

# Knowledge, Attitude and Practices of Food Handlers in a Hospital Kitchen- an Administrator's Perspective

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**Abstract**— *Hospital food hygiene plays an important role in patients' health. Studies have proved that improper practices and lack of knowledge are major contributing factors of foodborne diseases.*

*This study has been conducted with an aim to determine knowledge, attitude and practices of hospital kitchen staff towards safe food handling in a tertiary care teaching hospital in Pune. A cross sectional study was conducted in the central kitchen of the hospital.*

*Data was collected from 20 food handlers (the entire staff working in the central kitchen) through a pre- validated questionnaire.*

*Data was collected in May- June 2022. Most of food handlers had studied up till high school and their mean age group was 36.2 years. The average work experience of respondents was 16.5 years. The result of the questionnaire showed that majority of food handlers have a fair knowledge in safe food handling procedures, have a good attitude and practices.*

*However, the results also strongly emphasize the need of more frequent food hygiene training of hospital food handlers. It also suggests that non-food handlers such as the nursing staff or kitchen supervisor should also be involved in the training. Some aspects of food handlers' safety behaviour also needs to be emphasized.*

**Key words**— *Food handlers, Hospital kitchen, Safe food handling, Safety behaviour*

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## I. INTRODUCTION

Food borne diseases are still a common problem all over the Asian countries. This is mainly caused through the oral route when pathogenic microorganisms or toxins in sufficient amount develop pathologic conditions. Research has identified the lack of knowledge and food mishandling as major causes of food poisoning [1]. Knowledge, Attitude and Practice (KAP) of food handlers is believed to have influence in such cases. Aycicek et al found that *S. aureus* contamination in healthcare facilities was contributed by food handlers' personal hygiene [2]. Food handlers may carry some foodborne pathogens such as *E. coli*, *Salmonella Spp*, *S.aureus* and *Shigella* in their bodies in particular on their skin or nose [3]. Hospital kitchen caters to a large population consisting of patients, doctors, nurses and visitors. Food handlers can play an important role in prevention of food borne diseases by ensuring hygiene standards for preparation, process and serving of food.

There is a significant correlation between personal hygiene and microbial status of food handlers. Several studies stated that hospital food poisoning could be a real threat to hospital quality assurance [4]. Food poisoning could hence also result in huge financial losses and also loss of public confidence.

Most of studies suggest improving food handler's knowledge, attitude and practice [5]. HACCP should also be implanted in hospital kitchens to further strengthen the safe food handling standards.

## II. RESEARCH METHOD

The aim of this study is to describe knowledge, attitude and practice amongst hospital food handlers. The study was carried out between May- June 2022. A total of 20 food handlers were recruited for this survey. The present cross-sectional study was conducted in the three food services, all services (food preparation, cooking and serving) were performed by the food service staff in the kitchens of the hospital. Data was collected by a questionnaire that was previously used in similar studies (7). The administered questionnaire consisted of 31 questions, assessing demographic characteristics as well as the awareness, attitude, and practices about food hygiene.

All participants either had direct or indirect contact with food handling.

The questionnaire consisted of three parts; knowledge, attitude and practice. Each questions in knowledge part consisted of two optional answers of "correct" or "incorrect". The knowledge questionnaire assessed food safety knowledge. It was organized into three main sections i) basic food hygiene, ii) safety and health, iii) HAIs prevention.

The questionnaires items for attitude questions were rated on a 5-point Likert Scale from 1 (Strongly Agree) to 5 (Strongly Disagree). Attitude questionnaire was developed to track i) personal hygiene, ii) safety and health opinions.

Practice questionnaires consisted of two optional answer "Yes" or "no" which was designed to determine employees' obedience on food hygiene practice. All study members were

trained to ensure consistent interviewing completeness standards.

The questionnaire was delivered to all participants after working hours. All participants replied to the questionnaire. The interview was carried after finishing their jobs to ensure participants complete their questionnaire without distraction from their duties. Descriptive statistics was used to summarize the general characteristics of participants and to describe interview results of knowledge, attitude and practice, the differences were determined to be significant at  $p < 0.05$ .

**III. RESULTS AND ANALYSIS**

The average age of the group of participants was 36.2 years. Average working experience was 16.5 years. All of participants (100%) were male. All participants have completed training in food processing.

