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The Extent of Chefs' Commitment towards Implementing Food Safety Practices during Rush Time "Applied on Local Restaurants of Mansoura City"

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Abstract

Food handlers, especially restaurant chefs, are a source of food contamination because they are often asymptomatic carriers of food poisoning. Restaurant health inspections by food hygiene professionals have been a major regulatory strategy to reduce the spread of restaurant-related foodborne diseases. This research aims to measure the commitment of chefs towards implementing food safety practises during rush hour in local restaurants in Mansoura city and analyse the differences in their commitment based on their demographic data. For achieving the research aim, 424 questionnaire forms were designed and distributed as a "test,", divided into (74) forms distributed through a personal interview with the chef, and (350) electronic questionnaire forms sent to a sample of chefs in local restaurants in Mansoura; the questionnaire forms were valid for statistical analysis by SPSS V.25. Most of the results indicated that the investigated chefs are not committed to implementing food safety practices, especially during peak times and crowding periods in the restaurant; this is due to their different and varying educational level, job level, years of experience, and time of training. Based on the results, some recommendations have been proposed to increase the commitment of chefs towards implementing food safety practises during the rush. Prominent recommendations included putting guidelines and instructions in clear places inside the kitchen to guide chefs on how to properly implement food safety practises in order to avoid the spread of food-borne diseases, especially during rush hour, and holding discussion sessions with chefs on food hygiene to inform them of the need for chefs to implement food safety practises during rush hour in the briefing meeting.

Keywords: Chefs' Commitment, Food Safety Practices, Food-Borne Diseases, Rush Time, Local Restaurants.

1. Introduction

According to Biando (2018), between 52 and 59% of food-borne illnesses occur during peak business hours in the restaurant industry. Country is cited for more serious violations than fast-food restaurants. However, there is minimal research on food practises and

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behaviours of food handlers that affect food safety.

Significant changes triggered by several factors, including urbanization, industrialization, professionalisation of women, and reduction of time for food preparation and/or consumption, among others, have resulted in an increase in the amount of meals prepared outside the home in recent years (Anjos et al., 2014).

Food handlers play a vital role in hygienic-sanitary management during the processing of food items and may be responsible for the spread of food-borne disease outbreaks, especially during peak times (Nasrolahei *et al.,* 2017). Todd (2020) claimed that examining food handlers in various sectors is critical, stating that 62.2 % of food handlers had harmful bacteria on their nails, which were identified as a variety of pathogens, including Staphylococcus aureus, Escherichia coli, Klebsiella, and Pseudomonas. The educational levels of handlers, the habit of washing hands after using the restroom, the number of training times, and adopting food safety standards during peak hours are all factors in these contaminations.

The disease due to contaminated food is perhaps the most widespread health problem in the contemporary world and one of the important reasons for reducing the rate of economic production. Methods of food production, distribution, and consumption, except that the availability of safe food is a human right for every individual (Bender *et al.,* **2012**). In the current world, food safety threats are constantly increasing as a result of changes in food production, distribution, and consumption, changes in the environment, and new and emerging pathogens. Ensuring that the food we eat is completely healthy and free from bacterial, parasitic, and chemical contamination is a food safety priority (Waters *et al.,* 2013). Food safety is increasingly globalized, and the need to strengthen food safety systems in countries is increasingly felt. Safe foods do not cause any contamination or harm to the consumer (Kibret & Abera, **2012**).Food safety is one of the most important means of ensuring that there are no microbial, parasitic, or chemical factors when consuming foodstuffs (Coleman *et al.,* 2013).

To increase positive food safety practices, environmental health specialists and restaurant owners can ensure more effective food safety trainings. Additionally, restaurant owners and managers are recommended to be on the restaurant floor at all times, especially during a busy rush, to ensure that proper food safety practises and behaviours are performed amongst their respective staff. Food-borne diseases due to poor food-handling practises are a preventable public health problem (Biando, 2018).

In this research, we will address food safety practises and the chefs' commitment to them at rush time by applying them to local restaurants in the city of Mansoura and the recommendations made in this regard.

1.1. Research's Problem

Food handlers serve as a potential source of contamination for food, as they may also be asymptomatic carriers of food poisoning organisms (Adesokan *et al.,* 2015). While there is a wealth of literature and knowledge on how routine food facility inspections improve food safety practices, research indicates that poor, or lack of, food safety practises among restaurant workers are becoming more prevalent regardless of routine inspections (Waters et al., 2015; Biando, 2018). These findings are consistent with the Hawthorne Effect, which states that food workers are more likely to perform safe food-workplace practices, such as good hand washing, in the presence of inspectors (Kohli *et al.,* 2009).

Additional research shows that many food-service workers do not engage in or follow food safety practises in their workplace, with about 63% of food-workers admitting that they do not always carry out the food safety behaviours that they knew they should be performing (Brown, *et al.,* 2014; Kibret & Abera, 2012).

Food handlers' food safety practises are critical for improving food quality because they have been blamed for the majority of food-borne illnesses (Cunha *et al.,* 2014). According to Wambui *et al.* (2017), food safety practises are significant in risk perception because they improve the control and regulation of food-borne illnesses. Risk perception can influence decision-making, resulting in changes in human behavior. Furthermore, evaluating self-reported behaviours is a valuable and cost-effective method for assessing current hygiene status and determining employee training needs.

Good foodservice hygiene procedures are essential for preventing foodborne illnesses and reducing threats to customers' health and the general public's health. In the current world, food safety threats are constantly increasing as a result of changes in food production, distribution, and consumption, changes in the environment, and new and emerging pathogens. Ensuring that the food we eat is completely healthy and free from bacterial, parasitic, and chemical contamination is a food safety priority (Waters *et al.,* 2013). Food safety is increasingly globalized, and the need to strengthen food safety systems in countries is increasingly felt. Safe foods do not cause any contamination or harm to the consumer (Kibret & Abera, 2012).

