Prevalence and aetiological agents of parasitic infestation among population in northern Namibia

S. Chikukwa[1]*, T. Lukas[1]

[1]Namibia Institute of Pathology, P.O. Box 15709, Oshakati, Namibia

Received: 25th June, 2014. Accepted: 3rd March, 2015. Published: 6th March, 2015.

Abstract

Intestinal parasitic infestations continues to be a public health burden in many developing countries. A hospital based cross-sectional retrospective study was conducted for the period June to December 2013 at Intermediate Hospital Oshakati (IHO), northern Namibia, to assess the prevalence of parasitic infestation. A total of 1000 stool specimens were analysed for intestinal parasites at Namibia Institute of Pathology (NIP) Oshakati laboratory based on all patients who submitted specimen during the study period. Data on age, gender, species of parasites and dual infection were tallied on the data collection sheet from microbiology stool bench work cards and laboratory information system, and was imported to and analysed by Microsoft Excel. Of the 1000 patients under review 138 (13.8%) patients had either dual or mono infestation by different species of parasites, of which 128 (12.8%) had mono parasitic infection, while 10 (1%) had dual infection. *Entamoeba coli* was the most (5.5%) prevalent intestinal parasites, followed by *Giardia lamblia* (4.4%) and *Entamoeba histolytic* (1.7%). The most affected age group was the 76-90 years old due to personal hygiene and the rural environment where most live under poor sanitation and portable water problems. Females (18.6%) were twice as much at risk of intestinal parasites infection than their male (9.7%) counter parts. Communal hand washing, absence of proper human waste disposal in rural areas and informal urban settlements may be attributed as predisposing factors. Drastic public health measures as provision of pit latrines and health education on intestinal parasites will go a long way in reducing these high prevalence rates. The mass deworming exercises currently being undertaken among school children should be expanded to cover older people.

*Corresponding author: Email: sydney.chikukwa@gmail.com

Keywords: Prevalence, Aetiologic agents, Parasitic Infestation.

ISTJN 2015; 5:97-103.

1 Introduction

Intestinal parasitic infestations continues to be a public health burden in many developing countries. The parasitic infections are endemic worldwide and have been described as constituting the greatest single worldwide cause of illness and disease (Mehraj et al., 2008). It is estimated that some 3.5 billion people are affected, and that 800 million are children who are ill as a result of these infections (WHO, 2014).

These infections are associated with poor sanitary habits, lack of access to safe water and improper hygiene, thereby occurring wherever there is poverty (Steketee, 2003). The degree of each factor and the prevalence of infections vary from one region to another (Ogde & Odudu, 1990). Developing countries are the most affected due to the fact that the majority of the population is living in poverty and water and sanitation facilities are either poor or non-existent. Mahfouz et al. (1997) acknowledges that climatic conditions, poor sanitation, unsafe drinking water and lack of toilet facilities are the main contributors to the high prevalence of intestinal parasites in tropical and subtropical countries.

Apart from causing morbidity and mortality, infection with intestinal parasites has known to cause iron deficiency anaemia, growth retardation in children and other physical and mental health problems (Evans & Stephenson, 1995; Wegayehu et al., 2013). The World Health Organization (WHO, 2014) estimates that about 750,000 children in Namibia are at risk for intestinal worms and 275,000 people are at risk for schistosomiasis. In spite of the prevalence of many risk factors in both rural and urban life predisposing people to parasitic agents, unfortunately, there is limited updated data about current situation of human parasitic infections in northern Namibia. Given the sanitary condition of populations living in Northern Namibia and some of the cultural characteristics as communal hand washing, the burden of intestinal parasitic infestation is likely to be very high. Against this background, the present study was undertaken to investigate the prevalence of intestinal parasitic infections. It offers a descriptive study of the relationship of prevalence with gender and age in northern Namibia.

2 Methods

A hospital based cross-sectional retrospective study was contacted for the period June to December 2013 at Intermediate Hospital Oshakati (IHO). IHO is located 750 km north of the capital city Windhoek. In the surrounding areas of Oshakati is where the majority of the population live in Namibia.

Stool specimens were sent and analysed for intestinal parasites at Namibia Institute of Pathology (NIP) Oshakati laboratory from all patients who submitted their stool specimens to NIP Oshakati. The data for the study was extrapolated to a data collection sheet from the microbiology stool bench work cards and from the laboratory information system (LIS) in cases where the work cards did not have enough information. Data on age, gender, presence or absence of parasites species of parasites and dual infection was extracted, then was imported to and analysed by Microsoft Excel. Prevalence rates and odds ratios for age and gender as well as for overall population were calculated.

