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Full Length Research Paper

Asymptomatic intestinal protozoan infections among inhabitants in Mexico City, Mexico

Takeshi Yoda[1,2*], Takeshi Suzue [2], Tomohiro Hirao[2], Akira Yoshioka[2], Jarot Jazek Escobar Jimenes[3], Tetsuo Yanagi[4], Kazuo Minematsu[4], Kensuke Goto[4], Jephtha Christopher Nmor[4,5], Hiroshi Tachibana[6], Yasuyuki Rakue[7], Noriko Sakano[8], and Nobuyuki Miyatake[8]

[1]Department of Global Health and Population, Harvard School of Public Health, Boston, MA, USA.
[2]Department of Public Health, Faculty of Medicine, Kagawa University, Miki, Kagawa, Japan.
[3]Faculty of Medicine, National Autonomous University of Mexico, Mexico City, Mexico.
[4]Institute of Tropical Medicine, Nagasaki University, Nagasaki, Japan.
[5]Department of Animal and Environmental Biology, Delta State University, Abraka, Nigeria.
[6]Department of Infectious Diseases, Tokai University School of Medicine, Isehara, Japan.
[7]School of Tropical Medicine and Public Health, Tulane University Medical Center, New Orleans, LA, USA.
[8]Department of Hygiene, Faculty of Medicine, Kagawa University Miki, Kagawa, Japan.

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Intestinal protozoan is still an important public health problem. We aimed to gain insight into the dynamics of intestinal protozoan infection with a view to describing the prevalence of intestinal protozoan in asymptomatic individuals in Mexico City, Mexico. The study population was primarily both in and out patients from four different hospitals who were referred for routine stool examination. Faecal specimens (510) were collected over a 3-weeks period from asymptomatic individuals. Specimens were tested for a range of protozoan infection using microscopic and partly Enzyme-Linked ImmunoSorbent Assay (ELISA) method. Seven known intestinal protozoan were identified from 54 faecal specimens, a total carriage rate of 10.6%. *Blastocystis hominis* were present in 22 specimens (4.31%), *Entamoeba coli* in 18(3.53%), *Entamoeba disper* in 8(1.57%), *Entamoeba hartomanni* in 2(0.39%), *Giargia lambia* in 2(0.39%), *Iodoamoeba* in 2(0.39%), and *Endolimax nana* in 1(0.2%). 10(2%) person were infected with two or more protozoa concurrently. These protozoa were all non-pathogenic, but are capable of discharging their cysts thus placing these asymptomatic carriers as potential distributors of intestinal protozoan infection. Considering the public health implication of asymptomatic carriers of intestinal protozoan infection, establishment of sustainable and regular de-worming programme in Mexico City coupled with health education messages on good hygienic practices are strongly recommend.

Key words: *Blastocystis hominis,* Mexico, *Entamoeba,* protozoan fecal.

INTRODUCTION

Intestinal protozoan infection has a significant impact on the health of a community and carries a substantial economic burden (Le Baron et al., 1990, Garthright et al., 1988). To tackle the impact of gastroenteritis, the or-ganisms responsible for community based disease must first be established. It is not possible to simply attribute an individual's symptoms to the organism found in the faecal specimen because some organisms can be present in the absence of symptoms (e.g. *Giardia, Cryptosporidium*) or are of uncertain significance (e.g. *Blastocystis hominis*). It is estimated that 3.5 billion people are affected, and approximately 450 million are ill as a result of these infections (WHO, 1998). Helminth infections are major causes of malnutrition, iron-deficiency anemia, malabsorption syndrome, and mental and physical growth retardation (Allen and Maizels, 1996). More so, Immunodeficiency persons including HIV/AIDS patients are highly sensitivity to opportunistic infections and are thus more often than not suffers from chronic diarrhoea caused by intestinal

*Corresponding author. E-mail: tyoda@med.kagawa-u.ac.jp. Tel: +81-87-891-2133. Fax: +81-87-891-2134.

Table 1. Composition of modified Tanabe-Chiba's medium*.

Content	Amount
$CaCl_2$ $2H_2O$	0.58 g
KCl	0.30 g
NaCl	8.30 g
L-asparagine monohydrate	0.50 g
Agar	15.00 g
Water	1,000 ml

*pH=7.2, Autoclave before use.

protozoan infection (Saksirisampant et al., 2009).

Although Mexico is one of the lowest prevalence countries of HIV infections (0.3%), only about half receive antiretrovirus therapy (USAID, 2010). Thus it is life threatening for HIV/AIDS patients to contract intestinal protozoan infections.

