

ORIGINAL ARTICLE

A Study on Fast Food and Worm Infestation among Food Handlers in a Metropolitan City

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ABSTRACT

Introduction: Parasitic infestation is a global public health issue, especially in developing countries like India. These diseases target a large group of population leading to malabsorption and fatal complications. Food handlers play an important role in cooking and distribution of foods to people. They are potential sources to transmit parasitic infestation to humans. The infestation in long term can predict the risk and progress of protein–energy malnutrition and iron deficiency anemia. Hence, in view of the above issues, the main objective of the study is to find out the level of addiction among food stackers of fast food and also to find out the prevalence of worm infestation among food handlers working in fast food. **Materials and Methods:** A population-based cross-sectional study was carried out from May 2018 to November 2019, to find out the prevalence of worm infestation among food handlers. Around 360 food handlers and 374 food stackers were covered in this study. Simple random sampling technique was used to select the centers. The food handlers were interviewed at one point of time. Initial face-to-face interview was performed and stool samples were collected from the food handlers and examined for intestinal infestation. The data was analyzed using SPSS version 20. **Results:** The prevalence of intestinal worm infestation was found to be 45.5% with 95% confidence interval of 39.6–49.87, the majority of them had protozoan infestation 83.8%. There was a significant contributing environmental factor with intestinal infestations among the food handlers. About 348 (93%) of food stackers regularly consumed food at fast foods on daily basis, either one meal for more than 6 months duration. **Conclusion:** This study confirms the determinant of intestinal parasitic infestation is not only limited to individual factors but also related to household and community. Control of parasitic infections is achieved by multisectoral approach- good sanitation, health education, and anti-parasitic treatment.

Key words: Food handlers, fast food addiction, parasitic infestation

INTRODUCTION

The WHO estimates 50 million people around the world suffer parasitic infections each year.^[1] The overall prevalence of intestinal parasitic infections in India varies from 12.5 to 67% depending on the organism. It is evident from the previous studies that the prevalence of intestinal parasitic infections in Chennai was around 36%. In today's fast moving world, people living in metro cities like Chennai with dense and diverse population, depend on

fast foods for their timely fill ups. Fast foods are available at every corner of road in Chennai and do not even have authentic permission from the local bodies. The food which is served along road premises is precooked reheated either on the previous day or on the same day and spicy. Consumers are not cautious on unhygienic environment. Proper hand washing is not followed by both food handlers and stackers. The infection in long term can predict the risk

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of protein–energy malnutrition and iron deficiency anemia.^[2] Hence, in view of the above issues, the objective of the study is to find out the level of addiction among food stackers and prevalence of worm infestation among food handlers.

MATERIALS AND METHODS

Study Design

This study was a population-based cross-sectional study.

Study Area

The study was conducted in southern part of Chennai urban population.

Study Population

Fast food centers were identified based on their habitation. From a total of 4846 fast food centers, 956 centers were randomly selected by lottery method. Around 374 food stackers and 360 food handlers were randomly selected from the fast food centers. All 374 food stackers were interviewed using the questionnaire. Among 360 food handlers, 354 food handlers gave their stool samples for examination. Stool examination was performed by direct saline and iodine wet mount preparation.

Study Period

The study was carried out from May 2018 to November 2019.

Sample Size

The prevalence of intestinal parasitic infections was taken as the basis for sample size calculation because of public health implications and its importance. The prevalence of intestinal parasitic infection in urban setting was reported to 37.6% by Maria *et al.*^[3] Assuming the 35% in this locality with limit of accuracy as 15% the sample size worked out to be 325.4. The anticipated non-response in providing stool samples was 2 % and accordingly the sample size arrived at 354.

Sampling Unit

Participants of all age groups were taken in as the study population who are currently employed in fast foods.

Sampling Method

A simple random sampling technique was adopted.