3 Results and Discussion

A total of 1000 patients were examined for parasites from June to December 2013 at Namibia Institute of Pathology Oshakati laboratory. Intestinal parasitic infestation prevalence was 13.8%. This prevalence of 13.8% is lower than the 34% in the study of Gelaw et al. (2013). The difference can be attributed to population differences, our population of this study being a mixture of both adults and children, Gelaw et al. population was school children. Children are more at risk of parasitic infection than adults because of personal hygiene and immune deficiencies as well as increased exposure risks in their playing environments. Our 13.8% prevalence is far above the 3.4% found by Akinbo et al. (2011) in their study on prevalence of intestinal parasites in urban and rural children of a developing country. The difference is attributed to the differences in the level of care between the two institutions were the studies were located. Our institution Oshakati hospital serves as both a primary care facility as well as secondary care facility whereas Akinbo et al. (2011) institution was a tertiary institution. The probability of the patients having received treatment prior to visiting the tertiary institution is most likely higher than that of a patient visiting an institution like ours that double as both primary and secondary treatment centre.

Of the patients under review, 128 (12.8%) had mono parasitic infection while 10 (1%) had dual infection. The most common parasite found in this study was *Entamoeba coli* with a prevalence of 5.5% followed by *Giardia lambilia* (4.4%), and *Entamoeba histolitica* (1.7%). The least common was *Hymenolepsis nana*, recorded at 0.3% (Table 1). These findings differ

Table 1: Prevalence of intestinal parasites by species

Parasite	Number of patients infested	Percentage ($n = 1000$)
Entamoeba coli	55	5.5
Giardia lambilia	44	4.4
Entamoeba histolytica	17	1.7
Taenia species	15	1.5
Strongyloides stercoralis	10	1.0
Hookworm	5	0.5
Hymenolepsis nana	3	0.3

from the findings of Gelaw et. al (2013), who found 2.6% of their study population had dual parasitic infection, the difference can be due to differences in the size of study population their sample size was 367 whilst our study sample was 1000 patients.

Davis et al. (2002) conclude that the most common intestinal protozoan parasites are *Giardia lamblia, Entamoeba histolytica, Cyclospora cayetanenensis*, and *Cryptosporidium* spp. The diseases caused by these intestinal protozoan parasites are known as giardiasis, amoebiasis, cyclosporiasis, and cryptosporidiosis respectively, and they are associated with diarrhoea. *G. lamblia* is the most prevalent parasitic cause of diarrhoea in the developed world, and this infection is also very common in developing countries. In our study Entamoeba coli, and Girdia lamblia were the most common parasites isolated followed by *Entamoeba histolitica, Taenia* species, *Strongyloides stercolaris*, hookworm and the least common was *Hymenolepsis nana*. These findings are different to the findings of Akibo (2011), who reported that in their study the most prevalent intestinal parasite was *Ascaris lumbricoides* (51.4%), followed by hookworm (32.4%), *Trichuris trichiura* (10.8%) while the least was *Entamoeba histolytica* (5.4%). The author's finding was consistent with previous reports Nduka et al, 2006; Wiwanitkit, 2001; Okadua et al., 2003; Mbanugo & Abaie, 2002 and Zelalem et al., 2008. The differences observed between their studies and ours can be attributed to differences in geographical locations and climatic differences.

Table 2: Prevalence of intestinal parasites by gender

Gender	Number of patients	Number infested	Percentage
Females	462	86	18.6
Males	538	52	9.7

Table 2 shows that of the 462 female tested in this study, 86 (18.6%) were infested with intestinal parasites, while 52 (9.7%) of the 538 male patients were infested. The female to male odds ratio was 2.0, i.e., female were twice as much at risk of parasitic infestation

than male patients. These difference can be attributed to the fact that women are always caring for the children and they are equally at risks as the children they are taking care of. Women are more likely to share their meals with their children and given the cultural habits of the Oshiwambo people of communal hand washing, the chances of children and mothers infecting each other are very high and that explains why women are more at risk than their male counterparts. These findings differ from Akinbo et.al findings who found out that gender was not a risk factor for parasitic infestation as males and females were equally infested. In this study females are twice as much at risk (Odds Ratio=2) than their male counterparts. Rashid et al. (2011) in their study on prevalence of intestinal parasites in urban and rural children of a developing country found out that males were 1.4 times more likely to get parasitic infestation than women.

Table 3 show that the age group of 76-90 years was the most affected with parasitic infestation prevalence of 17.6% followed by those in the 16-30 year age group (15.5%). Our study reveals that risk of parasitic infection increased with age from 12.0% at age 1-15 years to 15.5% at age 16-30years falling steadily to 14.5% at age 31-45 years. From age 46-60yrs risk of parasitic infection decrease from 13.3% to 13.0% at age 61-75 year age group and the risk increases to 17.6% at age 76-90 years. The 76-90 year age group is most vulnerable to parasitic infestation due to a number of reasons, the first being age which makes their immune system weak and secondly, personal hygiene decrease with age as one gets to year 60 and above. The majority of the 79 to 90 year olds live in the rural areas and portable water maybe a problem or no one will be available to fetch water for these elderly patients thereby compounding their personal hygiene. The other differences observed within different age groups cannot be fully explained by the scope of the study as some socio-economic and cultural characteristics of the studied population were not established in this study.

