

# PREVALENCE OF BACTERIAL PATHOGENS IN A TERTIARY CARE HOSPITAL AMONG FOOD HANDLERS

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## ABSTRACT:

**Background:** One of the public health threats in India is intestinal infections. Transmission by fruit, water, nails and fingers of intestinal parasites and enteropathogenic bacteria happens either directly or indirectly. These diseases endanger hospitalised patients and patients with immune defects. In our hospital, the present research was conducted to investigate the incidence of entry opathogenic bacterial infection in food service institution areas among food handlers.

**Materials and methods:** This analysis was carried out by 62 food handlers working in different food facilities (male 28, female 34). Using sterile cotton tipped swabs; swabs from both hands (palm, swabs, underneath, finger nails) were obtained from each subject. A clean big mouthed tub of all 62 participants gathered freshly passed stool samples. After 24 hours, all the plates were inspected and marked with a test script according to normal protocol. Detection of methicillin resistant *Staphylococcus aureus* was conducted according to CLSI guidelines using cefoxitin disc 30µg and ESBL detection.

**Result:** Among the 62 food handlers, males were 28 and females were 34 out of 62 samples, 47 (74.80%) samples had growth. Females 32 (51.61%) were found to be more infected and the age group between 18 – 30 yrs. Among 62 samples 15 had no growth, 39 had a single bacterial growth. *Staphylococcus aureus* 21 (33.87%) is the predominant isolate among gram positive organisms. *E.coli* 34 (54.83%) was the predominant isolate among gram negatives. No enteropathogenic bacteria like salmonella, shigella grown in culture. None of the *Staphylococci* isolates were MRSA positive, and ESBL producing organisms like *E.coli* & *klebsiella* were positive 6 (17.6%) & 2 ( 7.40%) respectively. All the food handlers positive for bacterial growth were appropriately treated and health education given. Repeat swab culture from all the food handlers were done after 6 weeks and it showed negative.

**Conclusion:** In order to control intestinal diseases, proper personal hygiene and productive means of educating all workers, stringent infection control policies and daily monitoring are very important.

**Keywords:** Food handlers, Intestinal infection, personal hygiene,

## INTRODUCTION

Intestinal infections are one of the public health problems in India <sup>[1]</sup>. The spread of food borne diseases via food handlers have affected large number of people and are a persistent problem world wide <sup>[2]</sup>. Bad personal hygiene has been identified by the Centre for Disease Control and Prevention as one of the common factors leading to foodborne diseases. Meat,

water, nails and fingers can spread parasites and enteropathogenic bacteria, either directly or indirectly.<sup>[4]</sup>

The bacteria important for transmission are the salmonella typhi, shigella species, campylobacter jejuni, enterohaemorrhagic E.coli, Enterotoxigenic E.coli<sup>[5]</sup>. These infections are threat to hospitalised patients and immunodeficient patients<sup>[6]</sup>. This present research was therefore carried out in our hospital to study the prevalence of bacterial infections causing infection in food service establishments among food handlers.

## MATERIALS AND METHODS

This research was conducted among 62 food handlers (male, female 34) employed in our hospital's separate food establishments. After securing the approval of the ethics committee and the written consent of the participants, this study was performed.

### Inclusion criteria

In the report, regular and balanced food handlers were included in food establishment regions, both male and female.

### Requirements for Omission

Food administrators who have suffered from diarrhoea or diarrhoea in the past 3 months and others who want to engage in the study<sup>[7]</sup>. Data on age, sex, level of education and hand hygiene habits were obtained from each food handler.

Swabs from both hands (palm, swabs, beneath, finger nails) were collected by each researcher using a sterile cotton tipped swab in a sterile brain heart infusion broth tube.<sup>[8]</sup>

A clean big mouthed tub of all 62 participants gathered freshly passed stool samples. The swabs and stool samples were processed as per normal practise immediately after processing. On blood agar, hand swabs were inoculated, macConkey agar incubated at 37C and checked for development, the number of colony-forming units grown on each dish was counted.<sup>[9]</sup>

Detection of methicillin-resistant Staphylococcus aureus with Cefoxitin disc 30µg and gram-negative species was screened for ESBL and verified in compliance with CLSI guidelines with the double disc diffusion system<sup>[10]</sup>. Both stool samples were cultivated for enrichment of Deoxycholates citrate agar, MacConkey agar and blood agar, selerite F broth. All the plates were examined after 24hrs and identified with a series of tests according to standard procedure<sup>[11]</sup>. Those food handlers identified with positive infection were kept off from work treatment given, and if there were found to be positive for entero pathogenic bacteria then repeat cultures to be done twice after cessation of treatment<sup>[12]</sup>.

## RESULT

Among the 62 food handlers, males were 28, females were 34 out of 62 samples, 47 (74.80%) samples had growth. The Table 1 showing socio demographic pattern and hand hygiene practices of food handlers.

