



Survey on Food Safety and Hygiene Knowledge in Manikganj City Restaurants

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Authors' contributions

This work was carried out in collaboration among all authors. Author MAH helped in conceptualization, investigation, resource findings, supervision and wrote the original draft. Authors MAI and AA did the data collection, statistical analysis, wrote, reviewed and edited the original draft. All authors read and approved the final manuscript.

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ABSTRACT

Humans and the food industry both depend on food safety. As a result, food handlers must have a strong understanding of food safety and practice good hygiene. The purpose of this study was to assess restaurant food workers' food safety knowledge and hygiene practices in Manikganj, Bangladesh. A total of 150 food workers were interviewed to assess their level of knowledge and practices on food safety and hygiene. The majority of people believe that knowing how to properly wash your hands reduces the risk of food contamination. Furthermore, 83.7% of people who use gloves to process food do so to prevent contamination (98 %). While 56.66 % of the respondents were confident in their knowledge of how to clean instruments properly to avoid food contamination, 40.66 % avoided it, and 2.67 % had no idea. Only 36% disagreed with the proportion of participants (50.67%) who agreed that eating and drinking at work increases the risk of food contamination. According to 34.67% of those polled, washing utensils with detergent removes contamination. Using preventative approaches, providing continuous education to food handlers on food hygiene

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and food safety, ensuring that monitoring systems are in place, and increasing the power of health inspectors concerning food inspection can all help to improve the effective management of microbiological hazards.

Keywords: Food hygiene; food safety; knowledge; practice; restaurant.

1. INTRODUCTION

“Food poisoning is one of the most common foodborne illnesses, claiming lives, putting people in hospitals, and causing significant economic losses in many communities. The severity of the problem varies, but it has the potential to affect everyone in industrialized and developing economies. Common bacterial pathogens like *Campylobacter* spp., *Vibrio cholerae*, *Shigella* spp. and enteropathogenic *Escherichia coli* for example, were responsible for 550 million of the 600 million cases of foodborne disease reported worldwide in 2010”.

Food hygiene is primarily concerned with preventing food poisoning and other food-borne illnesses. Food handling, storage, and processing practices may play an important role in the causal chain of food-borne illnesses, according to epidemiological and surveillance data. As a result, if proper food and personal hygiene are not practiced, patients, particularly those at higher risk, such as children, pregnant women, the elderly, and those with chronic diseases, may be exposed to food-borne illnesses” [1].

“Hygienic issues have received a lot of attention in the food service industry because they can harm customers' health and cause significant financial loss if not addressed properly. Food purchases from unsafe sources, insufficient cooking or reheating, holding at room temperature in advance service, cross-contamination from other foods or food preparation areas, poor hygiene practices, and improper nutrition knowledge are among the factors most commonly associated with foodborne illness outbreaks, according to previous studies” [2]. Restaurants have been identified as important entry points for microbial pathogens, potentially resulting in food poisoning outbreaks. As a result, food handlers and managers are receiving more safety training in the food service industry. Effective safety training programming should be developed in Bangladesh due to food safety has become a hot topic where consumers have been the victims of serious food adulteration [3-5]. According to

reports in the media, some "rogue" restaurants use dead chicken meat and sweets laced with harmful substances. In Bangladesh, one barrier to food safety is the lack of sanitation facilities for customers. The majority of eating stalls in Bangladesh's markets are plagued by unsanitary conditions, such as inadequate water supply and drainage, unsanitary waste disposal, and overcrowding, all of which contribute to poor personal and environmental hygiene. Another source of concern for food safety is the availability of raw foods and ingredients. Customers must be satisfied with the quality, standard, and hygiene of the food they eat, so we must follow specific criteria. Bangladesh's government must also help ensure food safety [6].

Bangladesh has limited infrastructure, capital, education, technical skills, and a high employee turnover rate. Hygiene knowledge education alone was not enough to improve food service workers' hygiene attitudes and practices, according to studies [7,8] and there was a gap between hygiene attitudes and practices [9]. Hands-on training materials should be offered, and the training program should be tailored to worker viewers with diverse exercises to induce positive changes in hygienic attitudes and behavior among food service workers through safety training [10-13]. Therefore, the purpose of this study was to evaluate the food safety knowledge and hygiene practices of restaurant food workers in Manikganj city, Bangladesh. Additionally, to assess the knowledge regarding safety and hygiene among food workers as measured by a structured knowledge questionnaire. Finally, to determine the socio-demographic characteristics, food safety knowledge, and hygiene practices of the food workers.

