record book. Each patient was issued a stool container and the procedure of stool sample collection and transportation clearly explained. The samples were then delivered to the laboratory for analysis. The results of the investigations were recorded in the record book.

Laboratory procedures

The stool samples were screened using direct wet preparation technique. Negative samples were concentrated using formal ether concentration technique and re-examined for parasites.

Microscopic examination of fecal specimens

This was done after saline preparation and formal ether concentration preparation.

Quality control

Internal quality control involved use of parasitological charts and text books such as [5] to confirm the features of the parasite seen, validated Standard Operating Procedures (SOPs) were used together with known positive and negative samples to test reagents, microscopes, and the methods used.

RESULTS

Social demographic data

Age distribution

The HIV positive patients who participated in the study were of ages 18 to 60 years.

Table 1: Age group distribution

Age group (years)	18-24	25-30	31-35	36-40	41-45	46-50	51- 55	56- 60
Number of clients	04	16	25	24	14	06	04	04

Figure 1. Age distribution of participants

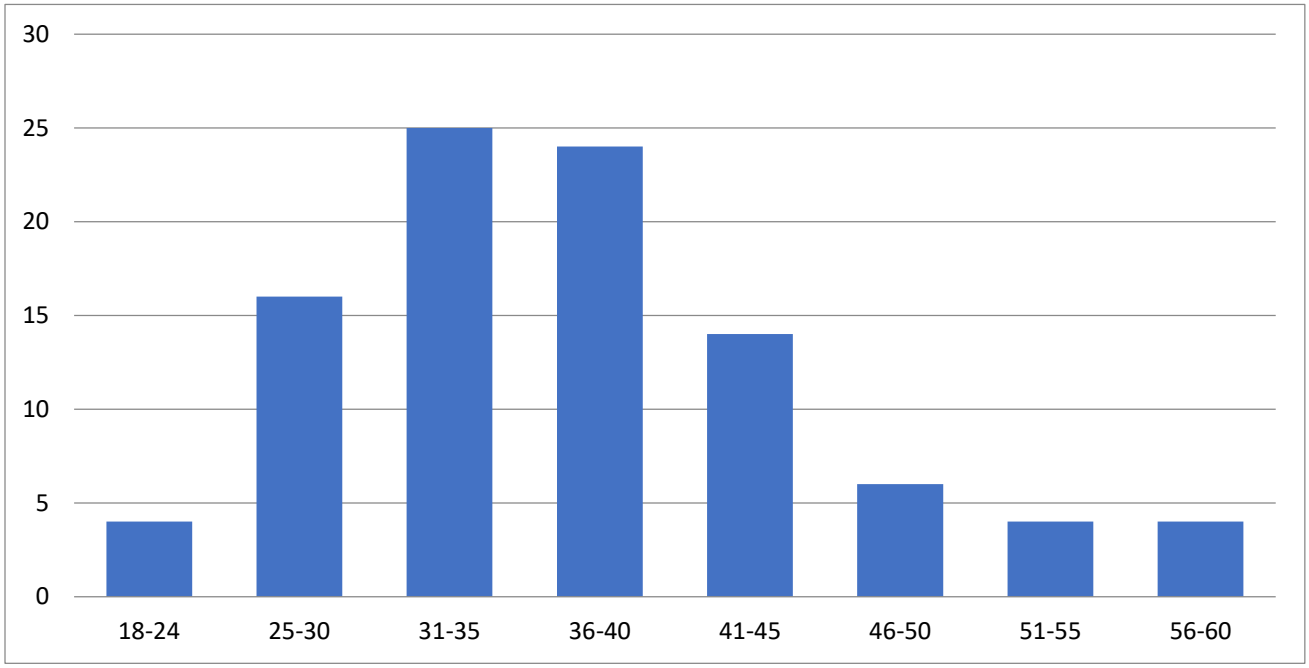
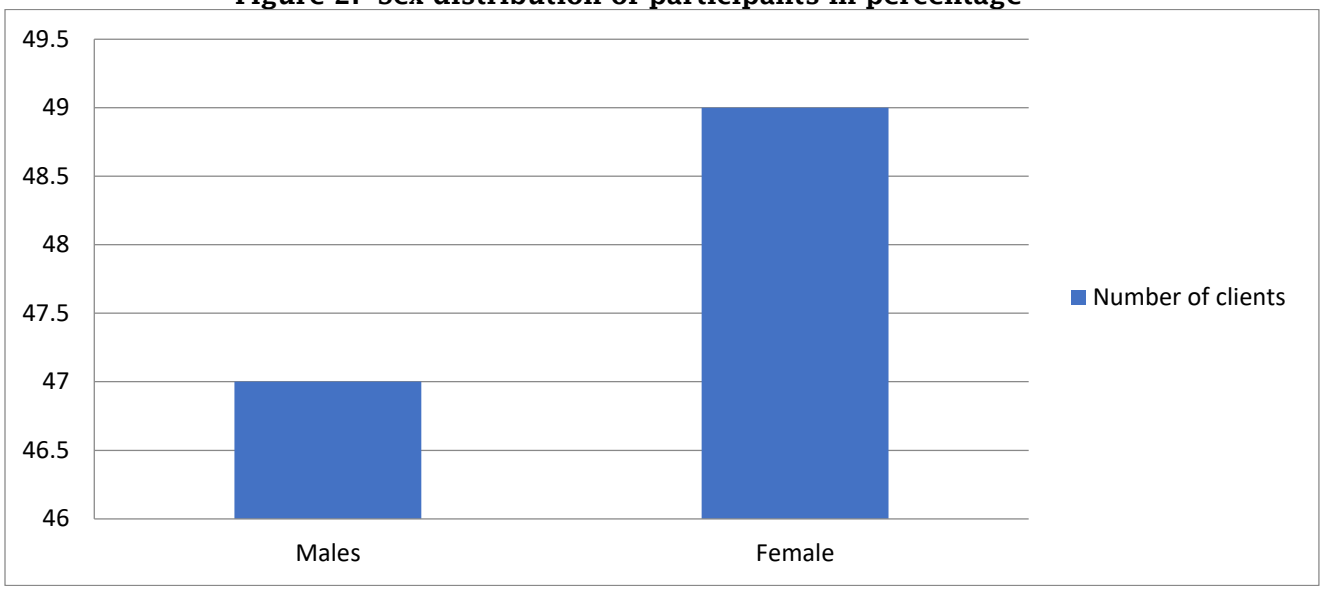