**Table 1.** Socio demographic pattern

variables	total no = 62	
	No.	%
Male	28	45.16
Female	32	51.61
Age group		
18 – 30 yrs	38	61.29
30 – 50yrs	16	25.08
> 50yrs	8	12.90
Literacy rate		

Illiterate	14	23.33
Upto school level	21	35.01
Personal hygiene		
hand washing before & after serving meal	19	30.64
hand washing after visiting toilet	24	38.70
after touching body parts	12	19.35
regular trimming of nails	16	25.80

Females 32 (51.61%) were found to be more infected and the age group maximum infected is between 18 – 30 yrs 38 (61.29%). From this table more than 60% of food handlers have poor hygiene.

**Table 2.** showing the type of bacteria isolated n= 62

Types of bacteria	n	%
Sample with single bacteria grown	39	62.90
more than one bacteria grown	8	12.90
no growth	15	24.19

Among 62 samples, 15 had no growth, 39 had a single bacterial growth

**Table 3.** showing the organisms grown in swabs of food handlers n= 62

Gram positive	n	%
Staphylococcus aureus	21	33.87
Micrococci	14	22.58
Coagulase negative staphylococci	11	17.74
Enterococci feacalis	9	14.51

Staphylococcus aureus 21 (33.87%) is the predominant isolate among gram positives.

**Table 4.** Gram Negatives

Gram negative	n	%
Escherichia coli	27	43.54
Klebsiella pneumoniae	34	54.83
Pseudomonas species	12	19.35
ESBL producing E.coli	6	17.6
Klebsiella	2	7.40

E.coli 34 (54.83%) was the predominant isolate among gram negatives. No enteropathogenic bacteria like salmonella, shigella grown in culture. None of the Staphylococci isolates were MRSA positive, and ESBL producing organisms like E.coli & klebsiella were positive 6 (17.6%) & 2 (7.40%) respectively. All the food handlers positive for bacterial growth were appropriately treated with course of antibiotics and health education given regarding their personal hygiene like hand washing wearing protective equipment like glove, mask, cap, nail trimming. Repeat swab culture from all the food handlers was done after 6 weeks and it showed negative.

## DISCUSSION

Intestinal infections among food handlers pose a significant threat and major public health issue. In a culture, the prevalence of enteropathogenic species varies according to the geographical location.<sup>[13]</sup>

Out of 62 samples, 47 (74.80%) had growth. This is lower when compared to study done by tathe et al who isolated 98.1% of growth in their study<sup>[14]</sup>. The maximum infected group in our sample was 18-30 years, which is consistent with Takalkar et al's study, which also recorded maximum infectivity in 20-40 years<sup>[15]</sup>.

In our sample, women (51.1%) were slightly more infected than male food handlers, which is close to the study performed by Waseem Arjun et al, who also stated that female handlers were more infected (31.4 percent)<sup>[16]</sup>. In our study significant association was seen with hand washing practises, personal hygiene that 72.14% of health workers do not wash hands were infected. Which is slightly higher than the similar findings reported by Zain MM et al who also reported 57.2% of food handlers who had no knowledge and not practicing hand washing were infected<sup>[17]</sup>.

In our study 32 (62.90%) showed growth of single bacteria & 8 (12.90%) showed more than 2 types of bacteria, this is much higher than sander s et al who showed 27.4% of growth of single bacterium<sup>[14]</sup>. In our study majority of cultures were positive for gram negatives. E.coli was the commonest isolate followed by klebsiella. Among the gram positive. Staphylococcus aureus was common isolate this is comparable to Tathe et al results, which also identified gram negative as the most prevalent isolate in which E.coli was predominant.

There is no enteropathogenic organisms like salmonella, shigella were isolated in our study. All the Staphylococci were subjected to MRSA screening. No MRSA strains were found ESBL testing done for E.coli and klebsiella isolate and there were 17.6% of ESBL E.coli & 7.40% of ESBL klebsiella were isolated. Which is slightly higher than study done by Fallah M et al who have isolated ESBL producing E.coli (11.2%) in their study<sup>[18]</sup>.

In our report, the prevalence of enteropathogens among food handlers was 74.80 percent, owing to a lack of personal hygiene, inadequate knowledge of hand hygiene activities. Similar studies done by Malhotra et al who reported 40.5%<sup>[19]</sup> and Abera et al who reported 47.7% in their study<sup>[20]</sup>. Variation in prevalence rates and frequency of pathogens may be due to varied cultural factors, food habits and conditions in that geographical area<sup>[21]</sup>. All our food handlers were given treatment and given health education about personal hygiene, hand washing practises and environmental sanitation A repeat sample was taken from all healthcare workers after 6 weeks and all were found to be negative. Health education and screening for pathogens is now made mandatory to maintain the standards of our hospital.

## CONCLUSION

In our study lack of knowledge and awareness, in food handling is one of the main reasons for enteropathogens and hence regular training given to all staffs and newly joined staffs. Early diagnosis of pathogens and treatment of those infected can prevent the spread of infections. Good personal hygiene and effective means of training all staffs, strict infection control policies and periodic surveillance is very essential for the control of intestinal infections.

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