The responses towards each section of the questionnaire are tabulated in tables 1,2 and 3 respectively. The literature taught to the respondents during their training courses and similar articles taken for reference have been used to assess the correctness of the responses received for each question for analysis in the later section of this article.

**Table 1 ( Food Handlers' Knowledge)**

S.no	Question	Options	Response	Percentage
1	Eating raw or half cooked food is highly risk for food poisoning	Correct	20	100
		Incorrect	0	0
2	Unwashed vegetables have many risks of food contamination	Correct	20	100
		Incorrect	0	0
3	Poor individual hygiene of food handlers can cause food borne infection to hospital patient	Correct	20	100
		Incorrect	0	0
4	Eating leftover cooked food for more than 6 hours is at high risk to cause food poisoning	Correct	20	100
		Incorrect	0	0
5	Keeping food at refrigerator helps to prevent bacterial contamination	Correct	6	30
		Incorrect	14	70
6	Contacting ready to eat food with bare hands might cause foodborne infections	Correct	4	20
		Incorrect	16	80
7	The correct methods for thawing frozen meat is to keep them in room temperature	Correct	16	80
		Incorrect	4	20
8	Food poisoning could cause severe diseases that end in hospitalization and sometimes death	Correct	20	100
		Incorrect	0	0
9	Healthy food handlers might carry foodborne pathogens	Correct	0	0
		Incorrect	20	100
10	Insect such as cockroaches and flies might transmit foodborne pathogens	Correct	20	100
		Incorrect	0	0
11	Food poisoning is caused only by pathogenic microbes	Correct	13	65
		Incorrect	7	35

**Table 2 (Food Handlers' Practice)**

S.no	Question	Options	Response	Percentage
1	Wearing Gloves when handle ready -to-eat food	Positive	20	100
		Negative	0	0
2	Washing hands with water and soap before preparing foods	Positive	20	100
		Negative	0	0

3	Washing hands with water and soap after preparing foods	Positive	20	100
		Negative	0	0
4	Still work when have diarrhea symptoms	Positive	0	0
		Negative	20	100
5	Keep cooked meat at room temperature for more than 4 hours	Positive	0	0
		Negative	20	100
6	Wear fully equipped PPE when on duty	Positive	17	85
		Negative	3	15
7	Work when have lesions on the hands	Positive	0	0
		Negative	20	100
8	Allow finger nails to grow	Positive	0	0
		Negative	20	100
9	Wash Vegetables before slicing	Positive	20	100
		Negative	0	0
10	Keep working when have common colds	Positive	4	20
		Negative	16	80

**Table 3 (Food Handlers' Attitude)**

S.no	Question	Options	Response	Percentage
1	Safe Food handling is an important part of my job	SA	16	80%
		A	4	20%
		N	0	0%
		D	0	0%
		SD	0	0%
2	Food Safety courses should be conducted every year	SA	13	65%
		A	0	0%
		N	7	35%
		D	0	0%
		SD	0	0%
3	Raw food should be kept separately from cooked foods	SA	3	15%
		A	17	85%
		N	0	0%
		D	0	0%
		SD	0	0%
4	Food handlers can be a source of food borne diseases	SA	4	20%
		A	3	15%
		N	0	0%
		D	12	60%
		SD	1	1%
5	Wiping vegetables or fruits make them safe to be eaten	SA	0	0%
		A	3	15%

		N	0	0%
		D	4	20%
		SD	13	65%
6	Male Food handlers should not have beards or moustache	SA	15	75%
		A	5	25%
		N	0	0%
		D	0	0%
		SD	0	0%
7	Female food handlers should not have long nails	SA	17	85%
		A	3	15%
		N	0	0%
		D	0	0%
		SD	0	0%
8	Raw vegetables and meat should not be cut on the same knife	SA	3	15%
		A	17	85%
		N	0	0%
		D	0	0%
		SD	0	0%
9	Raw vegetables and meat should not be cut on the same cutting board	SA	0	0%
		A	20	100%
		N	0	0%
		D	0	0%
		SD	0	0%
10	Food handlers should be medically examined every month	SA	17	85%
		A	3	15%
		N	0	0%
		D	0	0%
		SD	0	0%

SA : Strongly Agree; A : Agree; N : Not agree nor disagree; D: Disagree; SD: Strongly Disagree

### Knowledge

All participants (100%) have answered correctly by saying that

- Eating raw or half cooked food is a high risk for food poisoning.
- Unwashed vegetables have many risks of food contamination.
- Poor individual hygiene of food handlers can cause food borne infection to hospital patients and visitors.
- Eating leftover cooked food for more than 6 hours is a high risk to cause food poisoning.
- Food poisoning could cause severe diseases that may end up in hospitalization and also death.
- Insect such as cockroaches and flies might transmit foodborne pathogens.

