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Original Research Paper

Microbiology

EVALUATION OF STOOL SAMPLES OF FOOD HANDLERS FOR PARASITES, OVA AND CYSTS

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ABSTRACT Food borne infections, infestations and intoxications are one of the leading causes for worldwide morbidity and mortality. According to recent studies, most parasitic food-borne diseases are a result of poor sanitary and hygienic conditions and contamination of food and water. Thus, in a setting of a hostel, food handlers become the primary and major source of transmission of such illnesses. It hence becomes important to screen these food handlers for a carrier state of such illnesses, which otherwise goes undetected. The easiest way to do this is for screening the stool samples of these food handlers for the parasites, their ova and cysts, which was the aim of this study. Fifty food handlers, working in various parts of Kempegowda Institute of Medical Sciences, Bangalore and attached institutions, were screened for the presence of a carrier state, and the incidence was calculated. To prevent transmission of these parasites to the various medical undergraduates, postgraduates and healthcare professionals dependent on them, and thus in the long run reduce the morbidity and increase productivity, appropriate treatment was provided to the food handlers found to be carriers to bring down any chance of the transmission.

KEYWORDS : food handlers, stool samples, carriers, screen, treatment

INTRODUCTION

Food borne infections and infestations are one of the leading causes of morbidity and mortality among general population. Over 200 diseases are caused by consuming food contaminated by bacteria, viruses, protozoa, parasites or chemicals and heavy metals.[1]A majority of them are parasite borne.

According to the World Health Organization, parasitic diseases resulted in 48.4 million cases and 59,724 deaths annually, resulting in 8.78 million Disability Adjusted Life Years (DALYs), and it is estimated that 48 % of these parasitic diseases were food-borne.[2]

Foodborne parasitic diseases can be caused by contamination of food at any stage of the food production, delivery and consumption chain. Food handlers, being involved in virtually all of these steps, thus, pose as major causes of contamination of food, especially if they are dormant carriers of parasites, their ova or cysts. This transmission is termed as 'anthroponotic transmission'. This has historically been witnessed in the case of Typhoid Mary, who, as the first identified carrier of food borne infestations, is known to have caused contamination of at least one hundred and twenty-two people, with five known deaths. [3]

The major parasites responsible for such contamination include the species of *Ascaris*, *Trichinella*, *Cryptosporidum* and *Giardia*. [4] All of these parasites have well known and identified carrier states and recorded anthroponotic transmission.

In a resource poor country like India, a very easy and affordable method of identification of such carriers is by collection of stool samples from the food handlers and subjecting them to basic microscopic staining and examination. Stool examination, historically, is the basis of definitive gastrointestinal infection in a patient and a carrier. [5]

In the current day India, and specifically Karnataka, a major proportion of medical/paramedical undergraduates, postgraduates and healthcare professionals depend on canteens and messes for at least one of their meals. Any contamination of this food consumed by them can cause a fall in productivity and the level of healthcare provided to the patients they attend to.

Therefore, it is of the utmost importance to regularly identify the carrier rate in food handlers in such medical and associated institutions and provide

Figure 1: *Ascaris* egg under microscope.
SOURCE: (*CDC - DPDx - Ascariasis*, n.d.)

appropriate treatment to them to eradicate the carrier state and thus prevent transmission.

Case Study

In the present prospective case study, the stool samples of food handlers of various parts of Kempegowda Institute of Medical Sciences, a medical institute in Bangalore, Karnataka, were screened for the presence of parasites, ova and cysts using microscopic techniques and staining. The carrier rate was calculated, and if identified to be carriers, the food handlers were treated with appropriate medication free of cost.

OBJECTIVES

The primary objective of the study was to screen food handlers for presence of parasites, ova and cysts.

The secondary objectives included:

- Calculation of carrier rate of parasites among food handlers
- Provision of treatment, free of cost, if carrier state identified

METHODOLOGY

A prospective case study was carried out in 50 stool samples collected, after explaining the proper procedure, from all the food handlers from the following places-

1. KIMS Boy's Hostel, Banashankari, Bangalore
2. KIMS Girl's Hostel, Banashankari, Bangalore
3. VS Dental College Canteen, KR Road, Bangalore
4. Upahara Darshini, KIMSRH, KR Road, Bangalore

The samples were collected in screw capped stool sample collection cylindrical containers with pre attached spoon on the inner end of the container.

The collected stool samples were subjected to two sets of examinations:

1. Unstained Wet Saline mount and iodine staining on same slide.
2. Concentration using the Saturated Salt Solution Technique and examined under the microscope as follows [6]-

- About 2ml of saturated solution of sodium chloride taken in a flat-bottomed tube and 1g of faeces emulsified in it
- The container then filled completely to the brim with the salt solution.
- A slide placed on the container, so that it was in contact with the surface of the solution without any intervening bubbles. After standing for 20-30 minutes, the slide will be removed, without jerking, reversed to bring the wet surface on top, and examined under the microscope.