Table 2: Sex distribution of participants

Sex	Number
Males	47
Female	49

Figure 2. Sex distribution of participants in percentage



Participants gender

Of the 13 positive cases, *Ascaris lumbricoides* were (6)6%, *Trichuris trichiura* were (2)2%, *Strongloides stercolaris* (3)3%, *Hook worm* (1)1%, *Giadia lamblia* (1)1%.

Table 3: Summary of results from stool analysis for intestinal helminthes

ORGANISMS	Positive	Positive %	Negative	Negative %
Hookworms	1	7.4	95	98.9
Giadia lamblia	1	7.4	95	98.9
Strongloides stercolaris	3	23.1	93	96.9
Ascaris lumbricoides	6	46.1	90	93.8
Trichuris trichuria	2	15.3	94	97.9

Fig: 3 Graphical Representation

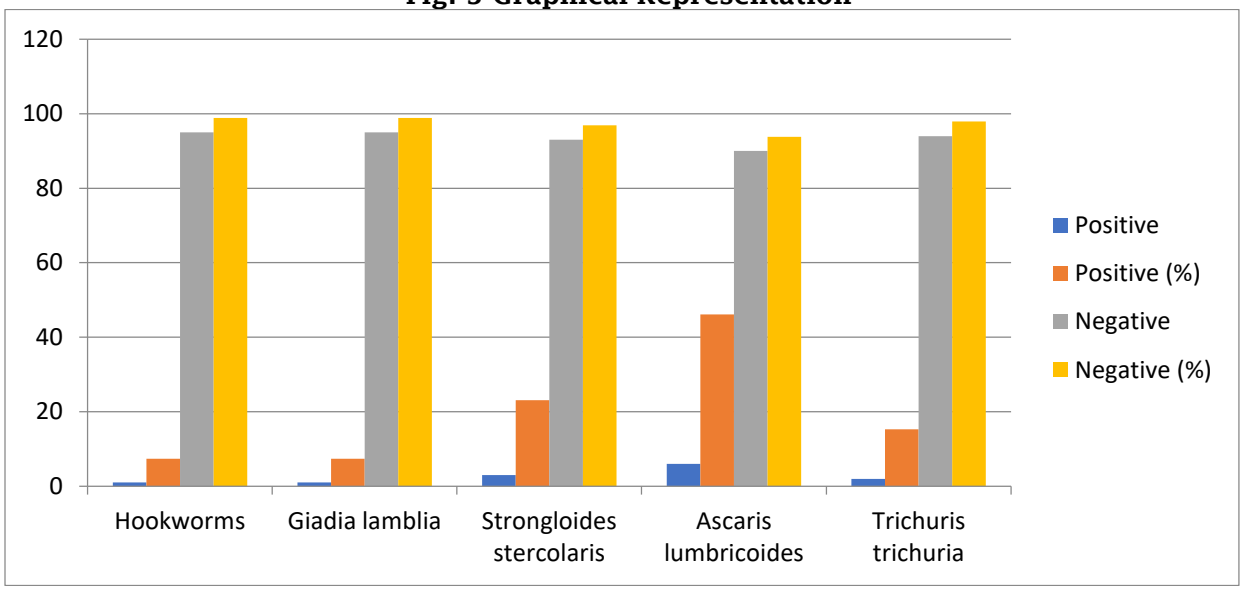


Table 4: Number of participants with intestinal parasitaemia in percentage

No intestinal parasites seen	83
Intestinal parasites seen	13

Figure 4: Percentage prevalence of intestinal Helminthes

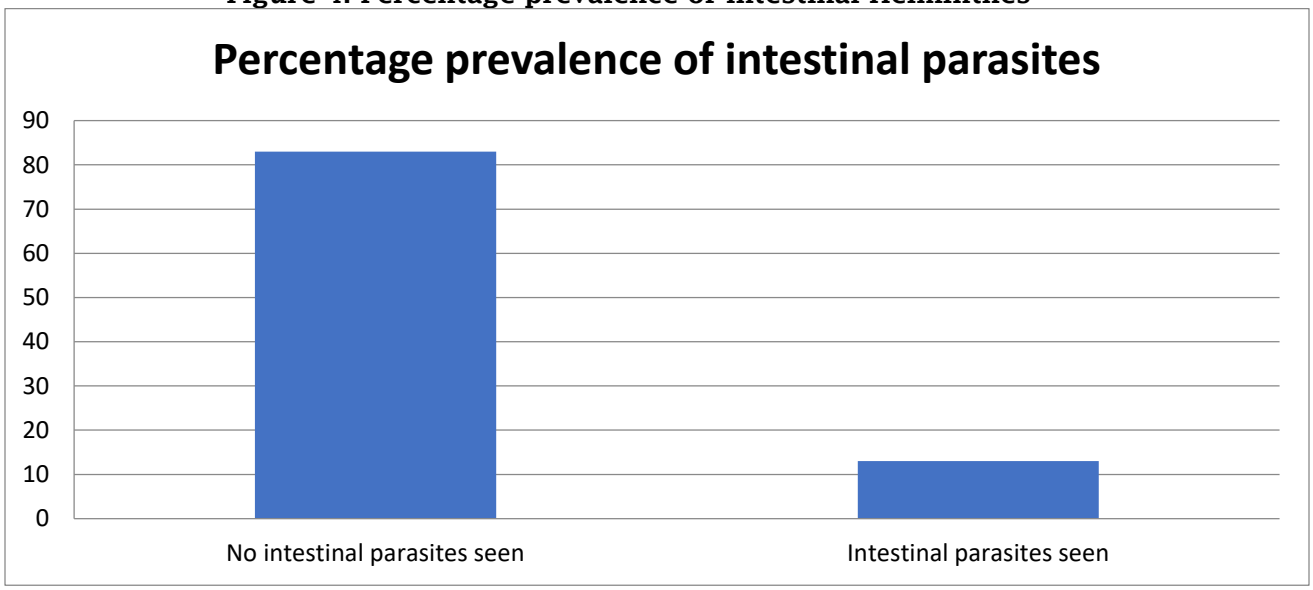


Figure 5: Results from questionnaire (part a)