The problem of the research lies in the failure of the chefs of local restaurants to follow food safety practises during rush hour, and this was evident through the field study of a sample of local restaurants in Mansoura during peak hours, as noted in the research's limitations.

1.2. Research's Limitations

The research's limitations are categorized into two types.

- Human & Place limitations: represented in chefs of local restaurants of Mansoura city. "(20) local restaurants in Mansoura city were as shown in table (1)."
- Time limitations: represented in addressing questionnaire forms as "a test" to the investigated chefs in the period from 20th of January, (2022) to 5th of May, (2022). *"The survey was distributed to chefs during peak periods, which included the second academic semester season, Ramadan and Eid al-Fitr, these periods are the peak times for these restaurants".*

1.3. Research Hypothesis

The following research hypothesis is based on the researcher's reading about food safety practices: According to some demographic data, there are significant differences in chefs' commitment to implementing food safety practises during rush hour.

("H 1.1" Gender, "H 1.2" Age "H 1.3" Educational Level, "H 1.4" Job Level "H 1.5" Years of Experience, and "H 1.6" Time Of Training).

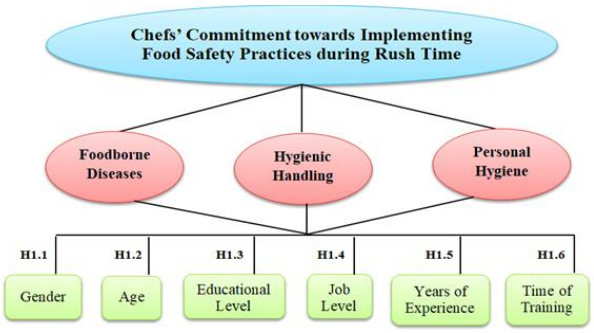

Fig. 1: Research Hypothisis

2. Literature Review

2.1. The Risk of Foodborne Diseases in Restaurants

According to the United Nations World Tourism Organization (UNWTO) (2020), 53% of customers eat outside the home at least once a week, 17% eat outside the home five or more times per week, and 4% eat outside the home seven or more times per week. In 2020, the restaurant business is expected to employ 14.7 million people, with that figure expected to rise to 16.3 million by 2027. Furthermore, half of the world's adults have worked in the restaurant sector at some point in their lives (UNWTO, 2020). Food-borne diseases caused by poor food handling are an avoidable public health issue; between 52 % and 59 % of food-borne illnesses can be traced back to restaurant-style operations (Todd, 2020).

Food-borne disease is defined by the Centers for Disease Control and Prevention (CDC) as "the occurrence of two or more episodes of a similar illness stemming from the intake of a common food"—and one out of every six people gets sick from it every year (CDC, 2019).

According to the Food and Drug Administration (FDA) (2021), food-borne illness costs the world $152 billion per year, with total productivity losses from food-borne disease costing $ 110 million per year in low- and middle-income countries and the annual cost of treating food-borne illnesses costing $ 15 million. Medical services, reduced productivity, lost work, disability, and mortality are among the costs. More than two million people could be saved from falling ill if the rate of food-borne illnesses was decreased by 5% yearly, saving $7.5 billion in societal expenditures (FDA, 2021). According to Harris (2015), half of food-borne illness outbreaks occur in restaurant establishments. Customers are concerned about contracting a food-borne illness as a result of how they prepare meals at home, but some believe that food served at a restaurant is more likely to cause illness (Lando, *et al.*, 2016). Approximately 48 million illnesses, 128,000 hospitalizations, and 3,000 fatalities are caused by food-borne illness each year (CDC, 2019). According to the World Health Organization, 1.8 million people died as a result of diarrheal infections, the majority of which were caused by consuming contaminated food and water (WHO, 2020).

Food-borne disease is underreported to a great degree, according to FDA (2021), because less severe cases go unreported and the role of food-borne transmission can be masked by pathogenic transmission via other pathways such as water sources or person-to-person contact. Todd (2020) found that Salmonella, Campylobacter, Shigella, Cryptosporidium, and Shiga toxin-producing E. coli O157 are the top five food-borne pathogens based on laboratory-confirmed food-borne infections.

ImathIu (2017) linked foods and risk factors, as well as preventive strategies, for all major food-borne disease pathogens. The FDA has identified Staphylococcus aureus and its enterotoxins as a significant pathogen. Reheating foods, ham and other meats, egg products and other protein foods, sandwiches, milk and dairy products, potato salads, custards, cream-filled pastries, and salad dressings are all associated foods and risk factors. Avoiding contamination from unwashed bare hands; practising good personal hygiene with skin infections from food handling and preparation duties; appropriately refrigerating food; and quickly cooling cooked foods are all examples of preventive methods (FDA, 2021).

Several food-borne illness outbreaks have been linked to the eating of fresh vegetables in recent years (Gelting, *et al.*, 2011). In a study utilizing leafy greens, researchers discovered that poor temperature control during storage or preparation in restaurants can lead to bacterial growth, and that incorrect handling by restaurant employees might lead to direct contamination (Coleman, *et al.*, 2013). Food-borne illness cases that are less severe go

undiscovered, resulting in a significant rate of underreporting. Pathogenic transmission through channels such as water sources or person-to-person interaction can also disguise the involvement of food-borne transmission. Food prepared outside of the home has been linked to an increased risk of occasional food poisoning (Gould, 2013).

