Prevalence of Parasitic Infestations amongst the Food Handlers in a City of North Eastern Region of India.

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Abstracts: **Background & objectives**: The objective of this study was to determine the prevalence of intestinal parasitic infections among food handlers in the city of North eastern region of India. **Materials and Methods:** Three hundred food-handlers were included to in this study. The stool samples were collected from the subjects and examined for intestinal parasites following direct microscopic examination and Formol Ether concentration (Ritchie) technique. **Results:** The majority (88.63%) of the food-handlers (cases) were young adults and middle aged from 20 to 49 years. Eighty eight (29.33%) stool specimens were positive showing 99 different diagnostic stages of parasites. Some specimens were infected by more than 1 parasite. *Ascaris lumbricoides 37*(37.37%) was most frequent among the different detected intestinal parasites followed by *Entamoeba histolytica* 21(21.21%). Other parasites were *Trichuris trichiura* 10(10.10%), *Giardia lamblia 9*(9.09%) and *Taenia species* 5(5.05%). Most of the food handlers were having poor hygiene residing in rural area and slums. **Conclusion:** Routine screening of food handlers is a valuable tool for prevention of food-borne infections among the public. In addition we should provide health education emphasizing the importance of food handlers as potential sources of infections and suggested health institutions for appropriate hygienic and sanitary control measures.[Ghosh A et al NJIRM 2014; 5(2) :15-18]

Key Words: Ascaris lumbricoides, Entamoeba histolytica, food handlers

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Introduction Intestinal parasites and protozoan infections are among the most common infections worldwide. It is estimated that some 3.5 billion people are affected, and that 450 million are ill as a result of these infections, the majority being children.[1] Food is basic requirements for human Survival. Health of the people depends in large extent on the quality of the food.

Food is frequently subjected to contamination by microorganism resulting in illness. Contamination occurs at any point at the journey of foods from producer to consumer. The chances of food contaminated depend largely on health status of food handler's personal hygiene, sanitation, water supply, environment, knowledge of food hygiene. Food handlers with poor personal hygiene could be potential sources of infections of many intestinal helminthes, protozoa, and enteropathogenic bacteria.[2] The spread of disease via food handlers is a common and persistent problem worldwide.[3, 4]

The centre for disease control and prevention have stated that poor personal hygiene is the third most commonly reported food preparation practice contributing to food-borne diseases.[5] Parasitic infections in food handlers may pose a real threat to those who are more susceptible to infection like hospitalized patients especially those who suffered from immune deficient conditions,[6] Therefore, a proper screening procedure may be needed in order to diagnose food handlers, thus preventing possible morbidity and protecting the health of the consumers. This study was aimed at assessing the prevalence of intestinal parasites among food handlers a north eastern region.

Material and Methods: This descriptive cross sectional study was carried out among 300 Food handlers of the city by survey Team during the month of August-September 2007. Purpose of visit by the team was explained to the Food Handlers by doing a workshop. A pretested structured questionnaire was used for collecting information on age, sex, educational level, and hygiene, etc (hand-washing practices of each food handler) and history of Drug, Steroid, antacid etc were taken. Institutional ethics committee approved this study. Written informed consents were taken from patients or parents in case of children prior to the study.

Clinical data like flatulence, lower abdominal Pain, passing of loose stool, blood & mucoid stool were

also recorded to differentiate symptomatic & asymptomatic group clinically. Sample collection, transport, and microscopic examination: Stool samples were collected from each subject in a clean grease free universal container by medical laboratory technicians and transported into the parasitology laboratory in Department of microbiology. The samples were examined macroscopically for parasitic fragments mucus and blood.

Microscopic examination for stool samples: On a glass microscope slide, about 1–2 mg of stool was emulsified in a drop of normal saline (0.85% NaCl) on end of the slide, and in Lugol's iodine on the other side and observed microscopically. Saline direct smear is used mainly for detection of motility of intestinal protozoan trophozoites, ova and cysts which. Iodine mount shows the characteristic features of the diagnostic stages in more details.[7]

Formol ether sedimentation concentration technique Ritchie. Although, this formol ether technique cannot detect trophozoites, it is considered as the best concentration technique used in diagnostic parasitology laboratories for detection of cysts, ova, and larvae.[8,9] Generally, 10% formal saline is used in the Ritchie technique to kill and preserved diagnostic stages. Diethyl ether collects most of debris in a separate layer. All diagnostic stages that are applicable with the Ritchie technique will be concentrated at the bottom of the analysis centrifuge tube. Quantitatively, one slide from the Ritchie technique is a substitute of about 1000 slides or more from the direct smear technique. Thus the greater the amount of stool used, the greater the chance of recovery of diagnostic stages. The Ritchie sedimentation technique was performed by emulsifying about 2 g of stool in 10-15 ml of 10% formal saline. The suspension was allowed to stand for 30 minutes, and then strained through two layers of gauze into a 15 ml conical centrifuge tube and centrifuged at 2000 rpm for 5 minutes. When needed, the washing step was repeated until supernatant becomes clear. The sediment was resuspended with 10 ml of 10% formal saline and allowed to stand for 5-10 minutes. A total of 3 ml of diethyl ether was added, and then the tube was shaken vigorously for 30 seconds and centrifuged at 2000 rpm for 5 minutes. After centrifugation, the applicable diagnostic stages were sediment in the bottom of the tube. The fecal debris was separated in a layer between the diethyl ether and the 10% formal-saline layers. A fecal debris layer was loosened by wooden stick and the tube rapidly inverted to discard the top three layers while the sediment remained at the bottom. One to two drops of iodine were added to the sediment and mixed well. Then, part of the sediment was transferred to a microscope slide, covered with a cover glass and scanned microscopically under low and high objective lenses.[10]

