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## A community based study on food hygiene and sanitation practices among food handlers of various food settings in Jhansi, Uttar Pradesh

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### Abstract

**Introduction:** There is a growing demand for food safety information at the international, national and local level. Each day thousands of people die from preventable foodborne diseases. Occurrence of food borne illnesses can be attributed to many factors; one of it is the handling process of food preparation especially by food handlers.

**Objectives:** to assess the prevalence of knowledge on food hygiene and sanitation practices among food handlers and association between knowledge and practices among food handlers of various settings.

**Materials and Methods:** A community based cross sectional study was conducted between August to October 2015. Within 5 kilometers of Medical College, 5 Hotels, 7 restaurants and 24 dhabas were selected randomly and their food handlers were interviewed by using pre-tested questionnaire. Data was collected and results were analyzed by using frequency tables and proportions. Chi-square test was used to find out the association. Epi-info software was used for statistical analysis.

**Results:** Out of total, 60% hotels and 42.8% restaurants were followed good food hygiene and sanitation practices while 28.6% restaurants and 58.3% dhabas exhibited poor food hygiene and sanitation practices. A significant association was seen between knowledge of food hygiene and sanitation practices among food handlers of various food settings (p-value<0.05).

**Conclusions:** Consumption of foods at small restaurants and dhabas poses a high risk for the consumers because most of food handlers were lack of knowledge of food hygiene and poor sanitation practices in these premises.

**Keywords:** Food safety, food hygiene, sanitation practices, foodborne diseases

### Introduction

There is a growing demand for food safety information at the international, national and local level. Food hygiene is the set of basic principles employed in the systematic control of the environmental conditions during production, packaging, delivery, transportation, storage, processing, preparation, selling and serving of food in such a manner as to ensure that food is safe to consume and is of good keeping quality [1]. However, food itself can pose a health threat, a problem that is serious in developing countries due to difficulties in securing optimal hygienic food handling practices [2]. Food safety has increasingly gaining attention of authorities worldwide from the cases of food borne outbreaks.

Each day thousands of people die from preventable food borne diseases. Occurrence of food borne illnesses can be attributed to many factors; one of it is the handling process of food preparation especially by food handlers. This is because hand can be a vector of dissemination of pathogens through cross contamination [3]. Foodborne diseases are alarming health problem in both developing and developed countries and affect all age groups and create a vicious cycle of diarrhea and malnutrition. Proper food handling is key of prevention of foodborne diseases. According to WHO, there are Five Keys to Safer Food for Prevention of Food borne Disease, these are;

1. Keep clean personally
2. Separate raw and cooked food
3. Cook food thoroughly
4. Keep food at safe temperatures
5. Use safe water and raw materials

WHO has developed a global food hygiene message with these five key steps that promote health and explains safe food handling and preparation practices to prevent most foodborne diseases [4]. The knowledge of food hygiene and sanitation practices among food handlers is essential for safer food.

### Objectives

1. to access the prevalence of knowledge on food hygiene and sanitation practices among food handlers and
2. to find out the association between knowledge and practices among food handlers of various food settings.

### Material and Method

A community based cross sectional study was conducted between August to October 2015. All food settings within 5 kilometers around medical college towards city side as well as rural side were included in the study. A verbal informed consent was obtained from the food managers and owners of food settings to conduct the study while those who declined consent were excluded from the study. 5 hotels, 7 restaurants and 24 dhabas were selected randomly and total 252 food handlers in these settings were interviewed by using pre-tested questionnaire. The questionnaire includes questions about socio-demographic characteristics and knowledge of food hygiene and sanitation practices among food handlers in relation to 5 keys of safer food for prevention of food borne diseases given by WHO [4].

**Scoring and grading of responses:** The scoring and grading was based on previous research conducted by M. Bas *et al.* study among food handlers. Food handlers of various food settings were asked 20 questions on knowledge of food hygiene and sanitation practices. The response was recorded as Yes or No and coded as '1' or '0' respectively. The total score was evaluated between 0 to 20 and converted into percentage. The score below 50% was defined as poor, 50-75% as an average, and above 75% was considered as good food hygiene and food sanitation practices followed by these food settings. Data was collected and results were analyzed using frequency tables and proportions. Chi-square test was used to find out the association between knowledge of food hygiene and sanitation practices. Epi-info software was used for statistical analysis.