Development of Questionnaire

A questionnaire was prepared based on the information obtained by various studies related to the topic. Based

on the observation during pretesting, the modified questionnaire was used in the main study. Standard of living index was used instead of per-capita income for assessing socioeconomic status. Certain questions were rephrased. Informed consent was obtained from participants, prior to data collection.

The ethical approval was taken from the Institutional Ethics Committee of Sri Ramachandra Medical College (REF: IEC-NI/18/APR/64/28) dated May 21, 2018.

RESULTS

Food Stackers

Among the food stackers, a total of 374 individuals were interviewed during their consumption at fast foods. It has been found that 348 (93%) of food stackers regularly consumed food on daily basis, either one meal for more than 6 months duration and remaining 26 (7%) were consuming food regularly for <6 months duration. Age and area wise distribution of food stakers who consume food from fast food is given in Table 1.

Many of the food stackers were not aware of the health implications and their surrounding environmental conditions where food is served, they are only aware of the disposal papers kept on plate while serving food items. It has been found 37% wash their hands before eating and 63% do not wash their hands before eating.

Consumption of food regularly from same premises: It has been observed that most of the food stackers who consumes food from same premises for more than 6 months were 294 (78.6%) compared to other individuals 80 (21.4%) who consumes food on different places nearby.

Type of Food Consumed by Food Stackers

Vegetarian versus mixed diet: It has been found that 299 (79.9%) had mixed consumption of food compared to 75 (20%) who usually consume vegetarian diet. The reason coated by many of the food stackers that they usually believe taking food from plant source has got a least effect on ill health compared to non-vegetarian diet consumptions.

Table 1: Age- and area-wise distribution of food stackers who consume food from fast food

Age	Number	Percentage	95% CI	Chi-square	P value
<30 years	205	46.8	39.9–53.7	0.22	<0.05
More than 30 years	169	44.4	37–51.8		
Rural	186	53.8	46.8–60.8	9.64	<0.001
Urban	188	37.8	30.9–44.7		

Even though there is availability of food at home, the reason for consuming in fast food is, food is readily available at low cost amidst busy work schedule. Around 166 (44.3%) were not aware of health issues caused due to taking fast foods.

Food Handlers

Among the 360 (food handlers), 188 (50.1%) were male and 172 (49.9%) were female food handlers. The age ranged from 14 to 86 years. Of the 360 participants, 354 participants willingly gave their stool samples. It was collected and examined. The response rate was 98.3%.

Environmental Factors

Present study reveals 186 (51.6%), 91 (25.27%), 83 (23%) of food handlers were residing in kutchha, semi-pucca and pucca house respectively. Around 60% of overall prevalence of parasitic infections were contributed by kutchha and semi-pucca dwellers. About 224 (62.2%) participants were living in overcrowded houses.

Personal Hygiene

Among 360 food handlers 212 (58%) did not wash hand before serving and 234 (65%) did not wash their hand with soap after defecation. It was observed that 47.3% of the food handlers had trimmed their finger nails and 95 (26.38%) had the habit of nail biting.

Prevalence of Intestinal Parasitic Infections

Table 2 illustrates, Among 360 food handlers, 354 provided the samples for stool examination. Stool samples from 354 study participants were examined. Out of which 161 had intestinal parasite and overall prevalence of parasitic infections was found to be 45.4% with 95% confidence interval (CI) of 39.6–49.8%. Among the 161 food handlers with parasitic infestation, 83.85% had protozoal infection (*Entamoeba histolytica* and *Giardia*) which was higher than helminthic infestation, 16.15% (pin worm tape worm, hook worm, round worm), shown in Table 3

DISCUSSION

Parasitic infestation is one of the major problems that affect human health, especially in developing countries.^[1] Different studies have been conducted in the field of intestinal parasite found higher prevalence in food handlers. In this study, a prevalence 45.5% of intestinal parasites found among food handlers is different from what was reported by other authors in different parts of the world.^[4,5] Even though it seems to be lower compared to other studies, the prevalence of parasitic infestation is nearly half among the food handlers.

