INT. J. BIOL. BIOTECH., 16 (2): 319-323, 2019.

THE PREVALENCE OF HUMAN INTESTINAL PROTOZOAL AND HELMINTHIC INFECTION IN KARACHI

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ABSTRACT

The current study was aimed to find the frequency of human intestinal parasites in Karachi hospitals and medical centres and to know as to which age group was most prone to infection.

The patients having gastrointestinal symptoms which included diarrhea and dysentery visiting five different hospitals were sampled for protozoan and helminth parasites. Slides were microscopically examined for identification of trophozoite, cyst, egg, larva and worms. Data analysis were made using version SPSS 21.

Out of 2212 samples 274 (12.4%) were positive. The most prevalent protozoan was *Entamoeba histolytica* (66.1%) followed by *Giardia lamblia* (22.3%), *Ascaris lumbricoides* (5.5%), *Blastocystis hominis* (1.8%), *Hymenolepis nana* (1.8%), *Entamoeba coli* (1.1%), *Iodamoeba butschlii* (0.7%), *Ancylostoma duodenale* (0.4%) and *Taenia saginata* (0.4%). Children and teenagers (twenty or < 20 years) were the most infected.

Key-words: Protozoans, helminth, human intestine, Karachi, Pakistan.

INTRODUCTION

A major cause of morbidity and mortality worldwide is gastrointestinal infection (O'Brien and Halder, 2007). In Pakistan, Bangladesh and India and other developing countries they are a major cause of death (Liu *et al.*, 2012). They are usually endemic and the parasites are widespread in certain areas, therefore disease pattern varies in different geographical locations. In developing countries both helminths and protozoan are common cause of infections in humans while in developed countries protozoans are common cause of gastrointestinal infections while helminths are rare (Haque, 2007). Parasitic infections are widely prevalent in Pakistan. *Entamoeba histolytica* infection prevailed in Karachi throughout the year irrespective of seasonal variation (Bilqees *et al.*, 1982). In workers of health department of Swat, Pakistan, 93.9 percent helminths and 6.4 percent protozoans were recorded (Khan *et al.*, 2015). However, the distribution of various parasites probably differ according to the climate, environmental condition, local habits and customs in the urban and rural population of the country (Baqai and Zuberi, 1986). World Health Organization had recommended that the control of parasitic infestation should be efficiently incorporated into a multi-disease control approach alongwith with T.B., Malaria and HIV/AIDS (WHO, 2008).

The common causes of intestinal parasitic infections are improper hygiene, lack of access to safe drinking water and poor sanitation. People with poor water and sanitation conditions, of all ages, may get infection by the parasites however, the children are most susceptible (Anwer *et al.*, 2015). The presence of parasitic infection resulted in poor physical, mental and social health and poor job performance and loss of employment (Siddiqui *et al.*, 2002). These infections occur more prominently in poverty stricken localities. Other risk factors include large size of family and poor health of the child and literacy rate of parents (Mumtaz *et al.*, 2009). The poor people of under developed nations are prone to reoccurrence of under nutrition and repeated infections leading to more than desirable morbidity that can continue from generation to generation (Mehraj *et al.*, 2008).

The parasites are also causative agents for chronic diseases such as iron deficiency anemia, stunted growth in children, physical and mental health problems, diarrheal diseases, cognitive impairment, malnutrition, protein depletion, vitamin deficiencies, or even causes surgical problems like intestinal obstruction and increased susceptibility to other infections (Quihui *et al.*, 2006). Some of the studies have shown a significant interconnection between parasitic infections with anemia, AIDS, cancer, organic brain syndrome, mental illness and can be fatal (Siddiqui *et al.*, 2002).

An extensive survey of different occupational group of Swat for intestinal parasites was conducted and found from 1041 stool samples examined from January 2006 to December 2008, 115 were infected with one or more intestinal protozoans (Khan *et al.*, 2018).