2.2. Food Handlers toward Food Safety Practices

Food handlers can be a source of food contamination because they are often asymptomatic carriers of food poisoning pathogens (Nasrolahei *et al.,* 2017). Despite the abundance of literature and understanding about how routine food facility inspections improve food safety procedures, research indicates that poor, or absence of, food safety practises among restaurant workers are continually becoming more visible, independent of routine inspections (Waters *et al.,* 2013). These findings support the Hawthorne Effect, which states that when inspectors are present, food workers are more likely to follow safe food-workplace procedures, including good hand washing (Cunha *et al.,* 2014). According to other research, many kitchen staff didn't engage in or follow food-safety standards in the workplace, with roughly 63 % saying that they do not always carry out the food-safety behaviours that they know they should. (Kibret & Abera, 2012).

Restaurant inspections by environmental health specialists have long acted as a main regulatory strategy to reduce restaurant-related foodborne illness, according to Yeager *et al.* (2013). Concerns regarding the effectiveness of the old inspection paradigm have led to a number of improvements in the process: food handler education, food safety certification, and increasing inspection frequency are three often pushed ways to improve restaurant sanitation (Wambui *et al.,* 2017).

According to Burkink *et al.* (2014), a strong food safety program, like strategic planning, is frequently put on the back burner while restaurant owners cope with the variety of challenges that come with running a business. Because food safety is so important to the success of any restaurant or food-service organization, independent operators face a problem in developing effective and economical food safety training programs. According to another study, the majority of foodborne illness occurrences in foodservice establishments can be traced to food workers' inappropriate food handling procedures, with 63 % of food employees admitting they did not always carry out the food safety behaviours they knew they should (Gould, 2013).

According to Kibret & Abera (2012), improving hand washing is one of the most challenging educational tasks in the foodborne sector, requiring repeated and painstaking efforts from restaurant owners and shift supervisors as well as sanitarians. Following up from this, Pilling (2008) found that poorer intenders were less likely to believe that hand washing and sanitising surfaces will decrease the spread of "germs" or keep the working environment clean (Pilling, *et al.,* 2008).

According to a 2013 study, in addition to improving food handling practices, more focus should be paid to ensuring safe holding and chilling practices (Yeager *et al.,* 2013).

Kibret & Abera, (2012), showed that employees believe that performing good food safety practises would be easier if they had more resources, such as knowledge from training, more time, more equipment, etc.; conveniently located resources; and managers who monitored, encouraged, and recognized their activities. Park *et al.,* (2016), suggested that more job-specific and hands-on training materials for restaurant staff be developed, as well as more continuous implementation of food safety training and integration of

employee appraisal programs with the results of safety training. Working in a chain restaurant, a larger restaurant, having more experience, and having more responsibilities were also linked to improved food safety awareness (Brown *et al.*, 2014).

Refresher and short-duration training of no more than two weeks at a time, according to Adesokan *et al.,* (2015), are critical components of an effective training program for enhanced food safety practices. Given the risk of duplication and dull repetitiveness, prolonged training, despite training contents and other relevant considerations, could result in poorer returns. Food facilities are inspected using the FDA Food Code requirements, with some changes depending on jurisdiction. These inspections are used to identify and prevent the CDC's top five risk factors for food-borne illness, which include: improper holding temperatures, insufficient cooking, contaminated equipment, food from untrustworthy sources, and poor personal hygiene—all of which are addressed by the US FDA Food Code (FDA, 2021).

Wambui *et al.*, (2017) mentioned that foodborne illness outbreaks in retail food service operations are caused by three key food safety contributors: poor personal hygiene, time and temperature control, and contaminated equipment. Food from unsafe sources, inadequate cooking, improper holding temperatures, contaminated equipment, and poor personal hygiene are among the risk factors identified by the FDA as "food-borne disease risk factors" (FDA, 2021).

2.3. Food handlers' Commitment & Food Safety Practices during Rush Time

Yeager *et al.,* (2013), found that inspections did not result in any quantifiable reductions in foodborne disease in restaurants. During the most recent inspection, 45 % of establishments linked to food-borne illness incidents had no critical infractions. According to Park et al. (2016), may not be a good predictor of foodborne disease outbreaks or an indicator of restaurant sanitation.The application of food safety practises by restaurant enterprises is critical to the protection of public health on a daily basis (Burkink *et al.,* 2014).

Brar (2016), found that inspections may benefit food safety practises in restaurants. Lower inspection ratings were one of the factors that were found to be significantly linked to the occurrence of foodborne occurrences. Wambui *et al.,* (2017) found there are numerous significant advantages to implementing the stated inspections: demonstrated that announced inspections consistently focused on assisting restaurant operators in identifying and managing key food concerns, and that the performance of restaurants that had undergone an announced inspection improved in two critical food safety criteria following the announced inspections: (1) The person in charge demonstrating knowledge of foodborne disease prevention, and (2) cross-contamination prevention (Wambui et al., 2017).

Customer pressure is supposed to promote food facility compliance by making inspection ratings public (Waters *et al.,* 2013). Following the use of grade cards, Simon *et al.,* (2005) discovered a substantial reduction in foodborne-disease hospitalizations.

Some researchers have looked into the impact of the internet and social media on public views of food safety and restaurant inspections. On their Web sites, county health departments are swiftly adapting to the use of the Internet to convey food safety information (Simon *et al.*, 2005). Despite the fact that only a few respondents stated they looked up inspection scores through sources such as health department web pages, a research found that more than half of respondents wanted inspection results to be available on the Internet (Kibret & Abera, 2012). According to another study, deploying such a web-based system

might result in a 20% to 30% reduction in the frequency of inspections with these serious violations (Waters *et al.,* 2013).

Social media is now being used as a non-traditional food safety surveillance strategy (Bender et al., 2012).Users would visit a restaurant based on positive Yelp evaluations, according to a survey. Despite the fact that inspection data are acknowledged as the regulatory source of food safety information, research shows that Yelp users trust customer reviews of retail food facilities (Parikh, *et al.,* 2014). Park *et al.* (2016) observed that Yelp ratings were exclusively connected with hygiene in chain retail food facilities, confirming similar findings.