### Results and Observations

Among selected food settings; 5 Hotels, 7 Restaurants and 24 Dhabas, 252 food handlers in these food settings were interviewed. Out of them, 64.28% respondents were male and rest were female (35.72%). 61.51% respondents belongs to age above 25 years and below 25 years were 38.49% while the average mean for the age is 26.4. Out of total, 53.97% were married while 46.03% were unmarried. Only 34.61% respondents were professional in food settings with either degree or diploma in hospitality and hotel management while most of respondents in various food settings had no such experience and training. (Table 1)

Among 252 respondents, 112(44.45%) had knowledge of food hygiene and 140(55.55%) lacks about it and when asked about sanitation practices, only 90(35.71%) followed them. A significant association (p-value=0.00) was seen between knowledge and sanitation practices followed by

them. (Table 2)

By scoring and grading of responses on knowledge of food hygiene and sanitation practices obtained by food handlers in various food settings, Among them 3(60%) hotels, 3(42.85%) restaurants and 2(8.3%) dhabas were followed good food hygiene and sanitation practices (score >75%) while 2(28.6%) restaurants and most of dhabas 14(58.3%) had poor food hygiene and sanitation practices (score<50%) and poses risk of food borne diseases for the consumers. (Table 3) Regarding five keys to safer food for prevention of food borne diseases given by WHO, most of the practices were followed by hotels (60%) and some restaurants (42.8%) but all practices were poorly followed by dhabas (8.3%) in their premises. (Fig.1)

### Discussion

In our study, out of total 252 food handlers in various food settings, 64.28% respondents were male, and 35.72% were female while different findings seen by Lee HY *et al.* [5] study in which 55.4% respondent were female and 44.6% respondents were male although similar ratio found in study by Annor GA *et al.* [8], 50% of the respondents were males and 50% percent were females. Majority of respondents (61.51%) were of age group above 25 years in comparison, 38.49% were below 25 years. While study of Annor GA *et al.* [8] showed that majority of the respondents were either under thirty years or between the ages of thirty and forty years.

In our study, only 88(34.61%) respondents has trained in work related to food settings with either degree or diploma in hospitality or hotel management while most of respondents in various food settings has no such experience or training while in M. Bas *et al.* [6] study, 47.8% of food handlers have not received basic food hygiene training and 55% had undertaken formal food hygiene training. Similar results in Chigozie O. *et al.* [9] study showed that approximately one third of respondents had regular training and health education on food hygiene and safety. According to study of Lee *et al.* [5] 84.2% of the participants had attended food training courses. Although Wen-Hwako [7] study, showed that most of catering employees thought that food sanitation training was not important. About the knowledge of food hygiene and sanitation, 112(44.45%) had knowledge while 140(55.55%) had listen first time or little knowledge of them.

According to M. Bas *et al.* [6] study, showed that food handlers in may have lack of knowledge about food hygiene and safety. There was lack of knowledge among the food handlers about the critical temperatures of hot or cold ready-to-eat foods, acceptable refrigerator temperature ranges, and cross-contamination. Almost Similar findings was seen in M. Bas *et al.* [6] study, which indicated lack of knowledge among the food handlers about the critical temperatures of hot or cold ready-to-eat foods, acceptable refrigerator temperature ranges, and cross-contamination. Only 42.0% of food handlers knew the correct temperature for holding hot food (63 C). In Walker *et al.* [12] study less than 50% food handlers knew the correct temperature food holding hot food.

About practices of food hygiene and sanitation in our study, only 90(35.71%) food handlers followed the food hygiene and sanitation practices and 162(64.29%) were not followed or followed improperly. Many of food handlers did not record food temperature and Keep cooked food and raw

food together.