On the Contrary, a lack of knowledge was also discovered among a few respondents. Only 30% of respondents said that keeping food in the refrigerator helps to prevent bacterial contamination, only 20% believed that contacting ready to eat food with bare hands might cause foodborne infections, 80% said that for thawing frozen meat, it is correct to keep it at room temperature, 100% participants said that healthy food handlers might not carry foodborne pathogens and only 35% believed that food poisoning is caused by pathogenic microbes depicting their lack of knowledge in these aspects.

The particulars of these outliers in the “knowledge section” are as given below.

Que 5 (Keeping food at refrigerator helps to prevent bacterial contamination)

S.no	Age	Experience	Education
1	32	12	High School
2	49	29	High School
3	31	10	High School
4	34	12	Intermediate
5	34	13	Intermediate
6	38	17	High School
7	32	10	High School
8	30	10	Intermediate
9	36	19	High School
10	47	26	9 <sup>th</sup> Standard
11	31	11	High School
12	27	7	High School
13	33	10	High School
14	36	15	High School

Que 6 (Contacting ready to eat food with bare hands might cause foodborne infections)

S.no	Age	Experience	Education
1	36	19	High School
2	44	21	High School
3	27	7	High School
4	33	10	High School

Que 7 (The correct methods for thawing frozen meat is to keep them in room temperature)

S.no	Age	Experience	Education
1	33	10	High School
2	27	7	High School
3	44	21	High School
4	36	19	High School

Que 11(Food poisoning is caused only by pathogenic microbes)

S.no	Age	Experience	Education
1	36	19	High School
2	44	21	High School
3	27	7	High School
4	33	10	High School
5	46	26	High School
6	31	9	High School
7	38	17	High School

**Attitude**

100% of participants agreed that Safe Food handling is an important part of their job, raw food should be kept separately from cooked foods, male food handlers should not have beards or moustache, female food handlers should not have long nails, raw vegetables and meat should not be cut with the same knife, raw vegetables and meat should not be cut on the same cutting board and food handlers should be medically examined every month.

However, 60% did not believe that Food handlers can be a source of food borne diseases, 15% agreed that wiping vegetables or fruits makes them safe for consumption and 35% of participants neither agreed nor disagreed upon conducting Food Safety courses every year depicting a casual attitude towards these aspects.

The particulars of the outliers in the “attitude” section are as given below.

Que 2 (Food Safety courses should be conducted every year)

S.no	Age	Experience	Education
1	38	17	High School
2	31	9	High School
3	46	26	Intermediate
4	36	19	High School
5	44	21	High School
6	27	7	High School
7	33	10	High School

Que 2 (Food handlers can be a source of food borne diseases)

S.no	Age	Experience	Education
1	34	13	Intermediate
2	34	12	Intermediate
3	46	26	Intermediate
4	31	10	High School
5	32	12	High School
6	49	29	High School
7	33	13	High School
8	47	26	9 <sup>th</sup>
9	30	10	Intermediate
10	36	15	Intermediate
11	49	29	High School
12	31	11	High School
13	32	10	High School

Que 5 (Wiping vegetables or fruits make them safe to be eaten)

S.no	Age	Experience	Education
1	46	26	Intermediate
2	31	9	High School
3	38	17	High School

**Practice**

Of The total participants, 100% believed and agreed that Wearing of Gloves is important when handling ready -to-eat food, that unwashed vegetables have many risks of food contamination, one should wash hands with water and soap after preparing foods, one should stop working when having diarrhoea symptoms, that cooked meat kept at room temperature for more than 4 hours may cause food poisoning, one should not work when having lesions on the hands, finger nails should always be clipped and vegetables should always be washed before slicing.

However, 15% participants believed that it is not important to wear fully equipped PPE when on duty and 20 % believed that its acceptable to keep working when having common colds depicting wrong practices being followed by few respondents.