According to Coleman, *et al.,* (2013), unfavourable food handling habits are deeply ingrained in an organization's culture and difficult to modify. This study also revealed that the restaurant's organisational culture influences employees' food handling attitudes and practices. This culture is shaped by key personnel who process and act on food safety based on their personal traits, and who, in turn; influence others' behaviour (Rozhavskaya, 2016).

Brown *et al.* (2014) discovered that ethnicity was a risk factor for food poisoning. Managers and staff who spoke English as their first language had a better understanding of food safety than those who did not. Darcey and Quinlan (2011) investigated the role of geography as a risk factor for food-borne diseases. Food service establishments with greater poverty rates had a higher percentage of facilities with at least one significant health code violation (56.7%) and more frequent inspections than those with lower poverty rates. There is a link between food safety and the location of a food establishment. There were 0.6 more significant breaches for every 10% rise in the number of individuals living in poverty (Todd, 2020).

According to Tirado *et al.,* (2010), meteorological changes such as temperature and precipitation, as well as increased frequency and severity of rare or extreme weather events, play a role in altering food safety. When it came to temperature violations, days with the highest temperatures of 20^{o} C, 25^{o} C, and 30^{o} C were associated with higher frequencies of infractions with a P-value of 0.05 (Rozhavskaya, 2016). Temperature and Salmonella outbreaks have statistically significant positive relationships, according to Akil *et al.,* (2014). When compared to previous seasons, the number of inspections with holding temperature violations increased by 26%–43% in the summer (Waters *et al.,* 2013).

3. Research Methodology

To achieve the research's aim, chefs in restaurants were surveyed. The sample equation was applied to an unlimited society (Thompson, 2012) as follows:

$$n = \frac{N \times p(1-p)}{\left[\left[N-1\times\left(d^{2} \div z^{2}\right)\right]+ p(1-p)\right]}$$

N: Sample size, P: Percentage of purpose of this research 0.50, d: Percentage of the error limit allowed 0.05, Z: The standard degree used for giving general results is 95%. Thus, the standard degree = 1.96

$$\mathbf{N} = \frac{250000 \times 0.50\ (1\text{-}0.50)}{[250000 - 1 \times (0.05^{2} \div 1.96^{2}) + 0.50\ (1 - 0.50)\ ]} = \frac{62.500}{162.94} = 383.58 \simeq \mathbf{384}$$

The population of the research is unlimited because of the difficulty of determining a specific number of chefs in local restaurants of Mansoura city, so in this study, a random sample size is an excellent method to use.

According to Thompson, (2012) the minimum number of respondents for this study is 384. The number of questionnaires "as a test" were (424), which designed and distributed from 20th of January, 2022 to 5th of May, 2022 in (20) local restaurants in Mansoura city and these were as shown in the following table:

Table 1**:** Investigated Local Restaurant of Mansoura City

(2) Branches of El-Mohamady	Elmo	Green Corners	Ketchup	Tampa
The Champs Elysees	The Chef	Sabry Afandi	Shashlik	Ontario
Chicken Tikka	Bremer	Al-Sabbahi	Patcha	Oliver
Shelter Cheese House	ORIGO	Heart Attack	Stereo	

Source: Chamber of Tourism Establishments "**CTE**", (2021).

The study was investigated in in local restaurants than in chains of brand restaurants of Mansoura city restaurants as "a field study", because it is expected that there will be shortcomings in implementing the standards of food safety practices during rush times in local restaurants than in chains of brand restaurants. It also focused on studying the extent of chefs' commitment towards implementing food safety practices during rush times, due to the lack of studies and scientific research focused during rush times, within the limits of the researchers' knowledge and experience.

Researchers were designed and distributed (424) questionnaire forms as a "test", divided into (74) forms distributed through a personal interview with the chef, and (350) electronic questionnaire forms sent to a sample of chefs in local restaurants in Mansoura, where the forms were valid for statistical analysis by SPSS V.25. *These were as shown in the following table:*

Table 2: Questionnaire Forms Distributed on the Investigated Sample.

Answers	Questionnaire	Distributed Forms	Lost Forms	Returned Forms	Excluded Forms	Valid Forms
Freq.	**Paper**	**80**	**4**	**76**	**2**	**74**
%		100	5	95	2.5	92.5
Freq.	**Electronic**	**360**	**-**	**360**	**10**	**350**
%		100	0	100	2.8	97.2
Freq.	**Total**	**440**	**4**	**436**	**12**	**424**
%		100	0.9	99.1	2.73	96.36

Source: Designed by the Researchers

A questionnaire was prepared based on the studies of Bender, *et al.*, (2012); Kibret & Abera, (2012); Yeager, *et al.*, (2013); Akil, *et al.*, (2014); Brown, *et al.*, (2014); Adesokan, *et al.*, (2015); Brar, (2016); Lando, *et al.*, (2016), Rozhavskaya, (2016). The questionnaire consisted of two sections. The first section intended to reveal the chefs' demographic data. The second section intended to determine the chefs' commitment towards implementing food safety practices during rush time which presented 30 statements subdivided into three parts, "*Foodborne Diseases, Hygienic Handling, and Personal Hygiene*".

The respondents were asked to answer these statements by using a two-point Likert-type scale (Yes-No). The data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0. After that, their responses were categorized as (False = 1, True = 2).

True, False, and I don't know are the three choices for answers on the questionnaire. If the answer is right, the first two are given a point, and the last one is always zero. The following equation was used to calculate the level of agreement range:

Table 3: Questions Answered Scale

Category	False	True
Code	1	2
Range	1 – 1.50	1.51 – 2

Range = (2 – 1) ÷ 2 = 0.50
False = 1 to 1.50
True = 1.51 to 2

3.1. Reliability Analysis

According to Table 3, The Cronbach's alpha reliability of the questionnaire statements was 0.82 "More than 0.70," (Pallant, 2016). This result reveals that the questionnaires used in the study were reliable and valid.