Table 3: Prevalence of intestinal parasites by age group

Age group (years)	Total number of patients	Number infested	Percentage ($n = 1000$)
1-15	350	42	12.0
16-30	290	45	15.5
31-45	152	22	14.5
46-60	120	16	13.3
61-75	54	7	13.0
76-90	34	6	17.6

This study is not without limitations. Foremost, the study was hospital based and such patients with signs and symptoms were included in the study but it is a known fact that some parasitic infestation do not present with signs and symptoms and most of the times they appear as stomach discomfort which most patient easily shrug off. The findings of the study may be lower than the actual prevalence of parasitic manifestation given the majority

of patients may not present at the hospital or health facility. It is our recommendation that further comparative studies between community based study and hospital based study be undertaken. The dynamics of age though explored in this study will further bring insights fully if a stand alone study on age and gender prevalence of parasitic manifestation be carried out.

4 Conclusion

Prevalence of parasitic infestation is very high in Northern Namibia especially among women compared to men. Public health interventions targeting women are hereby recommended. Woman are the ones that usually take care of the sick children and adults and also are the ones that are involved in food preparation. This put them at high risk of infection as well as source of infection. Churches and schools as well as government and non-governmental agencies should have massive education of the population on the causes and predisposing factors and prevention of parasitic infestations.We recommend that massive health education and provision of pit latrines in rural and informal urban areas be done in the communities of Northern Namibia. We also recommend massive deworming be done across all age group in order to reduce the high prevalence of intestinal parasites.

References

[1] Akinbo FO, Okaka CE, Machado RLD, Omoregie R, Onunu AN. Cryptospondiosis among HIV-infected patients with diarrhea in Edo State, Midwest Nigeria.Malaysian J. Microbiol. 2010, 6(1):99-101.

[2] Davis AN, Haque R, Petri WA., Jr Update on protozoan parasites of the intestine. Curr Opin Gastroentrol. 2002; 18: 10-144.

[3] Evans AC, Stephenson LS: Not by drugs alone: the fight against parasitic helminths. World Health Forum 1995, 16: 258-261.

[4] Gelaw A, Anagaw B, Nigussie B, Silesh B, Yirga A, Alem M, Endris M, and Gelaw B. Prevalence of intestinal parasitic infections and risks factors among school children at University of Gondar community school, Northwest Ethiopia: a cross sectional study. BMC Public Health 2013, 13: 304.

[5] Mahfouz AAR, El-Morshedy H, Farghaly A, Khalil A: Ecological determinants of intestinal parasitic infections among pre-school children in an Urban Squatter Settlement of Egypt. J Trop Paediatric 1997, 43:341-344.

[6] Mbanugo JI, Onyebuchi CJ. Prevalence of intestinal parasites in Ezinifite community, Aguata Local Government Area of Anambra State. Nigerian J. Parasitol.2002; 23:27-34.

[7] Mehraj V, Hatcher J, Akhtar S, Rafique G, Beg MA. Prevalence and factors associated with intestinal parasitic infection among children in an urban slum of Karachi. PLoS One. 2008; 3(11):e3680.

[8] Nduka FO, Nwaugo VO, Nwachukwu NC. Human intestinal parasite infections in Ishiagu, a leading mining Area of Abia State. Animal Research International.2006; 3(3):505-507.

[9] Ogbe MG, Odudu LA. Gastro-intestinal helminthiasis in Epe L.G.A., Lagos State, Nigeria. Nigerian Journal Parasitol. 1990; 9-11:95-106.

[10] Okodua M, Adeyeba OA, Talfeng YM, Okpala HO. Age and sex distribution of intestinal parasitic infections among HIV infected subjects in Abeokuta, Nigeria.Online J Health Allied Sci. 2003;4:3.

[11] Steketee RW. Pregnancy, nutrition and parasitic diseases. J Nutr. 2003; 133:1661S-1667S.

[12] Wiwanitkit V. Intestinal parasitic infections in Thai HIV-infected patients with different immunity. Biomed Centr Gastroenterol. 2001;1:1-3.

[13] Wogayehu T, Tsalla T, Seifu B, and Teklu T. Prevalence of intestinal parasitic infections among highland and lowland dwellers in Gamo area, South Ethopia. BMC public Health 2013, 13: 151.

[14] World Health Organization (WHO): Control of tropical diseases. Geneva: WHO; 2010.

[15] World Health Organization (WHO): Intestinal Worms. Geneva: WHO; 2014.

[16] Zelalem MT, Abebe G, Mulu A. Opportunistic and other parasitic infections in AIDS patients, HIV seropositive healthy carriers and HIV sero-negative individual in southwest, Ethiopia. East Afr J Public Health. 2008;5(3):169-173.