Journal of Biodiversity and Environmental Sciences (JBES)
ISSN: 2220-6663 (Print) 2222-3045 (Online)
Vol. 5, No. 4, p. 311-316, 2014
http://www.innspub.net

RESEARCH PAPER OPEN ACCESS

Assessment of gastrointestinal parasites in pit latrine samples from majjini mohallah valley gilgit, Pakistan

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Article published on October 21, 2014

Key words: Targeted parasite, pit latrine, gastrointestinal disease, sanitation,public health.

Abstract

Intestinal parasitic infections represent a public health problem in World specifically in developing countries. Where numerous environmental and socioeconomic factors have been identified to be main cause for the continued persistence.The present study was carried to assess the intestinal parasitic load (*Ascaris lumbricoid*, *Tricuristricuria*,*Giardia lamblia* and *cryptosporidium)*in pit latrine samplesfromMajjiniMohallah. The sample collection was carried out monthly intervals (Oct-Feb). During this study it is revealed that the monthly-wise load of parasites ranged as; October*Ascaris lumbricoid*(16.67-33.34), *Tricuristricuria*(2.66-4.00), *Giardia lamblia*(3.33-16.66) and*Cryptosporidium*(6.66-20.66):November(16.667-40.000), (8.6667-16.6667), (0-10.000) and (9.3333-22.333); December (16.00-26.33), (0-4.66), (6.66-16.66)and (6.66-16.66); January (16.66-50.00), (5.00-6.66), (1.66-8.33) and (6.66-10.00) & February (25.00-56.66), (6.66-23.33),(3.33-16.66) and (6.66-20.00) respectively. This study showed *Ascaris lumbricoid*highest population load among the targeted parasites.

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Introduction

Parasitic infections continue to be a major public health problem in the world despite of the great development in health care system. The disease remains embedded within the daily human life of poor and underdeveloped countries of Africa, Central and South America and Southeast Asia and has greatly affected the health and socio- economic status of individuals and communities.

Intestinal nematodes are considered to have injurious effect on human health. Many recent studies have revealed that some intestinal nematodes such as *Ascaris lumbricoid*, *Tricuriustricuria*, *Gardialamblia* and few species of *Cryptosporidium* are the major causing agents of appendicitis and diarrhea. It is reported that these parasites have caused morbidity and mortality around the word particularly developing countries have suffered more where mortality rate due to infectious diarrhea can be as high as 56%. Researchers have also studied that these parasites and large worms of human beings are wide spread and normal intestinal flora of tropical Africa (Cheesebrough, M., 2004.Ukoli, F.M.A., 1990. Okolie*et al.,* 2008).

Children and young adults are easily prone to these parasites in areas where recourses are inadequate and people are quit dark of hygienic measures. The eggs of the parasites are self protective against low temperature, desiccation, and strong chemicals and can stay alive for many years. It has also been absorbed that a wide Varity of bacteria, viruses and parasites are the cause of diarrhea in endemic areas. Intestinal parasites are linked with serious clinical diseases and mortality and are known to cause malnutrition and impairment of physical development in children and consequently effect their growth, development and learning. So it is necessary to have long lasting solution to the targeted interventions in the affected areas.

Parasitic infection has always been a major problem among Philippines regardless of the advancement in health care system. The disease has remained surrounded the life of poor and under developing countries of Africa central and south America and south east Asia and has inflicted the health and socio economic status of individuals and communities at large. It is based on a study that the occurrence rate of soil -transmitted helminthiasis in the Philippines reached to66% while *Ascariasis* alone reached to 70 %(UP 2005).

Parasitesarethe most important causative agents of intestinal infection, infects round about one fourth of the world's population annually and one of the major factors of intestinal parasitism in the Philippines. Soil is a best source of its rout of transmission and development(Vicente B, and WinifredaD., 2004).

In Gilgit-Baltistan specifically in Majjini Mohallah valley intestinal parasitic problems are increasing rampantly as compare to the other parts. So for no comprehensive studies were conducted in this connection that's why the current study was design to assess the intestinal parasitic load in this area.

Material and methods

Study area

MajjiniMohallah is located in the center of Gilgit city and is a small village. The economic status of the people is not up to the mark. The people of the area depend on their agriculture land and have a simple life style and most of the economy of people comprises on agriculture. The climate of this area is generally cold in winters and hot is summers and varies in the regions according to altitudinal differences The sanitation and health and hygiene system is not well furnished due to which people fall prey to several diseases. Some of the local inhabitants still uses traditional pits for the discharge of human excreta. These human excreta are used as a manure for fields to increases the fertility of soil.