2. MATERIALS AND METHODS

2.1 Study Area

The research was conducted in ten different restaurants in Manikganj. These restaurants are named Dhanshiri Restaurant, Modern Fast Food, Pizza Station 1800, Maliha Food Corner,

Gaang Restaurant, Chaap KaBab, Moonlight Fast Food & Min Chinese (mfc), Shoafi - Restaurant & Coffee Corner, and Dhaka Biryani.

2.2 Selection of Employee

Considering male and female workers, fifteen (15) workers were randomly selected. Finally, a total of 150 workers of both sexes from ten different restaurants were selected in Manikganj.

2.3 Working Period

The research work was carried out from September 2023 to November 2023 among different restaurants in Manikganj.

2.4 Working Preparation

Several training sessions were held before the data collection procedure to better understand the work's goal, collect data in the most efficient manner possible, maximize data quality, and reduce both inter and intra-personal variation.

2.5 Developing the Questionnaire

This cross-sectional study was conducted in restaurants in Manikganj city of Bangladesh. Overall, 150 workers are employed in these plants. The safety knowledge and hygiene practice of food workers was assessed with a structured questionnaire, which was organized into the following four distinct parts: (1) Part 1: Demographic characteristics; (2) Part 2: Employee work satisfaction; (3) part 3: knowledge about food safety; (4) Part 4: food hygiene practices. The respondents' socio-demographic characteristics (Part 1), such as gender, age, level of education, working experience, and training were collected during the study. The age groups were classified according to 21-30 years old 31 -40 years old and 41-50 years old and above, have non-formal education, basic education, JSC, SSC, HSC. "experienced" (below 5 years, 5-10 years above 10 years). The questions regarding the knowledge section (Part 2) included 11 questions with three possible answers, "yes", "no" and "do not know". These questions focused on issues regarding personal hygiene, food hygiene, and knowledge about food safety, food cleanliness, and hygiene. In Section 4, the good hygienic practices of food handlers were evaluated and assessed through self-reporting on personal hygiene and related food handling procedures.

3. RESULTS

3.1 Demographic Characteristics of Workers

A total of 150 food workers were interviewed to assess their level of knowledge and practices on food safety and hygiene. The variables have been grouped to give the overall information. Similarly, findings have been presented in different forms that comprise frequency figures.

The majorities 92.67% were males and 7.33% females. 26.67% of respondents attained non-formal education, basic education comprises 61.33% of respondents, 10%, 1.33% and 0.67% of respondents respectively attained JSC, SSC, and HSC. In general, regardless of the education level, more male food workers were working in restaurants than female in all the age groups. Besides 72% have working experience below 5 years 24 % have five to ten years and only 4% have more than ten years' experience. Most of the food workers (96%) have full-time jobs on the contrary 4% were part-time workers. But another fact is that only 12% attained training whereas more workers (88%) didn't have any training experience.

3.2 Food Safety Knowledge

The vast majority of people (97.33%) believed that having positive information about proper hand washing reduces the risk of food contamination. Furthermore, 83.7 percent of people who handle food with gloves do so to reduce the risk of contamination (98 %). While 56.66 percent of those polled were confident in their knowledge of proper instrument cleaning to reduce the risk of food contamination, 40.66% avoided it, and 2.67 % had no idea. The majority of respondents (50.67%) agreed that eating and drinking at work increases the risk of food contamination, while only 36% disagreed. Washing utensils with detergent removes contamination, according to 34.67% of those polled. Furthermore, the majority of people were aware of changes in food color, odor, or taste as a result of contamination. A large number of people (94.67%) agreed that well-cooked foods are safe to eat. When cleaning products are closed, they can be stored with closed cans and jars of food, according to the majority of respondents (40.67%). Furthermore, 56.67 percent were unaware of the importance of checking the temperature of refrigerators and freezers regularly to avoid food contamination.