Table 4: Reliability Analysis

Number of Statements	Alpha
30	**0.82**

4. Results and Discussion

The results involved two stages. Descriptive analysis was used to discover participants' responses, and variance analysis for respondents' answers was conducted to examine the relation between independent and dependent variable. The results obtained were computed and analyzed in the following tables.

Demographic Data	Attribute	Statistics		Demographic Data	Attribute	Statistics	
		Freq.	%			Freq.	%
Gender	Male	**417**	**98.3**	**Job level**	Crew	**333**	**78.6**
	Female	**7**	**1.7**		Supervisory	**91**	**21.4**
Age	< 20 years old	**6**	**1.4**	**Years of experience**	< 1 year	**36**	**8.5**
	20:< 30 years old	**132**	**31.1**		1:< 5 years	**206**	**48.6**
	30:< 40 years old	**206**	**48.6**		5:< 10 years	**116**	**27.4**
	> 40 years old	**80**	**18.9**		> 10 years	**66**	**15.5**
Educational level	Below average	**17**	**4.1**	**Time of training**	Never trained	**214**	**50.5**
	Average	**127**	**29.9**		< 3 months	**114**	**26.9**
	Institutional	**65**	**15.2**		3:< 6 months	**44**	**10.4**
	University	**208**	**49.1**		6:< 12 months	**37**	**8.7**
	Postgraduate	**7**	**1.7**		> 1 year	**15**	**3.5**

As it can be observed from table 4 that, among the 424 respondents, a high proportion of the tested sample (98.3%) were males, while (1.7%) were females. **This result shows that** most of the chefs working in Mansoura restaurants are men and that women occupy a small amount of employment in these restaurants.

According to the age of chefs of Mansoura restaurants, the majority of the tested sample (48.6%) were in the category of 30 to less than 40 years old; (31.1%) of the chefs were in the category of 20 to less than 30 years old; (18.9%) of the chefs were in the category of more than 40 years old and (1.4%) of the chefs were in the category less than 20 years. **This result shows that** most of them are young chefs in Mansoura restaurants.

Regarding to education level, a high proportion of the chefs (49.1%) have a university educational degree and (29.9%) were have average education "vocational/secondary school degree", it was followed by chefs whose have an institutional qualification with (15.2%) and (4.1%) with below-average education "Primary-Preparatory-without". Chefs with have postgraduates degree "Diploma-Master–Ph.D." were the smallest group and presented by (1.8%). **This result shows that** chefs seek to obtain a university degree to help them with their career in restaurants.

In connection with job level, the majority of the chefs (78.6%) were at "operational level," while (21.4%) were at supervisory level. **This result indicates that** the majority of Mansoura restaurants do not follow the career hierarchy of the chefs working in the kitchen,

and that most of the chefs at these restaurants are at the same job level.

Concerning years of experience, a high proportion of the chefs (48.6%) have 1 to less than 5 years; (27.4%) of the chefs have 5 to less than 10 years; while (15.5%) have more than 10 years. Chefs with less than 1 year of experience were the smallest group and represented (8.5%). **This result shows that** the vast majority of chefs in Mansoura restaurants have medium years of experience, thus, they have less awareness of their commitment to implementing standards of food safety practices.

Finally, in the chefs' survey of training times, it was found that among the 424 respondents, a high proportion of the chefs (50.5%) never trained; while (26.9%) had less than 3 months of training; (10.4%) had 3 to less than 6 months of training; (8.7%) had 6 to less than 12 months of training. Chefs with more than one year of experience made up the smallest group, accounting for 3.5% of the total.**This result shows that** most of the chefs of Mansoura restaurants lose the training component, and therefore, this will lead to shortcomings in some operational processes and weaknesses in the application of standards for food safety practices.

Table 6: Chefs' Commitment towards Implementing Food Safety Practices During Rush Time

Attributes	$\bar{x}$	S.D	C.V	R	P-value	Sig.
Foodborne Diseases						
1. Eggs should not be eaten raw or undercooked because they may contain salmonella germs.	**1.58**	0.50	31	19	65.57	.000
2. Bacteria found on healthy people's skin, noses, and mouths, contaminating food.	**1.12**	0.22	34	3	39.49	.000
3. Microorganisms that cause food-borne illnesses found in lettuce and raw vegetables.	**1.37**	0.38	35	14	57.70	.000
4. Microorganisms responsible for food-borne diseases grow at room temperature.	**1.24**	0.32	34	8	46.48	.000
5. When food is stored at room temperature for long time, bacteria can grow.	**1.66**	0.45	28	24	72.21	.000
6. Food that has been prepared ahead of time is more sensitive to the detection of pathogens.	**1.50**	0.48	33	18	61.89	.000
7. Cross-contamination is increased by storing cooked foods near raw foods, which can lead to food-borne illnesses.	**1.72**	0.51	26	26	78.30	.000
8. Storing food near cleaning supplies could lead to chemical contamination.	**1.80**	0.63	22	29	91.60	.000
Hygienic Handling						
9. In the event of cuts, wounds, or burns, bandages and gloves should be properly applied before handling food.	**1.21**	0.28	33	6	60.38	.000
10. Food that is served raw (such as salads) is not required to be sanitized.	**1.33**	0.37	35	12	57.49	.000
11. Improper food handling raises the risk of contamination because the chefs might transfer organisms into the food.	**1.62**	0.49	30	22	68.11	.000