The temperatures of cold foods were frequently found above the recommended 5 °C. Sanitizing procedures was not observed in the central kitchen too. A significant association (p-value=0.01) was seen between knowledge and practices of food hygiene and food sanitation at various studied food settings. According to Lee HY *et al.* [5] study, the status of food hygiene practices obtained for each dimension is higher than other reported studies.

Chigozie O. *et al* [9] study showed strong indication of the poor health status and poor hygiene practices of food handlers/establishments in the FCT and agrees with the findings of Okojie *et al.* study [14], reported that the knowledge and practice of food hygiene and safety were poor.

The food handlers need to wash their hands, after touching unwrapped raw foods, before touching unwrapped cooked foods and after touching unwrapped cooked foods. Only 90(35.71%) food handlers reported that they usually washed their hands before starting the preparation of food and after handling raw meat. A majority of them reported that they do not use hand wash detergent to wash their hands before starting the preparation food and after handling raw meat. While In M. Bas *et al* [6] study, the food handlers always need to wash their hands, after touching unwrapped raw foods (2.2%), before touching unwrapped cooked foods (5.0%), and after touching unwrapped cooked foods (5.5%). Chigozie O. *et al* Study [9] showed that 89.3% reported that they usually washed their hands before starting the preparation of food and after handling raw meat. A smaller number reported that they do not use hand wash detergent to wash their hands before starting the preparation food and after handling raw meat. Less than one third of these respondents indicated using soap and water for washing their hands before starting the preparation of food and or after handling raw poultry or meat. Furthermore, it is most probable that majority of the participants do not wash hands according to good hygienic practices. This may be connected with lack of portable water and standard hand wash facilities in establishments. Even when such facilities are available, most participants do not have basic

understanding of standard hand washing procedures.

In Wen- HwaKo [7] study, the analysis of relationships between knowledge, attitude, and behavior were extrapolated and found that they shared positive relationships with one another. The results also indicated attitude was the mediating variable for knowledge on behavior. Griffith and Clayton [13] reported that improved knowledge will lead to behavioral changes involving improved practices, and also suggested that other factors, including staff attitudes, can limit or prevent improvements in staff practices. The five keys practices to safer food for prevention of food borne diseases were followed by most of the hotels (60%) and some restaurants (42.8%) but poorly followed by dhabas (8.3%) in our study. Study Annor GA *et al* [8]. showed that the place of work of respondents was found to significantly influence knowledge and practice on food hygiene and safety, food preparation and food handling and health problems.

**Table 1:** Socio-Demographic characteristics of food handlers in various Food Settings

Socio-demographic variables		Frequency (N=252)	Percentage (%)
Sex	Female	90	35.72
	Male	162	64.28
Age	Above 25yrs	155	61.51
	Below 25yrs	97	38.49
Marital status	Married	136	53.97
	Unmarried	116	46.03
Education	Uneducated	68	26.98
	Primary School	46	18.25
	Middle School	50	19.84
	High School	56	22.22
Occupation	Degree	32	34.61
	Serving	130	51.59
	Preparation	80	31.75
Residence	Cleaning	42	16.66
	Rural	135	53.57
	Urban	117	46.43

**Table 2:** Association between knowledge of Food hygiene and sanitation practices followed by food handlers of various food settings

Food settings	Frequency (N=252)	Knowledge of food hygiene		P-value	Sanitation Practices followed		P-value
		Yes	No		Yes	No	
Hotels	60	50	10	0.00*	44	16	0.00*
Restaurants	48	32	16		30	18	
Dhabas	144	30	114		16	128	
Total	252	112	140		90	162	

\* P value <0.05 i.e. statistical significant.

