



Research Article

A Pilot Study on the Incidence of Intestinal Parasitic Infestations among Food Handlers in a Tertiary Care Center

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ABSTRACT

Introduction: Intestinal parasitic infections are a major public health issue, especially in developing countries. They are more common in rural areas due to poor hygiene, overcrowding, and unsafe food and water. Food handlers are key in transmission, as inadequate hand hygiene can spread parasites through contaminated food, affecting both themselves and the community.

Aim: The present study is to know the incidence, distribution of the intestinal parasitic infestation among food handlers.

Materials and methods: The present study was conducted over a period of six months (January–June 2020) among food handlers in Ammapettai. Stool samples were collected in sterile containers and processed for routine macroscopic and microscopic examination. Microscopic evaluation included saline and iodine preparations, along with concentration techniques such as the formal-ether sedimentation method.

Results: Among 86 samples, out of which 39(45.34%) stool samples of food handlers were positive for parasitic infection & 47 (54.65%) were negative. The parasites encountered were - *Ascaris lumbricoides* – 13, *Ancylostoma duodenale* – 7, *Entamoeba histolytica* – 6, *Taenia species* – 4, Mixed infections – 4, *Trichuris trichiura* – 2, *Giardia lamblia* – 2 and *Strongyloides larva* – 1.

Conclusion: The study revealed a high incidence of intestinal parasitic infestations (45.34%) among food handlers, with *Ascaris lumbricoides* being the most prevalent parasite. The findings highlight the potential public health risk posed by asymptomatic carriers in food establishments.

Keywords: Intestinal parasites, food handlers, health education and contamination.

INTRODUCTION:

Intestinal parasitic infections are major health problem in most of the regions of the world, especially in developing countries. These infections differ from place to place and commonly seen in rural population due to poor hygiene, overcrowding, contaminated food and water⁽¹⁾. Intestinal parasites can be acquired by contamination of hands by the food handlers by feco-oral route, which finally leads to transmission of infections to the public in the local community⁽²⁾.

Changes in life style and food habits, due to occupation, make people to eat in restaurants which have inadequate hygiene conditions. This mainly depends on the health status of food handlers and their hygiene practices. It may lead to food-borne diseases. Food-borne diseases are increasing in both developing and developed countries. Diarrheal diseases, mostly common seen in the developing countries⁽³⁾.

The prevalence rate of intestinal infestations ranges from 14.6% to maximum of 91% in different studies, conducted in various parts of the country⁽⁴⁾.

Protozoal species like amoebiasis and giardiasis and the soil transmitted helminths (STH) like Ascaris, Trichuris and Hookworm are the important causes of childhood morbidity and mortality in developing countries like India. Global estimation of STH infections are more than 2000million and these are responsible for significant morbidity and 155,000 deaths annually ⁽⁵⁾

Soil-transmitted helminthes (STH) considered to be of global health concern are Ascaris, Trichuris and Ancylostoma etc. The WHO estimates that more than one billion of the world's population is chronically infected with STH. The high prevalence of this infection is closely correlated with contaminated food and water, poverty, poor environmental hygiene and impoverished health services ⁽⁶⁾.The present study was conducted to know the incidence of parasitic infestations and their distribution in food handlers nearby study area various food established.

Objectives:

1. To determine the incidence of intestinal parasitic infestations among food handlers.
2. To assess the distribution patterns of intestinal parasitic infestations among food handlers.

Materials and methods: This present pilot study was carried with total of 86 food handlers over a period of 6 months in our hospital laboratory with willing concern from food handlers in Ammapettai, after getting prior permission from the Institutional Ethical Committee (IEC).

Inclusion criteria: Symptomatic / asymptomatic food handlers who are willing & who were not on any treatment for intestinal parasites for 3 months.

Exclusion criteria: Unwilling asymptomatic food handlers.

Samples were collected randomly from those who are willing to take part in the study. They are instructed the importance of the study and to collect stool samples after getting their consent, in a sterile container. The samples are duly labeled and filled requisition form with relevant details like age, sex, symptoms if any and hygienic habits of food handlers with structured questionnaire details like education, cleanliness of hands before cooking and after cooking, use of head caps, gloves, nails & history of drug intake.

Stool examination for to detect ova/cyst: Macroscopic examination: Consistency, Presence of blood, mucus, segments, worms, color of the stool will be noted and recorded⁽⁷⁾.

Microscopic examination:

The stool specimens are examined microscopically under low and high-power objective, by saline; iodine wet mount preparations. Samples which were negative in mount will be subjected for concentration technique like formal ether and if it found negative by this procedure, reported as negative.

Formal ether concentration technique:

Formalin–ether concentration technique was employed to recover even minimal quantities of parasitic eggs and cysts. Approximately one teaspoon of fresh stool was placed in a 15 ml container and mixed with 5% formalin, then allowed to stand for 30 minutes. The supernatant was discarded, and the sediment was resuspended in 7 ml of 5% formalin. Subsequently, 3 ml of ether was added, and the mixture was centrifuged at 500 g for 10 minutes. The resulting sediment was then mixed with a drop of formalin, and a wet mount was prepared for microscopic examination ⁽⁸⁾.