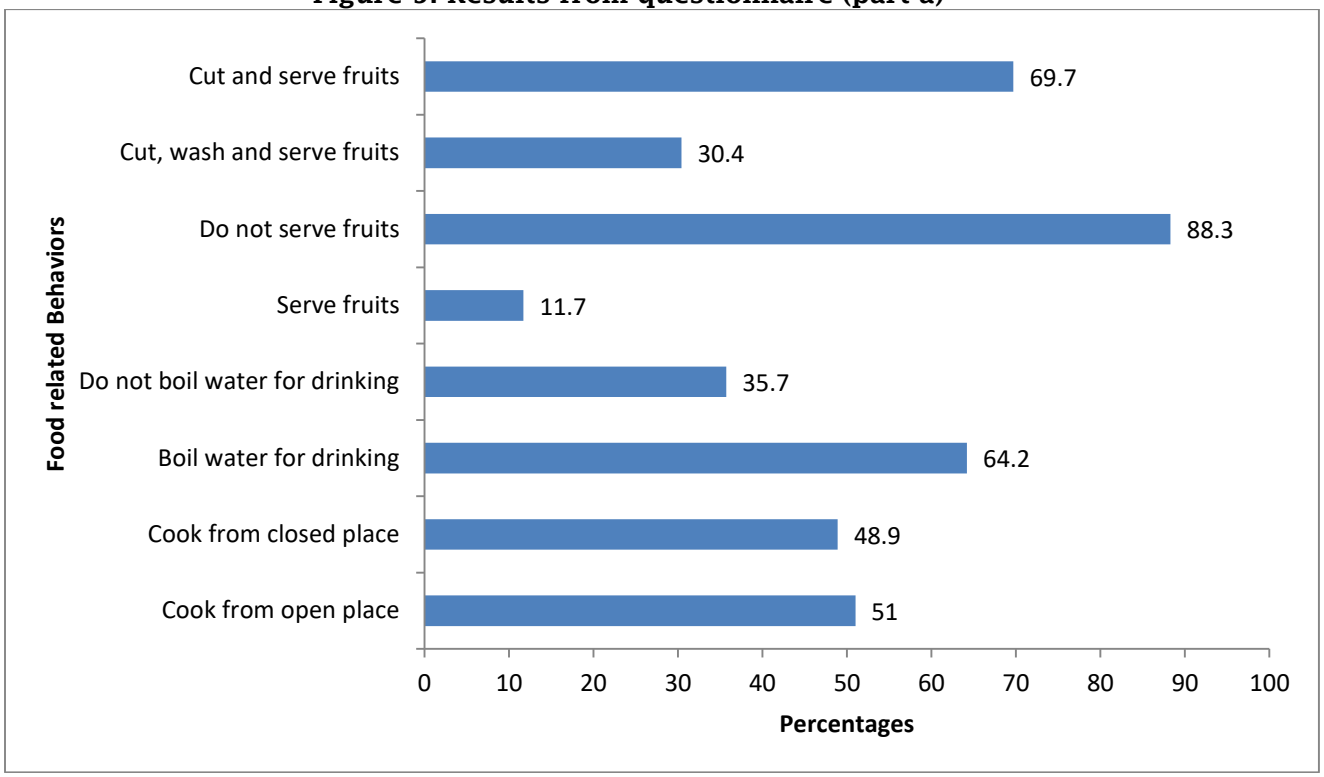
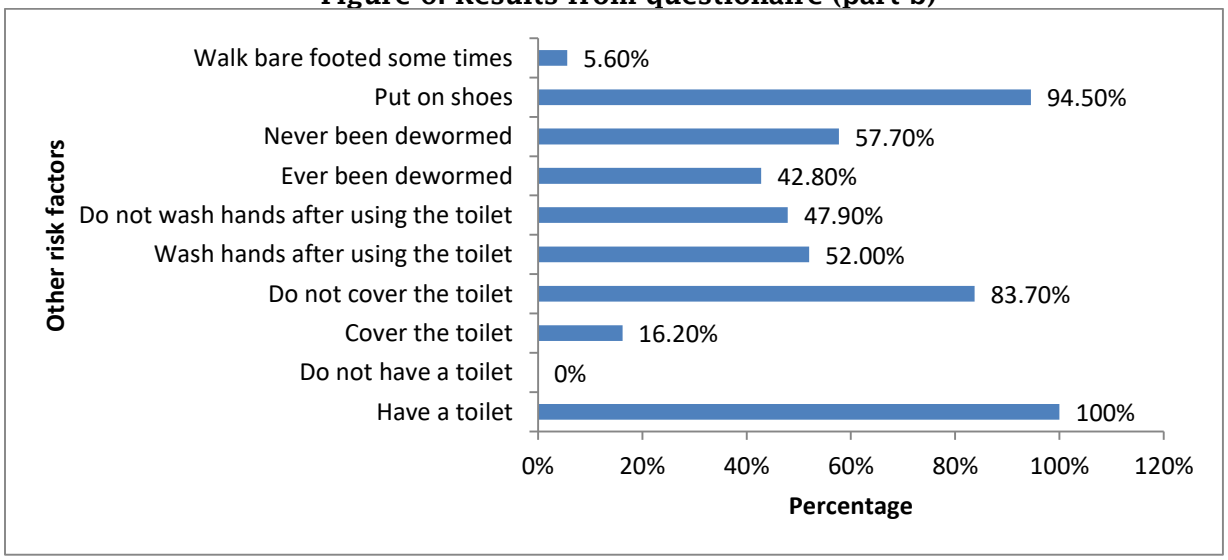