Around 348 (93%) of food stackers regularly consumed food on daily basis in fast foods, either one meal for more

Table 2: Prevalence of parasitic infections among food handlers

Parasitic infections	(n = 354)	Percentage
Absent	193	54.5 %
Present	161	45.5 %

Table 3: Prevalence type of parasitic infections (protozoan and helminths)

Parasite type	Number of food handlers infected (N = 161)
Protozoa (<i>entamoeba</i> and <i>giardia</i>)	135 (83.85%)
Helminths (<i>ascaris</i> , <i>tricuris hook</i> worm <i>tapeworm</i> <i>pinworm</i>)	26 (16.15%)

than 6 months duration which was higher addiction to fast foods compared to results of previous studies done in metro cities. This is a cause of great concern. This study is found to be similar to the prevalence of intestinal infection 46.4% reported in a study conducted in Kadar village of Tamil Nadu,^[6] while other studies in more or less similar group from different parts of India showed varied prevalence.^[7] Interestingly, when other studies done in Chennai, Andaman and Nicobar Island, Karnataka, and Darjeeling,^[8,9] showed higher prevalence of helminthic infections, the present study revealed higher prevalence of protozoal infection 83.85% (*Entamoeba histolytica* and *Giardia*) which was higher than helminthic infestation, 16.15% (pin worm tape worm, hook worm, round worm). Similar findings have been reported by Sackev and Fernandez *et al.* studies.^[2,8]

The prevalence of single parasitic infection was around 38% and less compared to multiple parasites infestations. A study done in Darjeeling^[11] among children showed lower prevalence of single parasitic infection reported 28.2% and higher of multiple infection 23.3% hence it may be concluded that the intensity of multiple infections was comparatively high in the present study. This difference in the prevalence may be attributed to the different geographical area of the latter study. The type of parasites mostly commonly seen is *Entamoeba histolytica*; *Giardia lamblia* which resembles available studies.^[12,13,16]

INTESTINAL PARASITES AND ASSOCIATED FACTORS

Water and Parasitic Infections

In the present study, it has been reported that improper water supply, source of water and cooking practices contributed to parasitic infection. On comparing this with Sugunan *et al*, Ali *et al* studies^[9,14]. The higher prevalence of waterborne protozoal infection was attributed to their use of untreated water

Type of Home and Overcrowding

In the current study around 186 (51.6 %), 91(25.27%), 83 (23%) of food handlers were residing in kutcha, semi-pucca and pucca house respectively. Food handlers living in kutcha and semi pucca houses constituted about 60% of overall parasitic prevalence compared to pucca dwellers. Similar significant association between type of house, low socio economic status and prevalence parasitic infestation was illustrated in a study at Egypt by Curtale^[15]

This study revealed that around 62.2 % of food handlers were living in over crowded environment, among them more than half of the food handlers were found to have intestinal parasitic infestations due to increased intrafamilial transmission in overcrowded houses These observations were nearly similar to study done in Argentina^[16] It stated that there was positive correlation between the presence of internal parasitic infection and overcrowding. Majority of the study participants belong to joint family, importance of personal hygiene among food handlers, was not adequate. There are high risk of transmitting the infection to other members of the family, especially among children.

Personal Hygiene of Food Handlers

Among 360 food handlers 212 (58%) did not wash hand before serving and 234 (65%) did not wash their hand with soap after defecation. It was observed that 47.3% of the food handlers had trimmed their finger nails and 95 (26.38%) had the habit of nail biting. Similar to reports of Sackev and Fernandez *et al.* studies.^[2,8] Therefore personal hygiene among the food handlers was found to be very poor.

The environmental factors of the food handlers were found to be favorable for the transmission of parasitic infections which resembles Carter *et al.*^[4] contributions.