Sample Collection

A total of fifty samples were taken from the three sectors of MajjiniMohallah during the month of

October to February 2011-12 from ten pit latrines (Fig. 1). In each month ten samples were taken with the help of sterilize spatula; packed in bottle and brought to the laboratory for determination of parasitic load.Samples were collected by the consent of relevant pit latrine owners.

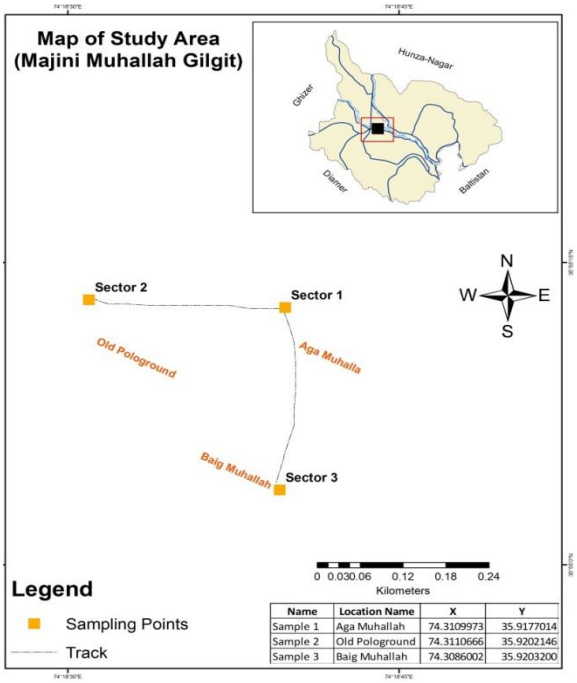

Fig. 1. Map showing the sampling sites and their locations.

Sample processing

Baermann funnels

In this procedure, first of all samples were put upon the filter and the filter is placed on the funnel full of water which has an evacuating value. After two hours the fecal parasites moved towards water and accumulated inside the funnel tube. At last opening the funnel tap lead the parasites in the glass bottle. After this glass slides were prepared andstained with haematoxylin and counterstained with eosin stain after the staining, the slides were covered with cover slips,they were then viewed under the microscope at x10 to x40 objectives lens (Southey F., 1974).

Identification

Positive specimens were identified on the basis of microscopy. Using standard methods described byCDC 2007.

Results

Throughout this study, ten pit latrines were selected purposefully from Majjini Mohallah valley to study the parasitic load monthly wise. Stool samples were taken from the month of October to February 2012**.**A total of 50 samples were taken during the five month sampling period. During this ten samples were taken in each month and one from each pit latrine. In this study *A.lumbricoids*showed highest population burden in five months. Fig. 2 shows grand mean of monthly wise distribution of parasites.

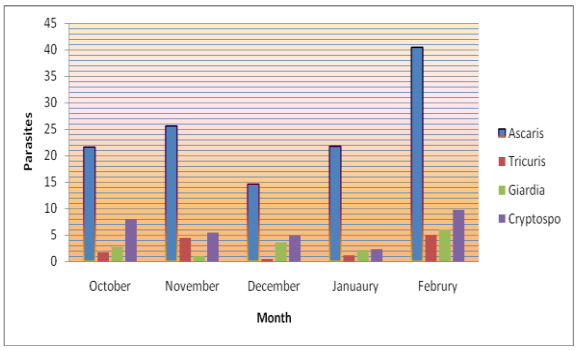

Fig. 2. Grand mean monthly wise distribution of parasites.

In the month of Octoberten samples were taken and carefully examined the load of targeted parasitic load with the help of microscope. The targeted parasites during this study include *A.lumbricoid*, *T. Tricuria, G. lamblia*andand *Cryptosporidium* respectively. In this month parasitic load varied among each sample in each household number. The above mentioned targeted parasites ranged from minimum to maximum (16.67-33.34), (2.66-4.00), (3.33-16.66), and (6.66-20.66) respectively with house hold numbers (0407, 0579),(0600, 0618), (0524, 0734), and (0524, 0579)(Table 1).Where as in the month of November the targeted parasites ranged from minimum to maximum (16.667-40.000), (8.6667-16.6667), (0-10.000) and (9.3333-22.333) with household numbers (0129, 0524), (0.600, 0618) (0524, 0407) and (0134, 0579)(Table 2)respectively. While in the month of December the targeted parasites varied from minimum to maximum(16.00-26.33), (0-4.66), (6.66-16.66), (6.66-16.66)(Tables 3)respectively with household numbers(0134, 0524)

(0524, 0134), (0734, 0.66) and (0129-0704). In the same way during the month of January the targeted parasites widely ranged from minimum to maximum (16.66-50.00), (5.00-6.66), (1.66-8.33) and (6.66-10.00) with house hold numbers (0579, 0524),(0134, 0734), (0734, 0688) and (0407, 0134) respectfully (Table 4).Where as in the month of February these targeted parasites varied from minimum to maximum (25.00-56.66), (6.66-23.33),(3.33-16.66) and (6.66-20.00) with house hold numbers (0600, 0407), (0407,704), (0734, 0600) and (0037, 0734) respectively (Table5).