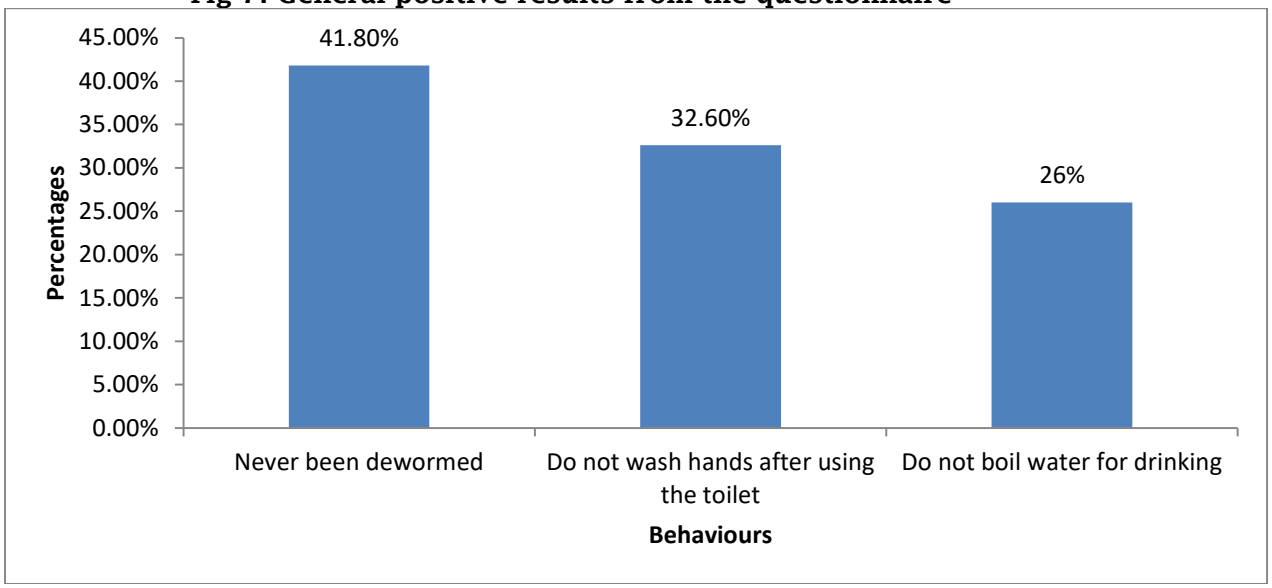
Figure 6: Results from questionaire (part b)



From figures 5&6, it shows that out of 96 HIV patients, (61)64.2% boil water for drinking, (34)35.7% do not boil water for drinking, (48)51.0% cook from an open place, (46)48.8% cook from a closed place, (96)100% posses toilet, (15)16.5% cover the toilet,(80) 83.7% did not cover the toilet, (49)52.0% wash hands after using the toilet

(45) 47.9% do not wash hands after using the toilet,(41) 42.8% ever been dewarmed, (55)57.1% never been dewormed, (11)11.7% serve fruits,(84) 88.3% do not serve fruits,(30) 30% of those that serve fruits cut, wash and serve,(66) 69.7 of those that serve fruits cut and serve, (90)94.3% put on shoes and (5)5.6% walk bear footed some times.

Fig 7: General positive results from the questionnaire



According to results from the questionnaire 41.80% had never been de wormed, 32.6 don't wash hands after using the toilet and 26% don't boil water for drinking.