The slides were examined for parasites, ova and their cysts.
The carrier rate was calculated as follows-

$$Carrier\ rate = \frac{No.of\ identified\ carriers}{Total\ number\ of\ subjects\ tested} * 100 [7]$$

If found to be carriers, the subjects will be treated with appropriate anti-parasitic medication (as appropriate), free of cost.

RESULTS

Post examination of the stool samples, the results were as follows-

SERIAL NO.	AGE	GENDER	SALINE MOUNT	IODINE MOUNT	FLOATATION TECHNIQUE	TRETAMENT
KIMS MEN'S HSOTEL						
1	43	FEMALE	-	-	-	-
2	46	FEMALE	-	-	-	-
3	57	FEMALE	-	-	-	-
4	34	FEMALE	-	-	-	-
5	46	FEMALE	-	-	-	-
6	32	FEMALE	-	-	-	-
7	51	FEMALE	-	-	-	-
8	30	FEMALE	-	-	-	-
9	37	FEMALE	-	-	-	-
10	34	FEMALE	-	-	-	-
KIMS LADIES HOSTEL						
11	45	FEMALE	-	-	-	-
12	47	FEMALE	-	-	+	YES
13	38	FEMALE	-	-	-	-
14	41	FEMALE	-	-	-	-
15	32	FEMALE	-	-	-	-
16	52	FEMALE	-	-	-	-
17	34	FEMALE	-	-	-	-
18	34	FEMALE	-	-	-	-
19	47	FEMALE	-	-	-	-
20	30	FEMALE	-	-	-	-
21	43	FEMALE	-	-	-	-
VS DENTAL COLLEGE HOSTEL						
22	40	FEMALE	-	-	-	-
23	36	FEMALE	-	-	-	-
24	34	FEMALE	-	-	+	YES
25	34	FEMALE	-	-	-	-
26	43	FEMALE	-	-	-	-
27	47	FEMALE	-	-	+	YES
28	48	FEMALE	-	-	-	-
29	37	FEMALE	-	-	-	-
30	51	FEMALE	-	-	-	-
31	30	FEMALE	-	-	-	-
32	43	FEMALE	-	-	-	-
33	42	FEMALE	-	-	-	-
34	39	FEMALE	-	-	-	-
35	40	FEMALE	-	-	-	-
36	35	FEMALE	-	-	-	-
UPAHARA DARSHINI, KIMS HOSPITAL						
37	46	MALE	-	-	-	-
38	44	MALE	-	-	-	-
39	44	MALE	-	-	-	-
40	32	MALE	-	-	+	YES
41	29	MALE	-	-	-	-
42	25	MALE	-	-	-	-
43	27	MALE	-	-	-	-
44	31	MALE	-	-	-	-
45	48	MALE	-	-	-	-
46	30	MALE	-	-	-	-
47	32	MALE	-	-	+	YES
48	29	MALE	-	-	-	-
49	43	MALE	-	-	-	-
50	40	MALE	-	-	-	-

Out of the 50 food handlers screened, 5 were found to be carriers of parasites, or their ova or cysts.

The incidence rate calculated using the aforementioned formula comes up to 10%.

Appropriate treatment was administered to all those food handlers found to be carriers.

DISCUSSION

Food safety still continues to be a major concern in developing nations. Food borne diseases are associated with outbreaks and pose a threat to public health security. [8] According to WHO, these food borne diseases are a serious issue due to bad hygienic food handling methods.

Although known diarrheal diseases such as typhoid are under regular surveillance by the integrated disease surveillance project of India [9], only limited food outbreaks were subjected to proper epidemiological investigation.[10] Thus, screening of food handlers catering to a wide population becomes impervious to prevent such outbreaks.

In this study, 5 among the 50 food handlers screened for the presence of carrier state for parasites, ova and cysts that could infect food and lead to diarrheal disease, were found to be carriers, bringing the incidence rate of carriers of the same among food handlers of various institutions linked to Kempegowda Institute of Medical Sciences, Bangalore, to 10%. All the identified carriers were adequately treated free of cost to prevent the spread of infection.

The main factors associated with good food handling practices and thus prevention of diarrhoeal outbreaks include safety training, supervision by health professionals, routine health check-ups and food handling knowledge. [11]

In conclusion, random screening of food handlers for identification of carrier state of infection or infestation is as important as education about food handling practices and sanitation, along with constant supervision of the same. These factors must go hand in hand to bring down the transmission of diarrheal diseases and outbreaks.

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