Studies conducted in different parts of the world suggest a high prevalence of intestinal parasitic infections (52-54%) (Khan *et al.*, 2012; Obala *et al.*, 2013). Intestinal parasitic infections rarely cause death but due to the size of problem, the global number of related deaths is considerable (WHO, 2006). Approximately 39 million disability associated life years (DALYs) are featured to intestinal parasitic infections and these infections thus represent a considerable economic burden (Stephenson *et al.*, 2000). *Ascaris lumbricoides*, *Trichuris trichiura* and hookworms are collectively known as soil-transmitted helminths (STHs) which are the most common intestinal parasites (Bethony *et al.*, 2006). *Ascaris lumbricoides* is the largest and the most common helminth found in human intestine and nowadays infects about 1 billion people worldwide (CDC, 2006). *Hymenolepis nana* is the most prevalent cestode parasite globally (Pillai and Kain, 2003). *Giardia duodenalis/Giardia intestinalis*, causing Giardiasis, which was previously known as *Giardia lamblia* is the most common protozoan parasite worldwide with about 200 million people are currently infected (Pillai and Kain, 2003; Minenoa and Avery, 2003). *Blastocystis hominis* is another common intestinal protozoan whose pathogenicity is under debate (CDC, 2006).

Studies indicate that a majority of these infections are asymptomatic, thus cases are not reported to the hospitals and a large number of carrier persons remain a serious threat to the community (Farooki, 1965). There was no specific denominator and the results did not reflect the correct prevalence of the human parasitic infections in the community and the burden of disease on the health resources. The relative frequency of different parasites in symptomatic patients has been carried out in Karachi (Siddiqui *et al.*, 2002). In the present study prevalence of human intestinal protozoal and helminth infection from five medical centres of Karachi, Sindh, Pakistan are being investigated and also to know which age groups was most prone to infection.

MATERIALS AND METHODS

This retrospective cross-sectional study is based on laboratory records of different tertiary care hospitals from January 2015 to October 2016 to find out the frequency of human intestinal parasites in Karachi, Pakistan. The five hospitals from where samples were collected were (1) Dr. Ziauddin Hospital, Block B, North Nazimabad campus, Karachi. Private health care hospital under "Ziauddin trust", (2) Dr. Ziauddin hospital, Shahrah-e-Galib, Clifton campus, (3) Dr. Ziauddin hospital, behind KPT, Kemari, KDLB campus, (4) Al-Mustafa medical centre, Block 13-C, Gulshan-e-Iqbal, University Road, Karachi. Primary health care hospital for poors working under Al-Mustafa Welfare Trust, (5) Imran clinic, ST-5, Block-I, North Nazimabad, Karachi, a private hospital.

Stool samples were collected from patients having gastrointestinal infections symptoms including diarrhea and dysentery, in a sterilized container. Slides were prepared by simple saline and iodine preparation technique. Slides were microscopically examined for identification of trophozoite, cyst, egg, larva and worms. Data Analysis were made using SPSS version 21.

RESULTS

A total of 2212 sample were collected January 2015 to October 2016. *Entamoeba histolytica* (66.1%) was the most prevalent parasite followed by *Giardia lamblia* (22.3%), *Ascaris lumbricoides* (5.5%), *Blastocystis hominis* (1.8%), *Hymenolepis nana* (1.8%), *Entamoeba coli* (1.1%) *Iodamoeba butschlii* (0.7%), *Ancylostoma duodenale* (0.4%) and *Taenia saginata* (0.4%). In both genders *Entamoeba histolytica* were the most frequent common followed by *Giardia lamblia, Ascaris lumbicoides*, *Blastocystis hominis* and *Hymenolepis nana*. Whereas in children and teenagers (equal or < 20 years patients) were the most infected (n=140) followed by age group of 21-40 (n=71), 41-60 years (n=38) and 60 + year (n=25) (Table 1-2).

DISCUSSION

In this study *E. histolytica* and *G. lamblia* were found to be the most prevalent protozoan parasites and *A. lumbricoides* and *H. nana* the most prevalent helminths in Karachi, which is somewhat similar to the results obtained earlier (Noori *et al.*, 2016). There was no change in the frequency in males and females. Children and young individuals were more infected than adult which may be due to poor hand wash and soil eating habits in children from poor strata as these parasites are mostly transferred by contaminated food and water. We need to begin awareness programs for public to control this high prevalence of intestinal parasites.