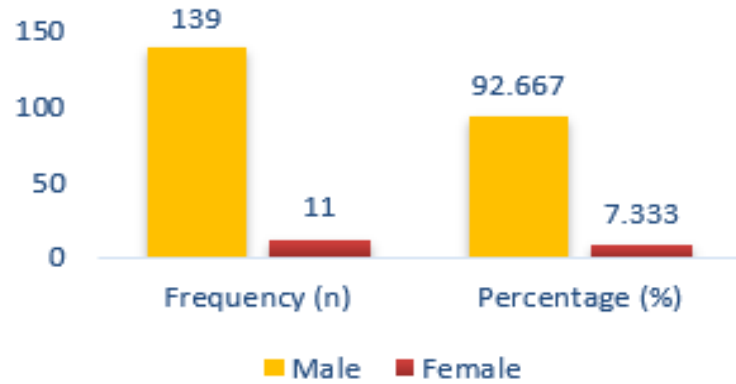


Fig. 1. Demographic characteristics of sex

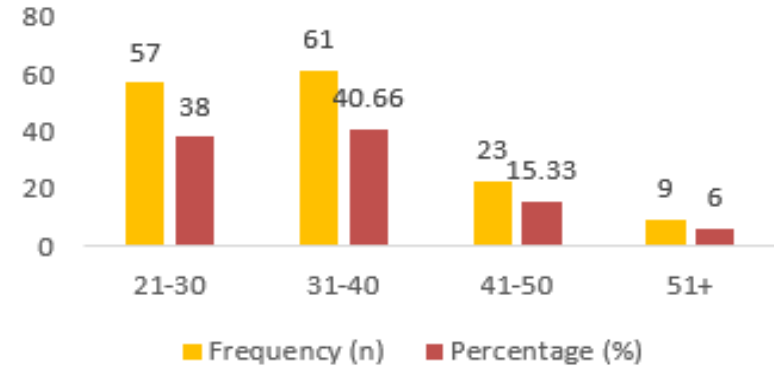


Fig. 2. Demographic characteristics of age

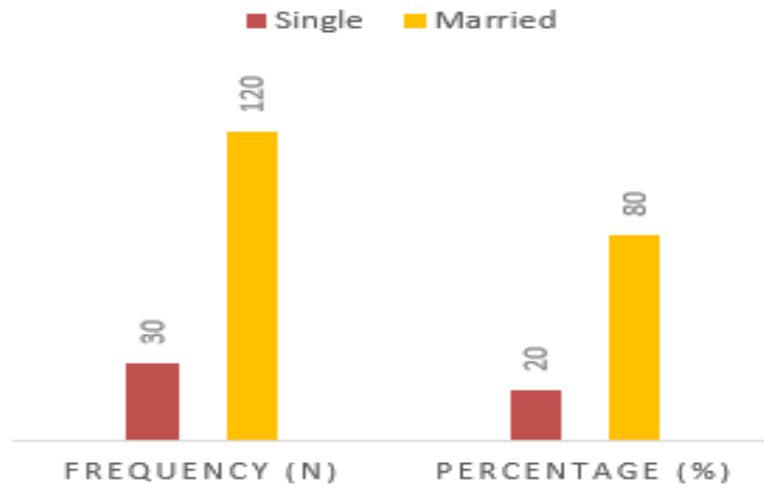


Fig. 3. Demographic characteristics of Marital

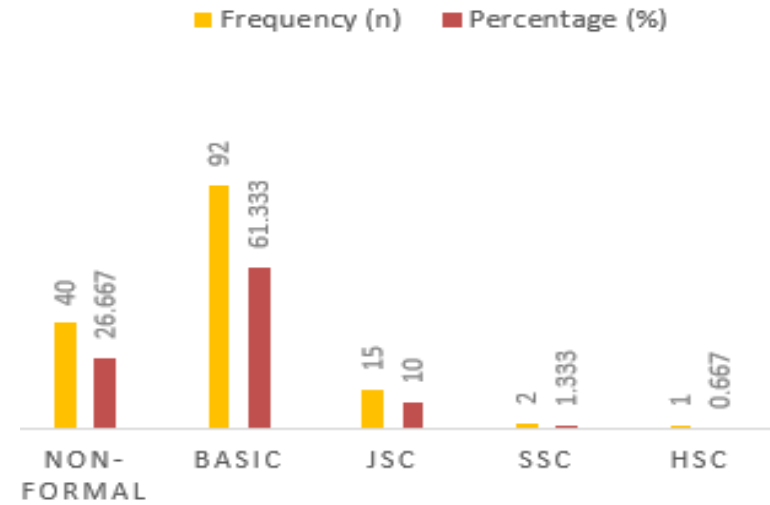


Fig. 4. Demographic characteristics of education

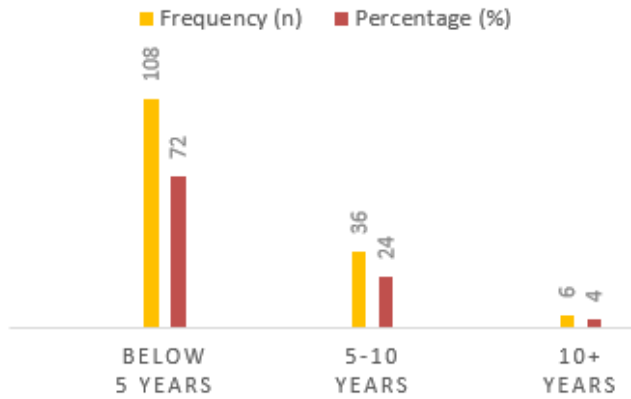


Fig. 5. Demographic characteristics of experience

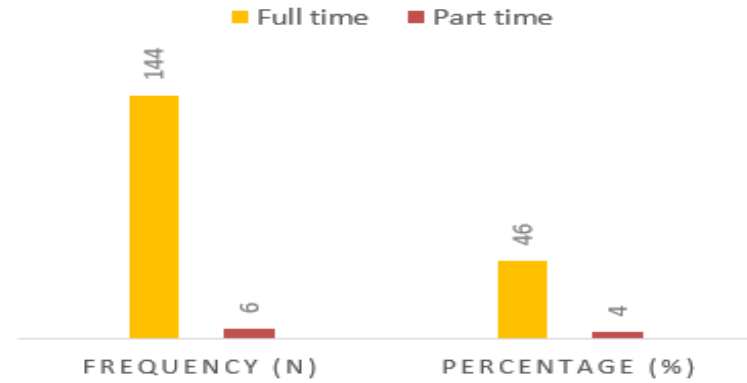


Fig. 6. Demographic characteristics of employment status

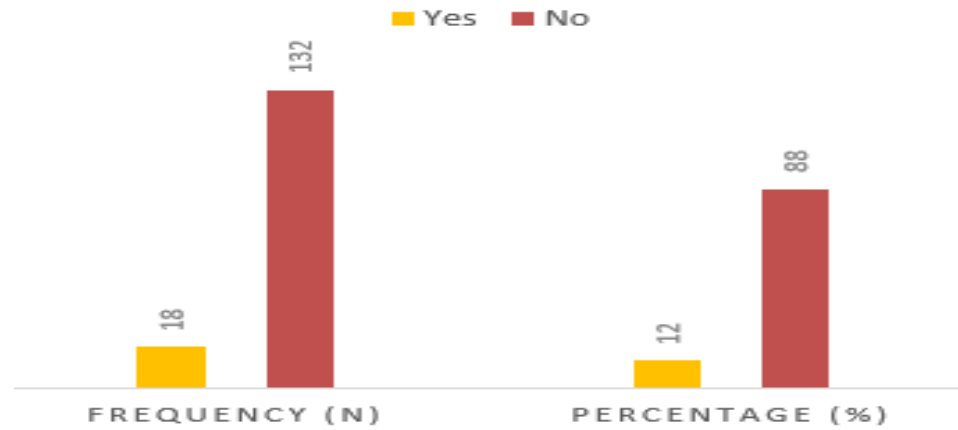


Fig. 7. Demographic characteristics of training

Figs. 1-7. Graphical presentation showing demographic characteristics of workers

Table 1. Food safety knowledge of restaurant workers in Manikganj

Questions	Correct	Incorrect	Don't know/ remember
Did you think that washing hands before work reduces the risk of food contamination? What is the way to wash hands that reduces the risk of food contamination?	146 (97.33%)	0 (0%)	4 (2.67%)
Using gloves while handling food reduces the risk of food contamination. How to reduce the risk of food contamination?	147 (98%)	2 (1.33%)	1 (0.67%)
Does not proper cleaning and sanitization of utensils increase the risk of food contamination	85 (56.66%)	61 (40.66%)	4 (2.67%)
Eating and drinking at the workplace increase the risk of food contamination	76 (50.67%)	54 (36%)	20 (13.33%)
Reheating cooked foods can contribute to food contamination.	93 (62%)	43 (28.67%)	14 (9.33%)
Washing utensils with detergent leaves them free of contamination	4 (2.67%)	94 (62.67%)	52 (34.67%)
The correct temperature for storing perishable foods is 5 °C	99 (66%)	2 (1.33%)	49 (32.67%)
Hot, ready-to-eat food should be kept at a temperature of 65 °C.	82 (54.67%)	55 (36.67%)	13 (8.67%)
Freezing kills all the bacteria that may cause food-borne illness	106 (70.67%)	5 (3.33%)	39 (26%)
Contaminated foods always have some change in color, odor, or taste	142 (94.67%)	6 (4%)	2 (1.33%)