Those positive samples of food handlers will be treated by the clinician prescribed drug. After a two weeks duration the samples of the treated food handlers will be repeated to check the proper deworming, if still positive for parasites he will be brought to OP of General Medicine and treated.

Results:

The study was done over a period of 6 months. Samples were 86, out of which 39 (45.34%) stool samples of food handlers were positive for parasitic infection & 47 (54.65%) were negative for parasitic infections. Among them 62 (72.09%) were males & 24 (27.90%) were females.

Among the 62 of males screened 32 (51.61%) were positive & 24 females 7 (29.16%) of them were positive, males had higher incidence of parasitic infections.

Table 1: Parasitic infestation among children (n=86)

Parasitic infection	Males	Females	Total
Positive	32	7	39
Negative	30	17	47
Total	62	24	86

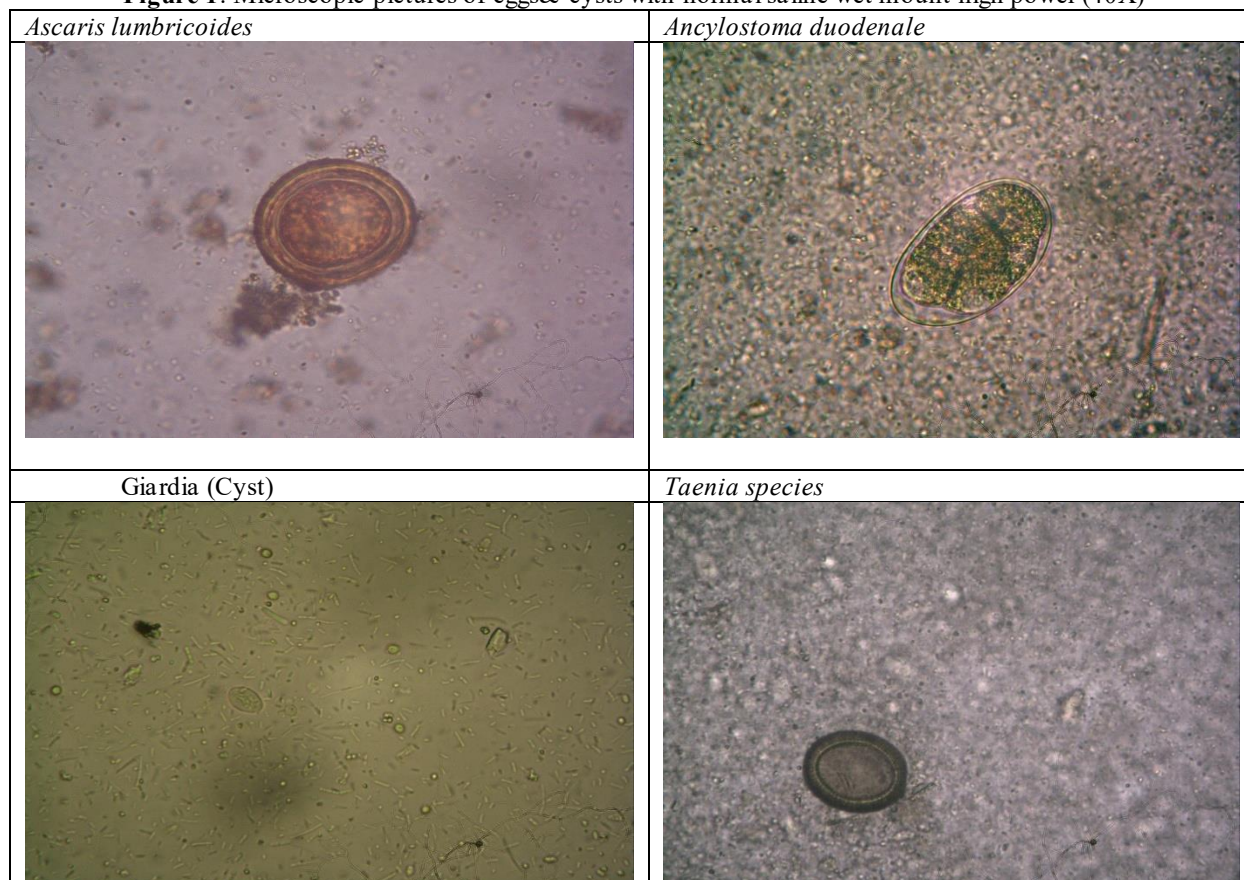
The parasites encountered were - *Ascaris lumbricoides* – 13, *Ancylostoma duodenale*- 7, *Entamoeba histolytica*- 6, *Taenia species*- 4, Mixed infections - 4. Mixed type of infection includes –*Ascaris lumbricoides*+ *Taenia species* - 1, *Entamoeba histolytica* + *Ascaris lumbricoides*- 2, *Ancylostoma duodenale* + *Ascaris lumbricoides*-1, *Trichuris trichiura* – 2, *Giardia lamblia*-2 & *Strongyloides larva*- 1.- (Figure-1)

The most common parasites in food handlers are *Ascaris lumbricoides*, *Ancylostoma duodenale* followed by other parasites. Parasitic infections in food handlers, after applying chi-square test $X^2 = 9.775$ and $p=0.002$, so it shows there is a significant in the study group.