Table 1. Population of parasites in month of October 2011.

H/No	*A. lumbricoid*	*T. tricuria*	*G. lamblia*	*Cryptosporidium*
0524	20.00^{BC}	3.33^{AB}	3.33^{C}	6.66^{C}
0618	27.33^{AB}	3.33^{AB}	0.00^{D}	19.33^{A}
0600	24.00^{BC}	2.66^{B}	0.00^{D}	13.33^{B}
0704	0.00^{D}	0.00^{C}	0.00^{D}	19.33^{A}
0579	33.34^{A}	0.00^{C}	0.00^{D}	20.66^{A}
0037	23.33^{BC}	0.00^{C}	0.00^{D}	0.00^{D}
0129	20.67^{BC}	0.00^{C}	0.00^{D}	0.00^{D}
0407	16.67^{C}	0.00^{C}	0.00^{D}	0.00^{D}
0734	26.66^{AB}	3.33^{AB}	16.66^{A}	0.00^{D}
0134	23.33^{BC}	4.00^{A}	6.66^{B}	0.00^{D}
St.Er.C	4.3767	0.5963	1.1832	0.9888
CVC	9.1296	1.2438	2.4681	2.0627

St.Er.C: Standard Error for Comparison; CVC: Critical Value for Comparison

Values of same later in column are statistically not different at LSD (p= 0.05).

Table 2. Population of parasites in month ofNovember 2011.

H/No	*A.lumbricoid*	*T. tricuria*	*G. lamblia*	*Cryptosporidium*
0524	40.000^{A}	10.000 ^{B}	0.0000 ^{B}	0.0000 ^{D}
0618	33.333^{AB}	16.667 ^{A}	0.0000 ^{B}	0.0000^{D}
0600	31.333^{AB}	8.6667 ^{B}	0.0000 ^{B}	0.0000^{D}
0704	40.667^{A}	9.3333 ^{B}	0.0000 ^{B}	0.0000^{D}
0579	0.0000^{D}	0.0000^{C}	0.0000 ^{B}	22.333^{A}
0037	23.333^{BC}	0.0000 ^{C}	0.0000 ^{B}	10.000^{C}
0129	16.667^{C}	0.0000 ^{C}	10.000 ^{A}	0.0000^{D}
0407	23.333^{BC}	0.0000 ^{C}	0.0000 ^{B}	0.0000^{D}
0734	23.333^{BC}	0.0000 ^{C}	0.0000 ^{B}	13.333^{B}
0134	23.333^{BC}	0.0000 ^{C}	0.0000 ^{B}	9.3333^{C}
St.Er.C	4.8899	1.5916	0.5164	0.9661
CVC	10.200	3.3201	1.0772	2.0152

St.Er.C: Standard Error for Comparison; CVC: Critical Value for Comparison

Values of same later in column are statistically not different at LSD (p= 0.05).

Table 3. Population of parasites in month of December 2011.

H/No	*A.lumbricoid*	*T. tricuria*	*G. lamblia*	*Cryptosporidium*
0524	26.33^{A}	0.00^{B}	0.00^{C}	0.00^{D}
0618	20.00^{AB}	0.00^{B}	0.00^{C}	0.00^{D}
0600	0.00^{C}	0.00^{B}	16.66^{A}	0.00^{D}
0704	0.00^{C}	0.00^{B}	6.66^{B}	16.66^{A}
0579	0.00^{C}	0.00^{B}	5.00^{B}	15.00^{A}
0037	23.33^{AB}	0.00^{B}	0.00^{C}	10.00^{B}
0129	16.66^{B}	0.00^{B}	0.00^{C}	6.66^{C}
0407	23.33 ^{AB}	0.00^{B}	0.00^{C}	0.00^{D}
0734	20.00^{AB}	0.00^{B}	6.66^{B}	0.00^{D}
0134	16.00^{B}	4.66^{A}	0.00^{C}	0.00^{D}
St.Er.C	4.1500	0.5375	1.1547	1.5846
CVC	8.6567	1.1212	2.4087	3.3055

St.Er.C: Standard Error for Comparison; CVC: Critical Value for Comparison

Values of same later in column are statistically not different at LSD (p= 0.05).