Result: Stool specimens were examined from a total of 300 food handlers. A total of 88 (29.33%) of the workers were tested positive for parasitic infestation. The distribution of the parasitic infections which were prevalent among the different age groups and condition of their hygiene was shown in Table 1

Table: 1: Distribution Of Parasitic Infection And Personal Hygiene In Different Age Groups

Total No of positive cases (%)	20- 29 yrs	30- 39 yrs	40 - 49 yrs	50 – 60 yrs
88 (29.33)	18 (20.45%)	32 (36.36%)	28 (31.81%)	10 (11.36%)
Personal Hygiene: Good 12 (13.6%), Moderate 16 (18.18%), Poor 46 (52.27%), Very poor 14 (15.9%)				

The distribution of the residential quality of the food handlers is demonstrated by the figure 1. Most of the food handlers were cooks (220), followed by dish/utensils washers (40), food provider (36) and helpers. The occupation of the food handlers were described in Table 2. There were 99 diagnostic stages of parasites found in 88 positive cases, some food handlers showed mixed parasitic infections. The Helminthes were the most prevalent, infecting 69 (69.69%) of the food handlers; followed by protozoa 30 (30.30%) which affected food handlers. The distribution of the pathogenic parasites among the food handlers were depicted in Table 3.

Table 2: Distribution Of Occupation Of Total Food Handlers

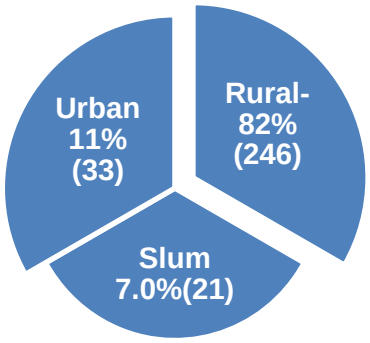
Occupation	Number	Positive Cases
Cook	210	24
Dish/Utensil Washer	40	28
Food Provider	26	17
Helper	24	19
	300 (100)	88 (29.33)

Table 3: Parasites found in food handlers

Food Handlers	Parasites						
	Gl	*Eh*	*Al*	*Tt*	*H*	*T*	Total
Cook (24)	04	06	10	03	02	0	25
Dish /Utensil Washer (28)	03	09	08	04	04	03	31
Food Provider/ Waiters (17)	02	02	06	03	06	02	21
Helper (19)	00	04	13	00	05	00	22
Total = 88	09	21	37	10	17	05	99

GL: *Giardia lamblia* *TT: Trichuris trichiura*
EH: Entamoeba histolytica *H: Hookworm*
AL: Ascaris lumbricoides *T: taenia spp*

Figure 1: Distribution of residential quality among food handlers.



Discussion: Several authors from all over the world have stressed out the importance of food handlers as threats in the transmissions of parasitic and bacterial diseases.[11] The majority (88.63%) of the food-handlers (cases) were young adults and middle aged from 20 to 49 years. In this study, the prevalence (29.33%) of intestinal parasites was quite similar to the other studies (29.1% and 27.9 % in the studies of Andargie *et al* and Takalkar et al)[12,13] and different from 41.1% in the study of Aberal et al and 31.94% of food handlers by Majed et al. (2009) from Saudi Arabia.)[14,15]. Such a varied prevalence of intestinal parasites is largely due to poor personal hygiene practices and environmental sanitation, lack of supply of safe water, and ignorance of health-promotion practices that can be related to their habitats. Mixed intestinal parasite infections were detected in some of the samples. The helminths infection (69.69 %) was more common than those due to protozoa (30.30 %). This pattern is different from that reported by Siddiqui et al[16] who reported protozoa being more common than helminthes and Ghandour et al[17] in cases examined in the Western region of Saudi Arabia and by Nasher[18] in the Southern region.

The most common pathogenic parasites observed in this study were *A. lumbricoides* (37.37%), *E. histolytica* (21.21%), hookworms (17.17%), *Trichuris trichiura* (10.10%), *G.lamblia* (9.09%) and *Taenia species* (5.05%). The possible explanation for these diversity rates of infections is the epidemiological-related conditions of the collected samples, belonging to different countries with special epidemiological situation affecting the infection rates (Marothi and Singh, 2011)[19]. Fallah et al. (2004) in Iran showed that food handlers were infected with *A. lumbricoides* (39%), *E. histolytica* (14.5%) and *G. lamblia* (9%).[20] Infections were most prevalent in 31.81% of dish washers, followed by 27.27% of cooks, 21.59% of Helpers and 19.31 % were waiters. Dish washers were the most commonly infected groups reported by some studies.[21,22] High prevalence amongst washers and cooks were attributed to high prevalence of unhygienic habits and poor personal hygiene. This study suggests that the poor hygiene practice might have been confounded by the fact that most food handlers were individuals from the lower socioeconomic class with low level of education.

Conclusion: The prevalence of intestinal parasites of the food handlers was high in this study. An effective means of preventing the transmission of pathogens from food-handling personnel via food to consumers is strict adherence to good personal hygiene, hygienic food-handling practices and an early diagnosis and treatment of intestinal parasitic infections among food handlers.

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