The particulars of the outliers in the “Practice” section are as given below-

Que 6 (Wear fully equipped PPE when on duty)

S.no	Age	Experience	Education
1	46	26	Intermediate
2	31	9	High School
3	38	17	High School

Que 10 (Keep working when have common colds)

S.no	Age	Experience	Education
1	33	10	High School
2	27	7	High School
3	44	21	High School
4	36	19	High School

**IV. DISCUSSION**

There have been a lot of studies on food handlers or food hygiene in the past decade but only a few have focused on hospitals [6]. Most studies suggested that improper food handling leads to approximately 80%-90% of food poisoning. Previous studies have found out that food hygiene training increases workers’ knowledge regarding food borne diseases issues [8]. Recent studies also reveal that lack of personal hygiene, knowledge in food handlers could result food poisoning incidents [7].

Many studies reported that food handlers of various ages think that they know how to handle food safely, but their practice does not always prove it [9]. Food handlers with younger ages and/or lack of experience are more likely to have risky food hygiene behaviour than others. Insufficient training in food hygiene may lead to inadequate food handling practice [10]. Allam et al found in their study that low educational levels will make food handlers unaware of food safety practices [11]. Hence, all food service authorities

must implement continuous courses in safe food handling.

In general, the study showed that participants’ knowledge in safe food handling is quite high. Majority of participants agreed that safe food handling had to be implemented in their daily routine job. Ironically, some questions in microbiological aspects of safe food handling were answered wrong by respondents. Research in India shows that that safe practices in food hygiene are not always significantly proportionate to workers with higher knowledge [12].

The results also indicated the acceptable awareness of food services staff at Central kitchen of the hospital. Moreover, the majority of the staff had a high level of awareness about general hygiene at the workplace. participants gave more correct answers to questions about general hygiene. 85% of them also stated that the use of gloves, masks, aprons, and a periodical check of the temperature of the refrigerator decreases the risk of food contamination.

Food safety is necessary for foodservice operations to decline food-borne illnesses. Washing hands and wearing gloves, masks, and hats is mandatory for food staff workers to prevent the transmission of food- related illnesses (13).

In this study, 35% of the respondents had confirmed microorganisms as the cause of foodborne diseases and which reflects the low levels of awareness them in connection with this pathogens. Numerous studies have concluded that bacteria are more effective in causing foodborne illnesses than viruses and parasites, and humans can somehow play a role in the transmission of these microorganisms. From among infections and food poisoning, Staphylococcal poisoning is very common, transmitted through hands and instruments during the process of food production and distribution. On the other hand, as this type of poisoning has a very rapid onset compared to other types of food poisoning (about 3-6 h), following the hygiene guidelines below can prevent food contamination with these pathogens: i) maintaining food at suitable temperatures above 60°C or below 5°C, ii) avoiding secondary contamination of cooked foods by raw foods or workers, iii) applying the HACCP system, and iv) providing awareness and training for food centre staff about food-borne illnesses.

Special training courses on illnesses and pathogens related to foods are required for food service staff. They also need to have sufficient awareness on food hygiene to be able to apply this awareness during food procurement.

There is, therefore, a need to recognize the weak points of educational courses and assess the proper functioning of the HACCP system. According to Al-Kandari et al. food handlers generally show very good practices, but that had a few areas of poor practice, including cross-contamination as well as time and temperature control (16).

There was no meaningful difference between attitudes and practices, attitudes and knowledge and knowledge and practices. Considering the results and since respondents with different years of experience, age and education responded in the same way regarding their knowledge, attitude and

practice, there was no correlation detected and it may have been owing to the small number of participants.

### V. CONCLUSION

Regarding the importance of hygiene and food safety, those who are involved in food preparation, should be aware of the fundamental principles of food hygiene and the basic practices to prevent food-borne diseases. This needs to be ensured by conducting more frequent training sessions in the form of refresher courses quarterly or half yearly. HACCP should be applied in kitchens where it is not yet implemented to achieve high quality standards, patient safety and satisfaction. It is also recommended that an analysis can be carried out post these refresher courses to assess improvement achieved in the KAP of the workers.

Food safety in hospital needs special attention towards definite preventive action to minimize the hazards of microbial and chemical contaminations.

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