The ideal place to store raw meat in the refrigerator is on the bottom shelf	26 (17.33%)	118 (78.67%)	6 (4%)

Table 2. Distribution of the workers by knowledge about personal hygiene practice

Questions	Correct	Incorrect
Working costumes should be changed every day.	64 (42.67%)	86 (57.33%)
It is unnecessary to shave for work regularly	92 (61.33%)	58 (38.67%)
Hands should be washed with warm water & soap in a way to include the wrists	119 (79.33%)	31 (20.67%)
Hands should be washed before starting to prepare meals	150 (100%)	0 (0%)
Hands should be washed after touching earth-covered and packed products	150 (100%)	0 (0%)
There is no need to wash hands after touching the face, ear, and hair	150 (100%)	0 (0%)
Hands should be washed after contact with upper respiratory tract secretions	146 (97.33%)	4 (2.67%)

They also agreed that the worker would be a source of food-borne outbreaks (61.33%). Furthermore, 85.33 % of respondents correctly answered that they should not touch foods without gloves if they have abrasions or cuts on their hands. Hands should be washed after each serving, according to 82% of respondents.

3.3 Knowledge about Personal Hygiene

Most of the workers agreed to wash their hands after touching earth-covered and packed products. Almost all workers agreed on washing before starting to prepare meals, and hands after touching their face, ears, and hair. Fewer respondents (2.67%) disagreed about washing after contact with upper respiratory tract

secretions. 92 % of respondents out of 150 workers agreed that is unnecessary to shave for work regularly.

3.4 Knowledge of Food Hygiene

90.67 % were aware of the importance of personal hygiene. The most interesting fact is that 100% of people agree that restaurants should provide you with information about hygiene and its importance, such as washing hands before and after eating with soap sanitizer, and cutting nails regularly. 86 % of respondents disagreed about handling money while serving food. None of the respondents agreed that they did not smoke or drink at work.