Despite its medical importance, there is a considerable lack of knowledge about the epidemiology of these intestinal protozoan parasites in Mexico City. The vast majority of studies of the prevalence of pathogens from asymptomatic individuals are performed in developing countries (Hellard and Fairley, 1997, Zuckerman et al., 1990). Considering both the public health and the long run epidemiological implication, it is highly important to gain an understanding of the asymptomatic carriage rate of pathogens and potential pathogens in the community. Given that, we report the results of a hospital based study conducted in Mexico City, Mexico in which 510 faecal samples were collected from asymptomatic individuals and thus call on the attention of public health managers not to undermine the health implication of asymptomatic carriers as they stand the potential of being a distributor of intestinal pathogens in the community.

MATERIALS AND METHODS

The subjects for this study were comprised of 510 individuals from 4 hospitals and 1 exhibition center in Mexico City between July 20th and August 4th, 2008. The subjects from 4 different hospitals were inpatient and outpatient from maternity, pediatrics, internal medicine, and surgery units respectively who had been referred for a routine stool test. They do not have any associated symptom of abdominal disorder, and all fecal samples were solid, not diarrhea. Fecal samples were obtained from subjects for examination at 4 different hospitals as part of a routine screening policy for the diagnosis of diseases associated with intestinal infections. The other subjects were voluntarily participants who visited the Geriatrics Health Festival at Mexico Exhibition Center. These participants have no symptoms about diarrhea, nausea, abdominal pain. Participants were collected voluntarily, and they received free medical check-ups not only for intestinal protozoan infection, but also for other helminthes infection. We explained the purpose of this study, and obtained their consent. Patients whose faecal sample was positive, were informed of the result and where treatments are required, we recommended an appropriate physician.

Fecal smears were stained with iodine stain prior to microscopic analysis. If *Entamoeba histolytica/disper* was observed, the fecal sample was analyzed using ELISA kit (*E. Histolytica* II manufactured by Tech Lab Co. Ltd) to identify specific Entamoeba (*E. histolytica* or *E. disper*). More so, *Entamoeba* species were further cultivated in modified Tanabe-Chiba medium (Yoshimura et al., 1988), this medium is the xenic cultivation (Table 1). *E. histolytica* or *E. disper, Entamoeba Nuttalli,* and *Entamoeba coli* (*E. coli*) were isolated by microscopic examination after cultivation.

Data on patient's age, gender and place of hospital/convention center were noted. Data were analyzed using Statistical Package for Social Sciences (SPSS) 15.0 J manufactured by SPSS, Inc.

RESULTS

A total of 510 samples were collected. The age and gender distribution was shown in Figure 1. Participants mean age was 27.1 years old. The number of male participants was 196 (38.4%), and female participants were 314 (61.6%), respectively. Table 2 shows the isolated number of each protozoon. We detected 7 protozoan types from a total of 54 samples (10.59%). The number and rate of protozoan observed in decreasing order are: *B. hominis* 22(4.31%), *E. coli* 18(3.53%), *E. disper* 8(1.57%), *E. hartomanni* 2(0.39%), *Giargia lambria* 2(0.39%), *Iodoamoeba* 2(0.39%), *Endolimax nana* 1(0.2%). Six persons who were infected with both *E. disper* and *E. coli,* Data on Table 3 show the multiple infection patterns. We detected no *E. histlytica* on this time.

DISCUSSION

This study revealed that, there was a considerable period of parasite persistence in asymptomatically infected with intestinal protozoan infections and that, pathogens in asymptomatic subjects; *G. lambria* and *B. hominis* were not uncommon

We detected 54 asymptomatic protozoan infections among inhabitants in Mexico City. Approximately a half of infections are *B. hominis*. According to the recent study for immigrants in southern Italy, *B. hominis* was the most commonly detected protozoa (52.7%) followed by *E. histolytica, E. dispar, E. moshkovskii* (11.9%) and *Giardia duodenalis* (4.5%) (Gualdieri et al., 2011). Our study shows the prevalence of *B. hominis* infection was 4.3%, *E. coli* infection was 3.5%. Previous study reported a prevalence of 7% *B. hominis* infection among l272 school children in northeast of Mexico City and 124 of total 272 children (44%) were positive for protozoan infection (Diaz et al., 2003). Compare with current Mexican study, our results (age-adjusted protozoan prevalence; 3.3%) was extremely lower. However, the previous study was conducted at rural areas; the duration was about 10 months. However, our study was conducted at the Capital, and the duration was only three weeks. Hygiene improvement for 5 years could be implicated for the differences.