12. Food can be contaminated by bacteria when it comes into touch with contaminated food.	**1.65**	0.47	28	23	72.21	.000
13. Food contamination can occur on work surfaces such as boards and benches.	**1.79**	0.51	23	28	90.63	.000
14. After handling raw meat, you can touch cooked meals while wearing gloves.	**1.27**	0.38	35	10	57.70	.000
15. To ensure that bacteria destroyed while cooking, the meal must achieve a temperature of at least 70° C.	**1.08**	0.17	32	1	63.39	.000
16. Cooked food must be maintained above 60°C once it has been prepared.	**1.78**	0.52	23	27	87.48	.000
17. Name, date of preparation, and shelf life must all be included on stored leftovers.	**1.39**	0.48	35	15	57.70	.000
18. Cooked food can be securely stored in the refrigerator at temperatures below 5 ° C.	**1.22**	0.42	34	7	59.49	.000
19. Before storing food in the refrigerator, it must be brought to room temperature.	**1.46**	0.50	34	17	59.85	.000
20. Defrosting can help to minimize, but not eliminate, microorganisms that can cause foodborne illnesses.	**1.44**	0.47	32	16	62.98	.000
21. The meat can be kept at room temperature for up to 5 hours after defrosting.	**1.11**	0.21	32	2	63.39	.000
22. Food hygiene requires removing undesired solid residues such as dust, filth, grease, and other contaminants.	**1.26**	0.32	34	9	59.49	.000
23. There are two steps to the cleaning process: Sanitation and disinfection.	**1.35**	0.42	35	13	57.70	.000
24. Hands must be cleaned only with soap and running water after handling raw meat.	**1.31**	0.41	35	11	57.49	.000
Personal Hygiene						
25. After using the bathroom, always wash your hands with soap, running water, and hand sanitizers.	**1.60**	0.47	30	20	67.43	.000
26. Hands should be carefully cleansed after sneezing.	**1.61**	0.49	30	21	67.27	.000
27. Men do not need to shave their moustaches because the contamination level is low.	**1.20**	0.31	34	5	60.25	.000
28. Light-colored nail paint can be applied.	**1.89**	0.60	22	30	91.60	.000
29. Uniforms are required to be washed once a week.	**1.17**	0.17	32	4	63.39	.000
30. To avoid contamination, do not wear adornments (earrings, rings, necklaces) when handling.	**1.69**	0.46	27	25	76.60	.000
Average of Responses	**1.45**	**0.43**	**30.9**	**30**	**----**	**----**

N= **424** **$\bar{x}$:** Mean **S.D**: Standard Deviation %) **R**: Rank
C.V: Coefficient Variance **(S.D÷$\bar{x}$)** **P-value**= (0.05) ***sig**. ≤ (.05)

The results in Table 5 show that the respondents have not awareness enough about implementing food safety practices during rush time, as the average mean was 1.45. Besides, the results show that there are significant differences among respondents towards the attributes of the table above which significant of p-value ≤ (.05).

- ***Part One "Foodborne Diseases"***

First, the previous table shows that chefs have knowledge about implementing food safety practices during rush time (mean= 1.51–2) in the following (5) statements:

- Eggs should not be eaten raw or undercooked because they may contain salmonella germs ($\bar{x}$ = 1.58).

- When food is stored at room temperature for an extended amount of time, bacteria can grow ($\overline{x}$=1.66). **These results agreed with Akil, *et al.*, (2014),** who mentioned that eggs should not be eaten raw because they contain salmonella bacteria that activate at room temperature very quickly.
- Food that has been prepared ahead of time is more sensitive to the detection of pathogens ($\overline{x}$ = 1.50).
- Cross-contamination is increased by storing cooked foods near raw foods, which can lead to food-borne illnesses ($\overline{x}$ = 1.72).
- Storing food near cleaning supplies could lead to chemical contamination ($\overline{x}$=1.80). **These results agreed with Lando, *et al.*, (2016)**, who stated that Pre-prepared food is more susceptible to bacteria, and may be exposed to cross contamination if it is moved next to raw foods or chemical contamination if it is near cleaning materials.

On other hand, the part one "*Foodborne Diseases*" in the previous table also shows that chefs haven't knowledge about implementing food safety practices during rush time (mean= 1–1.50), as their answers were not correct in (3) statements as follows:

- Bacteria can be found on healthy people's skin, noses, and mouths, contaminating food ($\overline{x}$ = 1.12).
- Microorganisms that cause food-borne illnesses may be found in lettuce and other raw vegetables ($\overline{x}$ = 1.37).
- Microorganisms responsible for food-borne diseases grow at room temperature ($\overline{x}$=1.24). **These results contradicts with ImathIu (2017),** who mentioned that that bacteria multiply in any area on the human body, and even more dangerously, they are also found in abundance in leafy vegetables because they contain an abundant amount of juicy liquid.

- ***Part Two "Hygienic Handling"***

Second, the previous table shows that chefs have knowledge about implementing food safety practices during rush hour (mean= 1.51–2) in the following (4) statements:

- Improper food handling raises the risk of contamination because the chefs might transfer organisms into the food ($\overline{x}$ = 1.62).
- Food can be contaminated by bacteria when it comes into touch with contaminated food ($\overline{x}$ = 1.65).
- Food contamination can occur on work surfaces such as boards and benches ($\overline{x}$=1.79).
- Cooked food must be maintained above 60°C once it has been prepared ($\overline{x}$ = 1.78). **These results agreed with Nasrolahei *et al.*, (2017),** who confirmed that cooked foods should be kept away from the dangerous temperature zone "TDZ", as leaving foods on work surfaces may expose them to spoilage and transfer bacteria to them, thus contaminating them.

On other hand, the part two "*Hygienic Handling*" in the previous table also shows that chefs haven't knowledge about implementing food safety practices during rush time (mean=1–1.50), as their answers were not correct in (12) statements as follows:

- In the event of cuts, wounds, or burns, bandages and gloves should be properly applied before handling food ($\overline{x}$ = 1.21).