Table 3. Distribution of the workers by knowledge about personal hygiene practice

Questions	Correct	Incorrect
Do you know about hygiene?	134 (89.33%)	16 (10.67%)
Do you know the importance of hygiene in the food section?	136 (90.67%)	14 (9.33%)
Does the Hotel/restaurant give you information about hygiene and its importance?	150 (100%)	0 (0%)
Do you wash your hands before/after having food?	150 (100%)	0 (0%)
Do you use soap sanitizer during washing?	150 (100%)	0 (0%)
Do you cut your nails regularly?	150 (100%)	0 (0%)
Does the operator handle money while servicing food?	21 (14%)	129 (86%)
Does the operator blow air into the polythene bag before use	0 (0%)	150 (100%)
Do you smoke or drink while working	0 (0%)	150 (100%)
Raw food and cooked foods can be stored together	6 (4%)	144 (96%)
Frozen food cannot be frozen again after being defrosted.	8 (5.33%)	142 (94.67%)
Vegetables should be first chopped and then washed.	148 (98.67%)	2 (1.33%)
Fresh vegetables and fruit should be well-washed under running water.	144 (96%)	6 (4%)
While buying vegetables and fruit, it should be paid attention that they are not withered, soil- or mud-covered, rotten, or damaged.	79 (52.67%)	71 (47.33%)
While buying meat, it must be branded.	148 (98.67%)	2 (1.33%)
Frozen foods are defrosted at room temperature	45 (30%)	105 (70%)
Smashed canned food cannot be used	31 (20.67%)	119 (89.33%)
Pre-cooling process of foods should be completed within 2 hr.	143 (95.33%)	7 (4.67%)
Raw food should be stored in lower shelves within cold storage	136(90.67%)	14 (9.33%)
The temperature of the refrigerator should be between 0°C and 4°C	105 (70%)	45 (30%)
The minimum temperature of the deep freezer should be - 18°C	14 (9.33%)	136(90.67%)
The temperature of hot foods ready for consumption should be more than 65°C.	62 (41.33%)	88 (58.67%)