Although the intestinal protozoan prevalence was lower

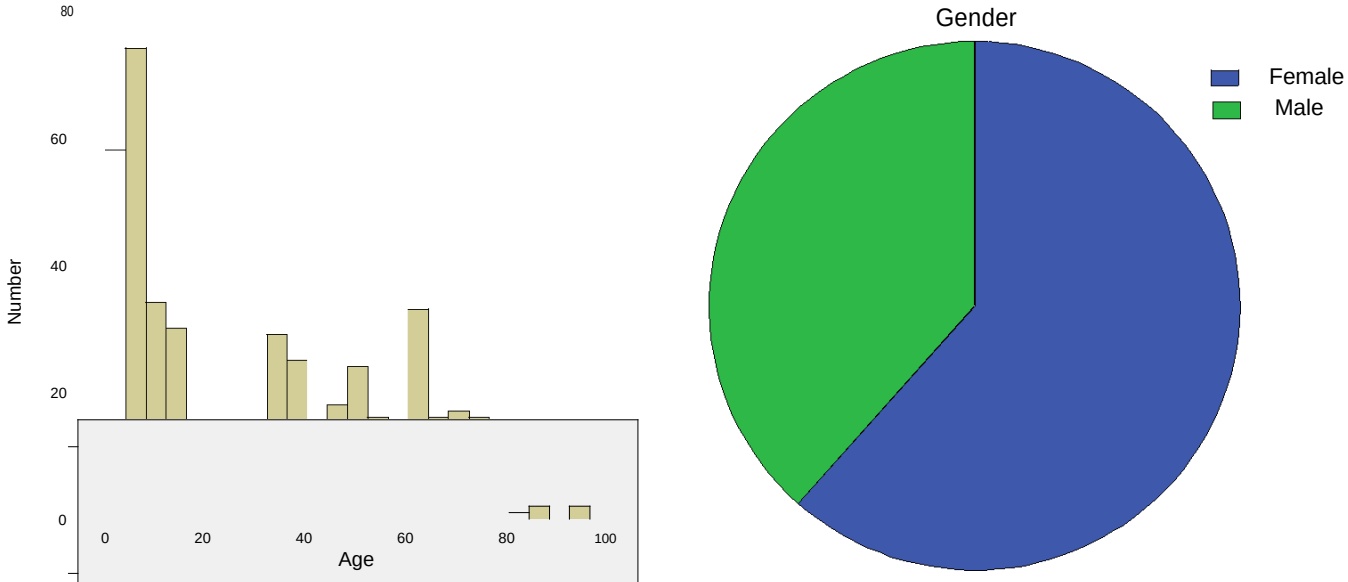

Figure 1. Age and gender distribution.

Table 2. Prevalence of isolated protozoa from patients.

Protozoa	Number (%)
B. hominis	22 (4.31)
E. coli	18 (3.53)
E. disper	8 (1.57)
E. hartomanni	2 (0.39)
G. lambria	2 (0.39)
Iodoamoeba	2 (0.39)
E. nana	1 (0.2)
Total	54* (10.59)

*This number does not mean participant's number. Some participants had mixed infections.

Table 3. The prevalence of multiple protozoa infections among patients.

Protozoa	Number (%)	Remarks
B. hominis + *E. coli*	2 (0.39)	
B. hominis + *E. disper*	2 (0.39)	
E. coli + *E. disper*	4 (0.78)	
E. coli + *E. disper* + *Iodoamoeba*	1 (0.19)	Female, 32 years old
E. coli + *E. disper* + *E. hartomanni* + *E. nana*	1 (0.19)	Male, 12 years old

than previous study in Mexico, current prevalence is not considerably lower compare to other countries. Reports from Qatar observed that, the overall prevalence of total protozoan infections among people in Qatar was 8.0% (Abu-Madi et al., 2010), *E. coli* prevalence among healthy immigrant workers at Saudi Arabia was 12.1% (Makki and Arafa, 2010), *B. hominis* prevalence was 4.3%. In Taiwan, the *B. hominis* prevalence among labors from foreign countries was 2.54% (Hsieh et al., 2010). According to previous Japanese study, the prevalence of *B. hominis* was 1.4% in Kyoto and 0.8% in Osaka, respectively (Yoshida et al., 2002).