Table 4. Population of parasites in month of January 2012.

H/No	*A.lumbricoid*	*T. tricuria*	*G. lamblia*	*Cryptosporidium*
0524	50.00^{A}	0.00^{C}	0.00^{D}	0.00^{C}
0618	23.33^{BCD}	0.00^{C}	0.00^{D}	0.00^{C}
0600	25.00^{BCD}	0.00^{C}	8.33^{A}	0.00^{C}
0704	23.33^{BCD}	0.00^{C}	3.33^{B}	0.00^{C}
0579	16.66^{D}	0.00^{C}	0.00^{D}	0.00^{C}
0037	20.00^{CD}	0.00^{C}	0.00^{D}	0.00^{C}
0129	0.00^{E}	0.00^{C}	0.00^{D}	0.00^{C}
0407	0.00^{E}	0.00^{C}	0.00^{D}	6.66^{B}
0734	28.33^{BC}	6.66^{A}	1.66^{C}	6.66^{B}
0134	30.00^{B}	5.00^{B}	8.33^{A}	10.00^{A}
St.Er.C	4.4672	0.4714	0.5963	1.0220
	9.3183	0.9833	1.2438	2.1318

St.Er.C: Standard Error for Comparison; CVC: Critical Value for Comparison

Values of same later in column are statistically not different at LSD (p= 0.05).

Table 5. Population of parasites in month of February 2012.

H/No	*A.lumbricoid*	*T. tricuria*	*G. lamblia*	*Cryptosporidium*
0524	43.33^{ABC}	0.00^{C}	6.66^{D}	16.66^{AB}
0618	46.66^{AB}	0.00^{C}	13.33^{B}	0.00^{D}
0600	25.00^{D}	0.00^{C}	16.66^{A}	0.00^{D}
0704	33.33^{BCD}	23.33^{A}	0.00^{F}	0.00^{D}
0579	53.33^{A}	0.00^{C}	0.00^{F}	20.00^{A}
0037	33.33^{BCD}	20.00^{A}	10.00^{C}	6.66^{C}
0129	50.00^{A}	0.00^{C}	0.00^{F}	13.33^{B}
0407	56.66^{A}	6.66^{B}	0.00^{F}	20.00^{A}
0734	30.00^{CD}	0.00^{C}	3.33^{E}	20.00^{A}
0134	33.33^{BCD}	0.00^{C}	10.00^{C}	0.00^{D}
St.Er.C	6.5845	1.6865	1.4220	2.0976
CVC	13.735	3.5181	2.9663	4.3756

St.Er.C: Standard Error for Comparison; CVC: Critical Value for Comparison

Values of same later in column are statistically not different at LSD (p= 0.05).

Discussion

It is evident that parasites are the potential thread to the human beings and cause many diseases where they harbor. These parasites are also major source of communicable diseases. It has also been observed that the population of parasites or parasitic load in a pit latrine or in area where people practice open human defecation depend upon many factors such, sanitary facility, population load, socioeconomic status of people, availability of portable water, environmental condition , personal hygiene and temperature. Our study revealed high prevalence of parasites in the pit latrine sample where the population burden was high, lack of basic health facilities with poor environmental condition and suitable temperature for the parasites. Our findings are in agreement to the study of carried out in Nigeria. (Luka*et al.,* 2000; Ndifon,1991; Adeyeba andAkinlabi2002; Ukpai and Ugwu, 2003; Menan*et al.,* 1997; Silva *et al.,* 1997).

This research showed that the availability of sanitary facilities were inadequate in the house with high parasitic load was high and this is of epidemiological significance considering the number of persons use the same pit. Besides this unavailability of clean water enhanced the rate of population load.This study also came to the point that poverty is one of the major root causes of parasitic load and its infection and our study appeals to work on poverty elevation where people suffer from the parasitic infection. This will consequently minimize parasitic disease transmission

among people.Our study came to this point that serious heed must be given to improve the sanitary facilities in ruler areas where still pit latrines are being used and people must be taught personal hygiene ethics through health education. This will in the end minimize the bane of gastro-intestinal parasites in the human beings .Our observation links to Murray and Lopez 1996; WHO 2000a) where they stated thatHuman waste and meagerness of personal and domestic cleanliness have been considered in the spread of various infectious diseases including cholera, hepatitis, *Ascariasis* and *Cryptosporidiosis*. The world health organization(WHO) estimated that 2.2 million persons succumb to death yearly due to diarrheal diseases while 10% of the population of the developing world are rigorously infected with intestinal worms due to ill waste and excreta management(Murray and Lopez 1996;WHO 2000a).

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