Table 4. Knowledge of food cleanliness and hygiene

Questions	Correct	Incorrect
Should always wash hands after coughing or sneezing	150 (100%)	0 (0%)
Is it enough just to wash your hands while running	5 (3.33%)	145 (96.67%)
Contamination occurs when raw and ready-to-eat food is put together in one place	141 (94%)	9 (6%)
Do not place chicken, fish, and raw meat in the same place (fridge/freezer)	110(73.33%)	40 (26.67%)
To determine the safety of food, you should taste/smell/check the expiry date before you eat	150 (100%)	0 (0%)
The kitchen sink drain should be cleaned every week	150 (150%)	0 (0%)

3.5 Knowledge of Food Cleanliness and Hygiene

All respondents agreed that hands should be washed after coughing or sneezing. Only a few respondents (3.33%) agreed that just washing their hands under running water removes bacteria before touching food. 73.33% answered that not place chicken, fish, and raw meat in the same place (fridge/freezer). Only 6% disagreed that Contamination occurs when the raw and ready-to-eat food is put together in one place.

4. DISCUSSION

A study conducted in Manikganj, Bangladesh, found a strong relationship between the knowledge, attitude, and degree of hygiene practiced by food outlets. The majority of the study's respondents were female, between the ages of 21-51, residents of Manikganj, an urban area, and possessing a basic education. Previous research has found that most food vendors are female, aged 20-40, with secondary or tertiary education [14]. According to various research, most food restaurant employees are male and have little or only an elementary education [15,16]. A significant proportion of the participants in this survey demonstrated a good understanding of food providers' food hygiene practices, which aligns with findings from earlier studies [17]. Conversely, research from Asian country found that the majority of food vendors lacked basic knowledge of food hygiene [18-20]. It would be easy to argue that the majority of food vendors in this study had good knowledge because most of the respondents had either completed basic education, which may have helped them understand food hygiene information better and thus have improved their knowledge. Again, this study showed that the majority of workers good knowledge of food safety. Al Mamun et al. [21] reported that 7.2% of

food handlers were unaware of food-borne diseases, and 10.3% were unable to identify the etiology of food-borne illnesses. In contrast, Tarannum [22] and Hossen et al. [23] reported that 78.77% and 72.5% of food handlers had an excellent degree of food safety awareness, respectively.

The current study indicates that the level of personal and environmental hygiene is fairly good, which is consistent with some other studies [24,25] whose authors have argued that, because restaurants must rely on repeat business from customers to maintain and sustain their livelihood, they are more likely to produce relatively safe food by adhering to the minimum required level of hygiene standards; even though there is still a serious need to improve proper hygienic conditions and give food vendors access to basic sanitary facilities.

5. CONCLUSION

Even though food workers' food safety knowledge, attitude, and hygienic practice levels were satisfactory, some hygiene aspects needed to be emphasized, according to this study. Food workers' knowledge in areas where it appears to be lacking should be strengthened through ongoing education and training. Furthermore, to reduce food-borne hazards, food workers should receive ongoing education and food safety training. This study's findings can be used to develop key messages for a variety of educational programs. As a result, proper food safety education and hands-on training for food workers should be provided so that good safety practices can be improved through better understanding and a positive attitude.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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