We also found cases of multiple protozoan infections among some patients. Eight cases were double infection,

one case was triple infection (*E. disper*, *E. coli* and *Iodoamoeba*), and one case was tetra infection *(E. disper, E. coli, E. nana* and *E. hartomanni*). Notably, none of the subjects showed symptoms compatible with invasive intestinal infection. However until treated, they remain potential distributors capable of discharging cysts of these entamoeba on a daily bases. Therefore, posing a significant health threat to the immunocompromized hosts infants and elderly people. In addition, *G. lambria* and *B. hominis* are considered that one of the major cause of diarrhea, especially among immunocompro-mized HIV/AIDS patient (Kitvatanachai et al., 2008; Al-Megrin et al., 2010).

These protozoan infections are dependent on environmental and personal hygiene. Therefore, improvement of hygiene is crucial to the prevention and control of intestinal protozoa. The health authorities in Mexico City should focus more attention on preventing asymptomatic protozoan infection using a combination of regular mass de-worming program and good hygiene.

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REFERENCES

Abu-Madi MA, Behnke JM, Doiphode SH (2010). Changing trends in intestinal parasitic infections among long –term-residents and settled immigrants in Qatar. Parasit. Vectors, 3: 98, doi:10.1186/1756-3305-3-98

Allen JE, Maizels RM (1996). Immunology of human helminth infection. Int. Arch. Allergy Immunol., 109: 3-10.

Al-Megrin WA (2010). Intestinal parasites infection among immunocompromised patients in Riyadh, Saudi Arabia. Pak. J. Biol. Sci., 13: 390-394.

Diaz E, Mondragon J, Ramirez E, Bernal R (2003). Epidemiology and control of intestinal parasites with nitazoxanide in children in Mexico. Am. J. Trop. Med. Hyg., 68: 384-385.

Garthright WE, Archer DL, Kvenberg JE (1988). Estimates of incidence and costs of intestinal infectious diseases in the United States. Public Health Report, 103: 107-115.

Gualdieri L, Rinaldi L, Petrullo L, Morgoglione ME, Maurelli MP, Musella V, Piemonte M, Caravano L, Coppola MG, Cringoli G (2011). Intestinal parasites in immigrants in the city of Naples (Southern Italy). Acta Trop. (in press).

Hellard ME, Fairley CK (1997). Gastroenteritis in Australia: Who, what, where, and how much? Aust. NZ J. Med., 27: 147-149.

Hsieh MH, Lin WY, Dai CY, Huang JF, Huang CK, Chien H H, Wang CL, Chung WL, Wu JR, Chen ER, Ho CK, Yu ML (2010). Intestinal parasitic infection detected by stool examination in foreign laborers in Kaohsiung. Kaohsiung J. Med. Sci., 26: 136-143.

Kitvatanachai S, Boonsilip S, Watanasatitarpa S (2008). Intestinal parasitic infections in Srimum suburban area of Nakhon Ratchasima Province, Thailand. Trop. Biomed., 25: 237-242.

LeBaron CW, Furatan NP, Lew JF (1990). Viral agents of gastroenteritis. Public health importance and outbreak management. MMWR, 39: 1-24.

Makki SM, Arafa WA (2010). Parasitosis among apparently healthy immigrant workers at Dammam, Saudi Arabia. J. Egypt Soc. Parasitol., 40: 311-320.

Saksirisampant W, Prownebon J, Saksirisampant P, Mungthin M, Siripatanapipong S, Leelayoova S (2009). Intestinal parasitic infections: prevalences in HIV/AIDS patients in a Thai AIDS-care centre. Ann. Trop. Med. Parasitol., 103: 573-581.

USAID/Mexico. HIV/AIDS health profile. Available at URL http://www.usaid.gov/our_work/global_health/aids/Countries/lac/mexico_profile.pdf

WHO (1998). World Health Report 1997-Conquering Suffering Enriching Humanity. World Health Organization.

Yoshida Y, Arizono N (2002). Illustrated Human Parasitology (Zusetsu Jintai Kiseichu Gaku) 6th edition : Nanzando. Tokyo, Japan, pp. 32-33 (in Japanese).

Yoshimura M, Ebukuro M (1988). A modified Tanabe-Chiba medium for detection of Entamoeba Histlytica. Jikken Dobutsu, 37 : 321-324 (in Japanese).

Zuckerman MJ, Ho H, Hooper L, Anderson B, Polly SM (1990). Frequency of recovery of Blastocystis hominis in clinical practice. J. Clin. Gastroenterol., 12: 525 32.