Karachi has humid and semiarid warm climate and it is home to a number of infectious parasites. Among them *Entamoeba* species, *Giardia, Ascaris, H. nana, Taenia* species and *T. trichiura* are most common (Haleem *et al.*, 1965). Some survey based reports from Pakistan show *Giardia lamblia* to be the most prevalent parasite and is followed by *Ascaris lumbricoides* and *Entamoeba histolytica* (Siddiqui *et al.*, 2002; Mehraj *et al.*, 2008).

Table 1. Frequency of human intestinal parasites in positive stool sample.

Parasites	**Frequency (n)**	**Percentage (%)**
Entamoeba histolytica	181	66.1
Giardia lamblia	61	22.3
Blastocystis hominis	5	1.8
Entamoeba coli	3	1.1
Iodamoeba butschlii	2	0.4
Ascaris lumbricoides	15	5.5
Hymenolepis nana	5	1.8
Ancylostoma duodenale	1	0.4
Taenia saginata	1	0.4
Total parasites	274	100

Table 2. Frequency of human intestinal parasites according to age groups.

Parasites	**< 20 yr (n)**	**21-40 yr (n)**	**41-60 yr (n)**	**60+ yr (n)**
Entamoeba histolytica	86	47	29	19
Giardia lamblia	39	14	3	5
Blastocystis hominis	1	3	0	1
Entamoeba coli	1	0	2	0
Iodamoeba butschlii	0	1	1	0
Ascaris lumbricoides	7	5	3	0
Hymenolepis nana	4	1	0	0
Ancylostoma duodenale	1	0	0	0
Taenia saginata	1	0	0	0
Total parasites	140	71	38	25

The percentage of internal parasite varies from 18-81 in reports published from Pakistan (Ahmed *et al.*, 2003; Khan *et al.*, 2004; Malik and Baig, 2006). According to the studies done in different areas of Pakistan, children of different age groups depicted prevalence of 81% in Abbottabad, 54.91% in Skardu, 21.75% in Bagh and 18.02% in Neelum valley. Among all these areas of Pakistan *Ascaris lumbricoides* and *Giardia lamblia* were the most common parasites isolated (Ahmed *et al.*, 2003; Malik and Baig, 2006; Khan *et al.*, 2004; Alam *et al.*, 2007). Other reports from Peshawar and Bannu (cities situated in Northern Pakistan with a relatively colder climate) showed *Ascaris lumbricoides* to be the most common parasite infecting the school children followed by *Enterobius vermicularis* and *Hymenolepis nana* (Khan *et al.*, 2012; Ullah *et al.*, 2009). Report from Muzaffarabad showed *Giardia* to be the commonest intestinal parasite followed by *Entamoeba histolytica* (Chaudhry *et al.*, 2004).

While comparing with result of previous workers such as Khan *et al.* (2017) who stated that the most prominent helminths were *Ascaris lumbricoides*, *Trichuris trichiura* and *Taenia sagnita*. As compared to females the males were more infected. It was further reported that shepherds were more infected than farmers and educated individuals with soil transmitted helminths and it was suggested that surveys should be conducted from time to time to know the hazardous effect of these parasites to human health. They also opined that food handling with improper hand-washing before preparing food and dirty utensils contributed significantly in spreading intestinal parasitic infection.

Karachi being the most populous city of Pakistan its population is prone to intestinal parasitic infections. Poverty, poor hygiene, lack of proper drinking water, illiteracy and its hot and humid climate add to the prevalence of parasitic infections in humans. These parasites are usually associated with malabsorption syndromes and gastrointestinal morbidity (Speich *et al.*, 2013). Thus development of a health education programme and proper treatment of patients to eliminate this menace is important. The drug recommend for control include Mebendazole,

albendazole and Pyarantel pamoate as suggested by Medical practitioners. The highly recommended drug is albendazole when there is mixed helminthic and protozoal infection (Baqai *et al.,* 2001).

CONCLUSION

In the prevalence of human intestinal protozoal and helminthic infection in Karachi, the most prevelant protozoans were *Entamoeba histolytica* and *Giardia lamblia* whereas *Ascaris lumbricoides* and *Hymenolepis nana* were the most common helminths encountered.

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(*Accepted for publication March 2019*)