Table 2: Distribution of parasitic infections among food handlers (n=86)

Names of the parasites	Food handlers' type			
	Cook (%)	Food servers (%)	Helper (%)	Total (%)
<i>Ascaris lumbricoides</i>	8 (20.51)	4 (10.25)	1 (2.56)	13 (33.3%)
<i>Ancylostoma duodenale</i>	2(5.12)	2 (5.12)	3 (7.69)	7 (17.94)
<i>Entamoeba histolytica</i>	2 (5.12)	4 (10.25)	0	6 (15.38)
<i>Taenia species</i>	2 (5.12)	1 (2.56)	1 (2.56)	4 (10.25)
Mixed type of infection	3 (7.69)	0	1 (2.56)	4 (10.25)
<i>Trichuris trichiura</i>	0	1 (2.56)	1 (2.56)	2 (5.12)
<i>Giardia lamblia</i>	1 (2.56)	1 (2.56)	0	2 (5.12)
<i>Strongyloides larva</i>	0	0	1 (2.56)	1 (2.56)
Total	18 (20.93)	13 (15.11)	8 (9.3)	39 (45.34)

Figure 1: Microscopic pictures of eggs& cysts with normal saline wet mount high power (40X)



Discussion:

The present study revealed a notably high prevalence of intestinal parasitic infections among food handlers in the study area, with 45% of individuals testing positive for one or more parasites. This significant burden not only poses a risk to

the health of the food handlers themselves but also raises serious public health concerns regarding the potential for foodborne transmission to consumers. The high positivity rate observed in this study is consistent with findings from similar investigations conducted in other parts of India and developing regions, where poor personal hygiene, lack of awareness, and inadequate sanitation infrastructure continue to contribute to the persistence of parasitic infections⁽⁹⁾.

In our study, mixed infections were identified in 4 samples (10%), indicating a relatively higher occurrence compared to the findings of Hindi et al., who reported only 1 case (4.31%) of mixed infection in their study. This difference may be attributed to variations in study population, geographical location, hygiene practices, or methodological approaches used for parasite detection⁽¹⁰⁾.

Interestingly, the data also indicated that male food handlers exhibited a higher incidence of parasitic infections compared to their female counterparts. Several factors could be contributing to this disparity. Males in the study population may be more likely to engage in outdoor or mobile food vending activities, often in less hygienic environments where access to clean water and sanitary facilities is limited. Moreover, differences in hygiene practices between genders may play a role. Some previous studies have reported that male food handlers are less likely to adhere strictly to handwashing and other personal hygiene protocols, increasing their susceptibility to acquiring and transmitting infections.

In addition, socio-behavioral factors such as smoking, alcohol use, and lack of health education which are often more prevalent among male populations in certain settings may also indirectly contribute to their higher infection rates⁽¹¹⁾. The high prevalence of intestinal parasites among food cooks and food servers can largely be attributed to unhygienic habits and poor personal hygiene practices. In our study, food cooks were found to have the highest rate of infection, with 18 individuals (20.93%) testing positive.

This finding is consistent with the study conducted by Arun Ghosh et al., who also reported maximum infectivity among food cooks (29.3%). However, the prevalence reported in their study was higher than that observed in our findings. The similarity between both studies highlights the increased vulnerability of food cooks to parasitic infections, possibly due to their direct and prolonged contact with raw food materials, frequent exposure to contaminated environments, and inadequate adherence to hand hygiene practices⁽¹²⁾.

All the 86 food handlers included in the study were provided with health education focusing on the importance of personal hygiene, safe food handling practices, and measures to prevent parasitic transmission. The 39 food handlers who tested positive for intestinal parasites were treated appropriately with antihelminthic agents—Metronidazole 400 mg twice daily for 5 days and a single dose of Albendazole 400 mg. Following treatment, a repeat stool examination was carried out for all participants after 3 weeks⁽¹³⁾. The results showed complete clearance of parasites, with no positive cases detected, indicating both the effectiveness of the treatment regimen and the impact of health education on improving hygienic practices.

Conclusion: The findings emphasize the urgent need for health education, routine screening, and deworming programs, especially focused on male food handlers, to reduce the burden of parasitic diseases in this occupational group.

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Conflict of Interest: Nil

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