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Prevalence of targeted parasites in pit latrine samples from Oshkhandas valley, Gilgit, Pakistan

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Abstract

This study was carried out in Oshikandas valley to evaluate the population load of targeted parasites (*Ascaris lumbricadi, Trichuris trichuria, Giardi lamblia, Cryptospridium*) in pit latrine samples. The sanitation facilities in the study area were not up to the mark, so, the inhabitants of the village are more prone to gastrointestinal diseases. In this connection 10 houses were randomly selected where the people were using pit latrines for defecation. The samples were taken in 5 months (Oct.2012-Feb.2013). Overall 50 samples were taken in the study period and 10 samples in each month and 1 from each pit latrine. During the whole research work, overall parasitic load in 50 samples was 1821.42/50g, while the total number of individual parasites including (*A. lumbricoid*, 1237.93/50g), (*T. trichuria*, 127.62/50g), (*G. lamblia*, 153.26/50g) and (*Cryptospridium*, 302.59/50g) respectively.

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Introduction

Parasitic infections continue to be a major public health problem in many developing countries 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 (Cheesebrough, 2004) Based on a study, the prevalence rate of soil- transmitted helminthiasis in the Philippines reached to 66% while Ascariasis alone reached to about 70% (UP National Institute of Health and Department of Health, 2005). Intestinal nematodes are considered to have injurious effect on human health. Many recent studies have revealed that some intestinal nematodes such as *Ascaris lumbricoid, Tricurius tricuria, Gardia* 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 (Ukoli, 1990). Children and young adults are easily prone to these parasites in areas where recourses are inadequate and people are quit dark of hygienic measures (Okolie *et al.*, 2008). 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 (Ukoli, 1990). 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 (Cheesebrough, 2004).

In Gilgit-Baltistan specifically Oshkandas valley, the content of pit latrine is potential source of spreading of gastrointestinal diseases in the study area, because most of the intestinal parasites and pathogenic bacteria have fecal oral route of transmission (Hussain *et al.*, 2014).The health and hygiene system of the area is not satisfactory due to lack of good sanitation system which results into the heath and economic lose. So far no such study is conducted previously, hence this study was indispensable to give awareness about the possible threats of pit latrine.

Materials and methods

Sample collection

Samples were taken from pit latrines to check the difference in parasitic load in pit samples. During this study overall 50 samples were taken 5 samples each from pit latrine during October 2012-July 2013, from Oshikandas valley, Gilgit (Fig.1).

Fig.1. Map showing study area and their location.

Preparation of Sodium Chloride Saturated Solution

We crushed the rocky salt into powder and mixed it in 1000 ml distill water until the solution becomes completely saturated. For Assessments of parasites from pit latrine one gram of sample was mixed in saturated sodium chloride solution and mixed thoroughly to homogenize. A plane glass slide was placed on the surface of the plastic small case and poured the saturated NaCl solution in the mixture till it touched the surface of the slide. Picked the slide and observed under the microscope for identification and enumeration of parasites in per field.

Results

This study was carried out in Oshkhandas valley to evaluate the impact of pit latrine on human health. During this study overall 50 samples were taken 5 samples each from pit (October 2012 to February 2013). Our results are shown in the table 1 and figures 2-6.

Figure 2 shows the percentage of individual parasite in 10 samples of the month of October.Where *Ascaris lumbricoid (Al)* was 215.33 (64%), *Trichuris trichuria (Tt)*16.65 (5%), *Giardia lamblia (Gl)* 25.99 (8%) and *Cryptosporidium (CRYPT)* 79.31 (23%) respectively. Figure 3 shows the percentage of parasites in the month of November. Where *A. lumbricoid* was observed as 145.65 (70%), *T. trichuria* 34.98 (12%), *G. lamblia* 4.66 (3%),,and *Cryptosporidium* 48.32 (15%) respectively. Figure 4 shows the percentage of parasites in the month of December. Where *A. lumbricoid* was observed as 255.32 (62%), *T. trichuria* 10 (2%), *G. lamblia*35.32 (15%) and *Cryptosporidium* 44.67 (21%) respectively. Figure 5 shows the percentage of parasites in the month of January. Where *A. lumbricoid* was observed as (216.65)79%,*T. trichiuria* (11.66)4%, *G. lamblia* (21.65) 8% and *Cryptosporidium* (23.32) 9% respectively while Figure 6 shows the percentage of parasites in the month of February. Whereas *A. lumbricoid* was observed 404.97 (66%), *T. trichuria* 49.99 (8%), *G. lamblia* 58.66 (10%) and *Cryptosporidium* 96.65 (16%) respectively.

Table 1. Summary of overall parasitic load from October 2012 to July 2013.

House No.	Parasitic Load Counted per gram (Oct.2012-Feb. 2013)
H-129	133.99
H-134	183.98
H-037	179.98
H-407	153.31
H-524	226.30
H-579	186.32
H-600	171.64
H-618	203.31
H-704	175.97
H-734	206.62
TOTAL	1821.42

Discussion

In Oshkhandas village people still use traditional pit latrines due to which the health and hygiene system of the area is not up to the mark. 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 (Ndifon, 1991). 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 (Luka

et al., 2000). 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 carried out in Nigeria. (Adeyeba and Akinlabi, 2002; Ukpai and Ugwu, 2003; Menan *et al.,* 1997; Silva *et al.,* 1997).