**Table 3:** Score and grading of food settings on the basis of food hygiene and food sanitation practices.

Food settings	Frequency	Score and grading of food settings		
		Good (>75%)	Average (50-75%)	Poor (<50%)
Hotels	5	3(60%)	2(40%)	-
Restaurants	7	3(42.8%)	2(28.6%)	2(28.6%)
Dhabas	24	2(8.3%)	8(33.4%)	14(58.3%)
Total	36	8(22.2%)	12(33.3%)	16(44.5%)

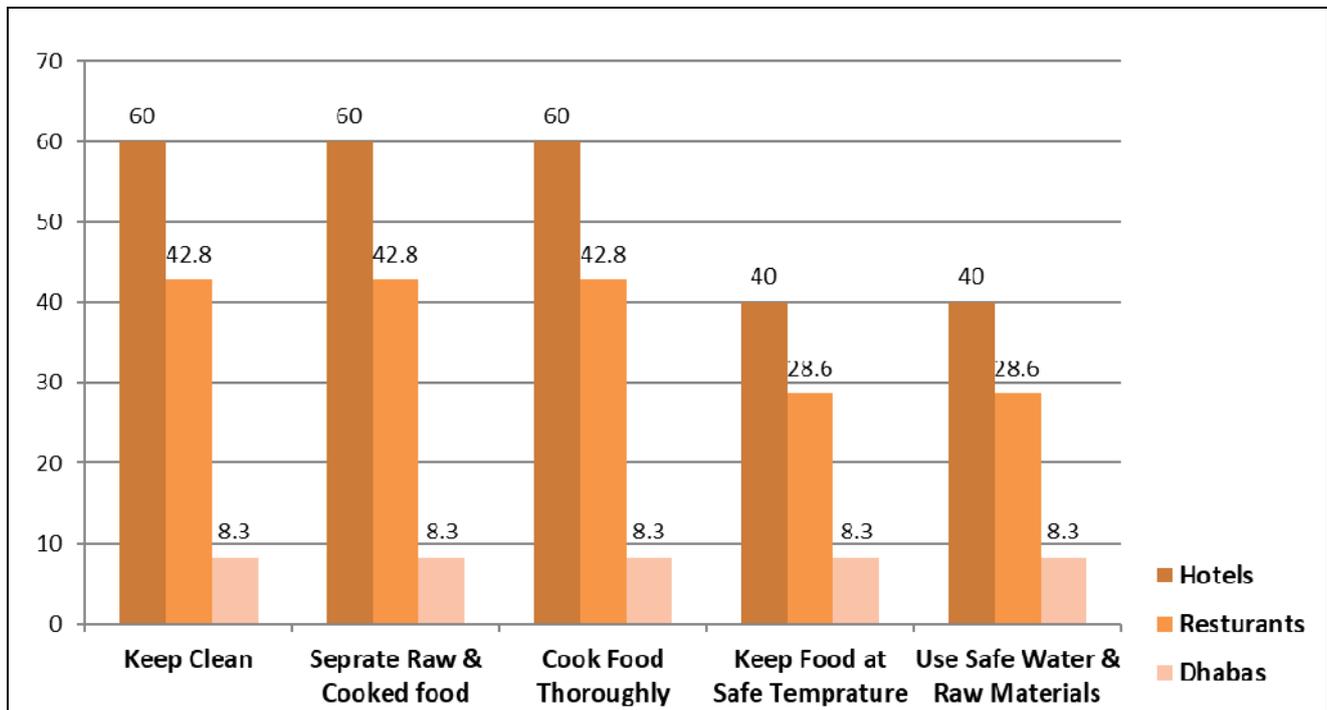


Fig 1: Percentage of food settings showing five keys for safer food for prevention of food borne diseases

**Conclusions**

Most of dhabas and small restaurants had poor food hygiene and sanitation practices and poses risk of food borne diseases for the consumers. Consumption of foods at dhabas and small restaurants of Jhansi poses a high risk for the consumers as the measures of safer food are not fulfilled appropriately in their premises.

The findings of this study demonstrated that most of food handlers have lack of knowledge and practices of food hygiene and sanitation. Therefore knowledge of food hygiene and food safety training should be provided for all food handlers before they begin to work in food settings. Health care system has to be implement awareness programs of food hygiene and food safety information at the different levels in community including various food settings. Although number of studies [10, 11] have indicated that although training may bring about an increased knowledge of food safety this does not always result in a positive change in food handling behavior.

**Recommendations**

Food settings have intensified efforts to improve knowledge and practices of food hygiene and food sanitation among food handlers which involved in food handling through the training and various workshops. The health system has to be introducing health education and health promotion program for awareness and benefits of these individuals.

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