CONCLUSION

The study confirms the determinants of intestinal parasitic infestations is not only limited to individual factors but also related to household and community. Multisectoral approach to control of parasitic infections must be adopted as advocated by the WHO. Control of parasitic infections is achieved by good sanitation, health education, and anti-parasitic treatment. Low socioeconomic factors, levels of education, surrounding environmental factors, solid waste, and nuisance have statistically significant association with intestinal infestation. Behavioral changes of food handlers were very important. Hence, strict law / policy should be implemented among food handlers as public health importance. Frequent practice of thorough hand washing with soap and water to be encouraged among both food handlers and food stackers.

FUNDING

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CONFLICTS OF INTEREST

None declared.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee of SRMC &RI (SRU), Chennai (REF: IEC-NI/18/APR/64/28), dated May 21, 2018.

REFERENCES

1. World Health Organization, Division of Control of Tropical Disease. Intestinal Parasites Control; 1998. Available from: <http://www.who.int/ctd/html/intest.html>.
2. Sackev ME. Intestinal Factors and Parasite Infections: Prevalence, Risk Factors and Consequences for Child Growth, Iron Status and Development in Rural Ecuador. Msc. Thesis. Ecuador: Virginia Polytechnic and State University; 2001.
3. Norhayati M, Fatmah MS, Yusof S, Edariah AB. Intestinal parasitic infections in man: A review. *Med J Malaysia* 2003;58:296-306.
4. Carter ML. Anemia Anorexia Helminth and Wealth. Vol. 6. Hyderabad: Proceedings of the Nutritional Society of India; 1993. p. 1-12
5. Paniker CK. Textbook of Medical Parasitology: Protozoology and Helminthology. 1st ed. India: All India Publishers and Distributors; 1996.
6. Ananthkrishnan S, Pani SP, Nalini P. A comprehensive study of morbidity in school age children. *Indian Pediatr* 2001;38:1009-17.
7. Gupta PK. Health status of rural school children. *Indian Pediatr* 1989;26:581-4.
8. Fernandez MC, Verghese S, Bhuvanewari R, Elizabeth SJ, Mathew T, Anitha A, *et al.* A comparative study of the intestinal parasites prevalent among children living in rural and urban settings in and around Chennai. *J Commun Dis* 2002;34:35-9.
9. Sugunan AP, Murhekar MV, Sehgal SC. Intestinal parasitic infestation among different population groups of Andaman and Nicobar islands. *J Commun Dis* 1996;28:253-9.
10. Curtale F, Nabil M, El Wakeel A, Shamy MY. Anaemia and intestinal parasitic infections among school age children in Behera Governorate, Egypt. Behera Survey Team. *J Trop Pediatr* 1998;44:323-8.
11. Ram R, Chakraborty M, Sarkar M, Bhattacharya SK. Parasitosis: A study among Nepali children in the district of Darjeeling. *J Indian Med Assoc* 2004;102:349-52.
12. Singh HL, Singh NB, Singh YI. Helminthic infestation of the primary school-going children in Manipur. *J Commun Dis* 2004;36:111-6.
13. Sharma RS, Mahadik VJ. Prevalence of intestinal parasites in a rural area of Rajasthan. *J Commun Dis* 1988;20:312-5.
14. Ali I, Mekete G, Wodajo N. Intestinal parasitism and related risk factors among students of Asendabo Elementary and

- Junior Secondary school, South Western Ethiopia. *Ethiop J Health Dev* 1999;13:157-62.
15. Curtale F, Pezzotti P, Saad Y S, Aloï A. An analysis of individual, household, and environmental risk factors for intestinal helminth infection among children in Qena Governorate, Upper Egypt. *J Trop Pediatr* 1999;45:14-7.
 16. Soriano SV, Barbieri LM, Pierángeli NB, Giayetto AL, Manacorda AM, Castronovo E, *et al.* Intestinal parasites and the environment: Frequency of intestinal parasites in children of Neuquén, Patagonia, Argentina. *Rev Latinoam Microbiol* 2001;43:96-101.
 17. Sung JF, Lin RS, Huang KC, Wang SY, Lu YJ. Pinworm control and risk factors of pinworm infection among primary-school children in Taiwan. *Am J Trop Med Hyg* 2001;65:558-62.