DISCUSSION

Prevalence of intestinal parasites

This study was carried out to determine the prevalence of intestinal parasites among HIV patients attending KIUTH ART clinic and this was found out to be 14.0 % out of 96 HIV patients that participated in the study. This prevalence was high compared to the one obtained from school pupils in Mbarara Municipality which was 3.4% [8,9,10]. This could be due to the inability implement government policy on food handlers where by these food handlers are not licensed and screened before operating these food serving centre's and there is no continuous inspection on their operating sanitary conditions which increase chances of transmission of these intestinal parasites. Another study done among 127 food handlers working in the cafeterias of the University of Gondar and Gondar teachers training college in Ethiopia indicated 25% with 18% *Ascaris* lumbricoides, 5.5% *Strongloides stercolaris*, 1.6% *Trichuris tricuria*, and 0.8%, Hookworm. This was slightly higher compared what has been found in this study but according to other studies done in Uganda indicate the overall prevalence of intestinal parasites is estimated between 9% and 40% [10,12,16] therefore this puts this study results in the estimated range of intestinal parasites in Uganda. According to [4] the prevalence of intestinal parasites was found to be 15.85 % among refuges attending Nakivale Health Centre IV in Isingiro District. This was high compared to what was got in this study. This could be due to the poor hygienic conditions among refuges.

Prevalence according to age group

The prevalence was higher in the middle age group 30-35 years of age (4%) than in any other age groups this could be because they were many clients in this age group that participated in the study compared to other age groups. 65.0 % of the participants in this age group(30-35 years) had not been de wormed, 42.6 % (30-35

years) do not wash hands after using the toilet despite 100% possession of the toilet and 19.6 % (30-35 years)do not boil water for drinking which increased the chance of transmission of infection since these are main ways of transmission of intestinal parasites. 36-40 age group followed with a slightly low number intestinal parasite infections (3 %) which is due to medium number of clients that participated in the study. Out of 24 participants in this age group, 3 (3%) had intestinal parasites. Of the 24 participants 57.9% do not hands after using the toilet, 65.2% have never been de-wormed and 62.3% do not boil water for drinking. This is followed by 41-15 age group 2 (2%) and the least was 46-50, 51-55 and 56-60 with 1(1%).

The intestinal parasite identified

Different intestinal were found; *Ascaris lumbricoides* were (6)6%, *Trichuris trichiura* were (2)2%, *Strongloides stercolaris* (3)3%, *Hook worm* (1)1%, *Giadia lamblia* (1)1% and these are similar with what was got in a study done among HIV patients in Gondar Ethiopia (Gashaw and Kashay 1999). Out of the 13 participants with intestinal parasitaemia, In this study *Ascaris lumbricoides* were (6)6%, *Trichuris trichiura* were (2)2%, *Strongloides stercolaris* (3)3%, *Hook worm* (1)1%, *Giadia lamblia* (1)1%. From above it shows that *Ascaris lumbricoides* had the highest prevalence. This is the same case with a study done in Luwero district with a prevalence of 22.7% (Dumba, *et al.,* 2008) ant it was noted that poor hygiene practices and environmental hygiene was the main cause of these intestinal parasites which is the same contributing factor.

Behavior and other risk factors

According to the information obtained using a questionnaire the following behaviors practiced by HIV patients predisposes them to intestinal parasites. Not boiling drinking water, cooking from open places, not washing hands after using the toilet and a few who wash do not use soap, not covering the toilet, serving unwashed fruits these behaviors we the same as those found in a study done in Nigeria [18] but according to this poverty was the main factor that contributed to most of these behaviors. Results showed that out of 96 HIV patients, (61) 64.2% boil water for drinking, (34)35.7% do not boil water for drinking, (48)51.0% cook from an open place, (46)48.8% cook from a closed place, (96)100% posses toilet, (15)16.5% cover the toilet,(80) 83.7% did not cover the toilet, (49)52.0% wash hands after using the toilet (45) 47.9% do not wash hands after using the toilet,(41) 42.8% ever been dewarmed, (55)57.1% never been dewormed, (11)11.7% serve fruits,(84) 88.3% do not serve fruits,(30) 30% of those that serve fruits cut, wash and serve,(66) 69.7 of those that serve fruits cut and serve, (90)94.3% put on shoes and (5)5.6% walk bear footed some times. All the above risk factors contributed to the high prevalence of intestinal parasites.

CONCLUSION

The study revealed a high prevalence (14%) of intestinal parasites among HIV patients attending ART clinic at KIU-TH. This may be attributed by risk factors by the earlier that predispose them to infection of intestinal parasites.

Recommendations

Routine de worming which is supposed to done every 3 months to all HIV patients. A health education programme with reference to, Boiling of water for drinking, washing fruits vegetables before serving them, Avoid cooking from open places proper hand washing using soap after using a toilet and before serving food. Further studies need to be carried out over a wider area about food handlers in many food serving establishments so that proper measure can be put in place to control spread of intestinal parasites so that the public is not at risk of getting infected. All food handlers for public consumption be examined for intestinal parasites and be issued with certificate of fitness before business.

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