- Food that is served raw (such as salads) is not required to be sanitized ($\overline{x}$ = 1.33).
- After handling raw meat, you can touch cooked meals while wearing gloves ($\overline{x}$=1.27).
- To ensure that bacteria are destroyed while cooking, the meal must achieve a temperature of at least 70 ° C ($\overline{x}$ = 1.08).
- Name, date of preparation, and shelf life must all be included on stored leftovers ($\overline{x}$ = 1.39).
- Cooked food can be securely stored in the refrigerator at temperatures below 5 ° C ($\overline{x}$ = 1.22). **These results disagreed with Food and Drug Administration "FDA", (2021),** which indicated that cooking must be done above 70°C to ensure that thermophilic bacteria are killed. But, when preserving food, it must be stored at a temperature of less than 5 °C to ensure its protection from psychrophilic bacteria.
- Before storing food in refrigerator, it must brought to room temperature ($\overline{x}$ = 1.46).
- Defrosting can help to minimize, but not eliminate, microorganisms that can cause foodborne illnesses. ($\overline{x}$ = 1.44).
- The meat can be kept at room temperature for up to 5 hours after defrosting ($\overline{x}$ = 1.11).
- Food hygiene requires removing undesired solid residues such as dust, filth, grease, and other contaminants ($\overline{x}$ = 1.26).
- There are two steps to the cleaning process: Sanitation and disinfection ($\overline{x}$ = 1.35).
- Hands must be cleaned only with soap and running water after handling raw meat ($\overline{x}$ = 1.31). **These results disagreed with the Centers for Disease Control and Prevention "CDC", (2019),** which mentioned that when dealing with raw materials, especially raw meat, poultry and fish, hands must be washed and disinfected to prevent the spread of bacteria that may cause accidental contamination. The cleaning process consists of three stages, starting with washing, disinfection, and then sterilization.

- ***Part Three "Personal Hygiene"***

Third, the previous table shows that chefs have knowledge about implementing food safety practices during rush time (mean= 1.51–2) in the following (4) statements:

- After using the bathroom, always wash your hands with soap, running water, and hand sanitizers ($\overline{x}$ = 1.60).
- Hands should be carefully cleansed after sneezing ($\overline{x}$ = 1.61).
- Light-colored nail paint can be applied ($\overline{x}$ = 1.89).
- To avoid contamination, do not wear adornments (earrings, rings, necklaces) when handling ($\overline{x}$ = 1.69). **These results agreed with Todd, (2020),** who mentioned that food handlers, especially chefs, should wash their hands frequently, and disinfect them after sneezing to avoid the transmission of bacteria, and not wear accessories so as not to carry some food residues and thus lead to cross-contamination.

On other hand the part three "*Personal Hygiene*" in the previous table also shows that chefs haven't knowledge about implementing food safety practices during rush time (mean= 1–1.50), as their answers were not correct in (2) statements as follows:

- Men do not need to shave their moustaches because the contamination level is low ($\overline{x}$=1.20).

- Uniforms are required to be washed once a week ($\bar{x}$ = 1.17). **These results disagreed with Yeager *et al.*, (2013),** who confirmed that uniforms must be washed daily.

4.1. Testing Hypothesis

Table 7: T-Test & One-Way ANOVA Test / Post Hoc Multiple Comparisons

Demographic Data	Scheffe Post Hoc			Df	T- Test	F	Sig.	H
	Attributes	N	$\bar{x}$					
Gender	Male	417	1.57	423	8.642	-------	**0.437**	**R.H**
	Female	7	1.20					
Age	< 20 years	6	1.35	423	-------	6.272	**0.285**	**R.H**
	20:< 30 years	132	1.49					
	30:< 40 years	206	1.52					
	> 40 years	80	1.58					
Educational level	Below average	17	1.39	423	-------	1.174	**.000 ***	**A.H**
	Average	127	1.48					
	Institutional	65	1.50					
	University	208	1.54					
	Postgraduate	7	1.53					
Job level	Crew	333	1.49	423	8.753	-------	**.000 ***	**A.H**
	Supervisory	91	1.54					
Years of experience	< 1 year	36	1.45	423	-------	7.272	**.000 ***	**A.H**
	1:< 5 years	206	1.49					
	5:< 10 years	116	1.51					
	> 10 years	66	1.54					
Time of training	Never trained	214	1.23	423	-------	9.421	**.000 ***	**A.H**
	< 3 months	114	1.44					
	3:< 6 months	44	1.50					
	6:< 12 months	37	1.53					
	> 1 year	15	1.57					

N= 424 **$\bar{x}$:** Mean **Test Value** = (0.05) ""< less than ""> more than **df:** degrees of freedom *** sig.** ≤ (. 05) **A.H**= Accept Hypothesis **R.H**= Reject Hypothesis

With regard to Table 6 clarifies that the results of T-Test for two independent samples showed that there is no significant difference among chefs' commitment towards implementing food safety

practices during rush time back to the gender, which t-test (8.642) and P-value (0.437) "More than 0.05". This result clarifies the variation between the respondents according to gender. **Referring to Scheffe Post Hoc**, male chefs (mean= 1.57) more commitment towards implementing food safety practices during rush time than female chefs (mean= 1.20).

The results of One-Way ANOVA test showed that there is no significant difference among the chefs' commitment towards implementing food safety practices during rush time returns to their age, which F value (6.272), and P-value (0.285) "more than 0.05". According to Scheffe Post Hoc result, chefs who their age in the category of more than 40 years old (mean= 1.58); and in the category of 30 to less than 40 years old (mean= 1.52) were more committed towards implementing food safety practices during rush time, than chefs who their age in the category of 20 to less than 30 years old (mean= 1.49), and chefs in the category of less than 40 years old (mean= 1.35).