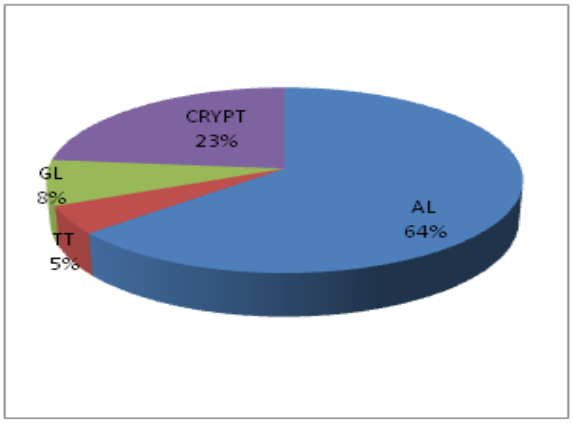

Fig. 2. Total population of targeted parasites in pit samples in October 2012.

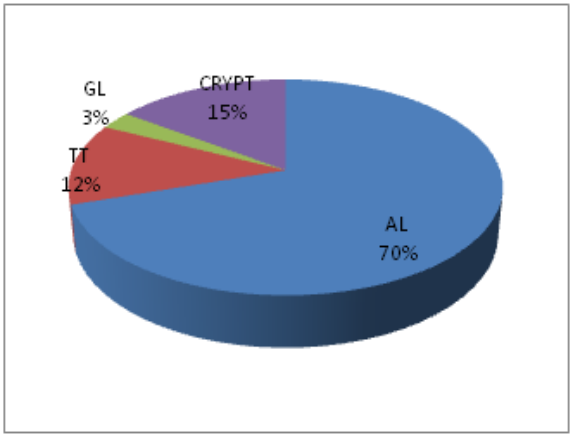

Fig. 3. Total population of targeted parasites in pit samples in November 2012.

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 study already carried out (Murray and Lopez 1996; WHO 2000a), where they stated that Human waste and meagerness of personal and domestic cleanliness have been considered in the spread of various infectious diseases including cholera, hepatitis, Ascariasis and Cryptosporidiosis. WHO (2000a) 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, our results also observe this trend.

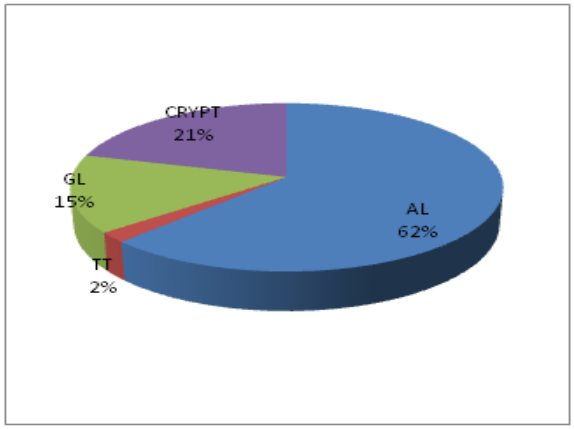

Fig. 41. Total population of targeted parasites in pit samples in December 2012.

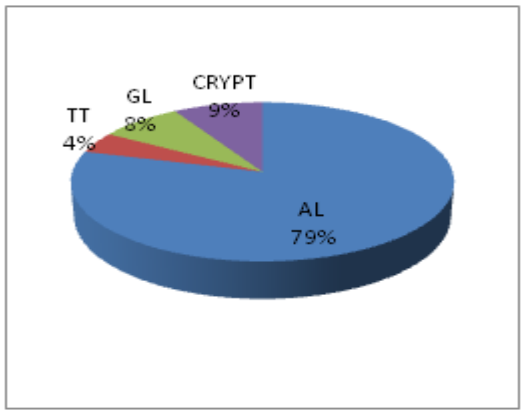

Fig. 5. Total population of targeted parasites in pit samples in January 2013.

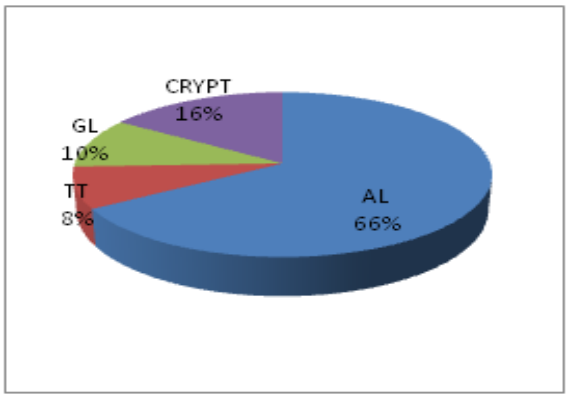

Fig. 6. Total population of targeted parasites in pit samples in February 2013.

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