"This result shows that different chefs' ages are not a clear measure of their commitment towards implementing food safety practices during rush time".

While, there is a significant difference among chefs' commitment towards implementing food safety practices during rush time refers to educational level, which F value (1.174) and P-value (.000) "less than 0.05". According to Scheffe Post Hoc result, chefs who have university educational degree (mean= 1.54); chefs who have postgraduates degree "Diploma-Master–Ph.D." degree (mean= 1.53), and chefs who have institutional qualification degree (mean= 1.50), more committed towards implementing food safety practices during rush time, than chefs who have average education "vocational/secondary school degree" (mean= 1.48), and chefs with below-average education "Primary-Preparatory-without" (mean= 1.39).

*"**This result agreed with Wambui et al., (2017)** who mentioned that the educational level has a significant role in the chefs gaining awareness and sufficient knowledge about the application of standards of food safety practices during peak hours in restaurants".*

Moreover, there is a significant difference among chefs' commitment towards implementing food safety practices during rush time back to the job level, which T-Test (8.753) and P-value (.000) "less than 0.05". **The Scheffe Post Hoc result** indicates that chefs who work on a crew "operational level" (mean= 1.49) have less commitment towards implementing food safety practices during rush time, meanwhile chefs who work on a "supervisory level" (mean= 1.54), have more commitment towards implementing food safety practices during rush time.

*"This result reveals the job level of chefs' effects on implementing food safety practices during rush time in restaurants and confirms that supervisory chefs should be have an essential role in increasing crew chefs' commitment towards implementing food safety practices during rush time, and **this result was confirmed by Brown et al., (2014)."***

Furthermore, there is a significant difference among chefs' commitment towards implementing food safety practices during rush time refers to years of experience, which F value (7.272) and P-value (.000) "less than 0.05". **According to Scheffe Post Hoc result**, chefs who have less than 1 year experience (mean=

1.45), and more than 1-5 years' experience (mean= 1.49) have less commitment towards implementing food safety practices during rush time, meanwhile chefs who have more than 5-10 years' experience (mean= 1.51) and more than 10 years' experience (mean= 1.54) have more commitment towards implementing food safety practices during rush time.

*"**This result agrees with Coleman, et al., (2013)** who mentioned that when the number of chefs' experience years increases, chefs' will have more awareness, knowledge, and commitment towards implementing food safety practices during rush time."*

Finally, there is a significant difference among chefs' commitment towards implementing food safety practices during rush time refers to time of training, which F value (9.421) and P-value (.000) "less than 0.05". **According to Scheffe Post Hoc result**, chefs who never trained (mean= 1.23); and chefs who have less than 3 months of training (mean= 1.44), less committed towards implementing food safety practices during rush time, than chefs who have 3 to less than 6 months of training (mean= 1.50); chefs who have 6 to less than 12 months of training (mean= 1.53), and chefs who have more than 1 year of training (mean= 1.57). This result shows that if the number times of training for chefs on how to handle food increases, the chefs' commitment to correctly implement food safety practices standards during peak times will increase directly.

***"This result was confirmed by (Adesokan et al., 2015)** who stated that qualified and trained chefs lead to reduce the risk of transmission of bacteria from the hands to the food.*

5. Conclusion

This paper has presented an investigation into determining the chefs' commitment towards implementing food safety practises during rush hour in local restaurants in Mansoura city. Chefs do not have sufficient knowledge and awareness of foodborne diseases, hygienic handling, and personal hygiene, and this may be a major reason for taking negative actions about the incorrect implementation of food safety practises during rush hour.

When it came to analysing chefs' commitment to implementing food safety practises during rush hour, the majority of chefs didn't know how to do it correctly, as evidenced by the fact that the average of their answers was incorrect in some statements.On the other side, the chefs' answers were correct despite contradictory wording in some statements.

Furthermore, there is a significant variance in the demographic data for chefs (*educational level, job level, years of experience, and time of training*) on chefs' commitment to implementing food safety practises during rush hour. This paper confirms that qualified and trained chefs reduce the risk of transmission of bacteria from the hands to the food. If the number of times of training for chefs on how to handle food increases, the chefs' commitment to correctly implement food safety practises during peak times will increase directly, and when the number of chefs' experience years increases, chefs' will have more awareness, knowledge, and commitment towards implementing food safety practises during rush hour.

Finally, the job level of chefs' effects on implementing food safety practises during rush time in restaurants confirms that supervisory chefs should have an essential role in increasing crew chefs' commitment towards implementing food safety practises during rush time.

Educational level has a significant role in the chefs' gaining awareness and sufficient knowledge about the application of standards of food safety practises during peak hours in restaurants. Different chefs' ages are not a clear measure of their commitment towards implementing food safety practises during rush hour.

6. Recommendations Addressed to Restaurants Management Conclusion

According to the literature review and the results extracted from the field study, the following recommendations could be suggested:

1. Placing guidelines and instructions in prominent locations throughout each store, directing chefs on how to implement food safety practises during rush hour,
2. Holding discussion sessions with chefs on food hygiene to inform them of the need for chefs to implement food safety practises during rush hour in the briefing meeting.
3. Design a checklist for implementing food safety practises during rush hour, and it should be reviewed continuously by daily reports provided to the executive chef.
4. Hiring chefs who have hotel qualifications, as they have more awareness of food safety practises during rush hour.
5. Disbursing material or intangible rewards for the most outstanding chefs who implement food safety practices
6. Holding advanced and intensive training courses for chefs and sending them to the faculties or institutes of tourism and hotels to get the theoretical and practical topics of food safety practises in order to develop their skills on the correct application of food safety and health practises during peak hours

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