

# **K**NOWLEDGE, ATTITUDE, AND PRACTICE OF FOOD HYGIENE AMONG FOOD HANDLERS IN RESTAURANTS IN JALINGO, TARABA STATE

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## **ABSTRACT**

**F**oodborne diseases, often stemming from poor food hygiene practices, are a global public health concern. This study evaluates food hygiene knowledge, attitude, and practice among restaurant food handlers in Jalingo, Taraba State. A cross-sectional survey involving 45 diverse restaurant staff utilized structured questionnaires, with statistical analyses exploring socio-demographic factors' relationships with knowledge, attitude, and practice. Results indicate mixed knowledge levels, with gaps in identifying symptoms of foodborne illnesses and proper cooking temperatures. Specifically, 40.0% recognized risks of improper food handling, 42.2% identified symptoms, and 35.6% knew proper cooking temperatures.

## **Introduction:**

### **Background**

Foodborne diseases pose a significant global public health challenge, often stemming from inadequate food hygiene practices (Girmay *et al.*, 2022). According to the World Health Organization (2022), nearly 600 million people, approximately 1 in 10 individuals worldwide, suffer from illness due to consuming contaminated food annually. Tragically, this results in around 420,000 deaths each year, leading to the loss of approximately 33 million healthy years of life (DALYs)

Positive attitudes were common (51.1% believed in food hygiene's importance), but inconsistent practices, especially hand washing and cleaning, were evident. Socio demographic factors (age, gender, experience, education) didn't significantly associate with knowledge, attitude, or practice ( $p > 0.05$ ). Targeted education, positive attitude reinforcement, and consistent practices are urged. Enhanced training, supervision, and collaboration can elevate food safety, bolster consumer confidence, and ensure a healthier dining experience and community in Jalingo's restaurant industry.

**Keywords:** Food hygiene; Knowledge; Practice; Attitude; Food handler

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(Afsana *et al.*, 2022). Furthermore, a substantial proportion of the 1.8 million deaths attributed to diarrheal diseases are linked to food and water contamination (WHO, 2022). The economic repercussions of foodborne illnesses in low and middle-income countries amount to an estimated \$95.2 billion in annual productivity losses, with the treatment costs reaching approximately \$15 billion annually (World Bank, 2018). Many instances of foodborne disease outbreaks in developed countries are traced back to restaurants, making them a focal point for investigations into pathogen sources (Hoelzer *et al.*, 2018).

In Nigeria, a case of food poisoning at a restaurant was reported in Calabar by the Tide newspaper on March 27, 2017 (Elechi & Allison, 2018). Similarly, the National Agency for Food and Drug Administration Control (NAFDAC) reported in 2018 that a comprehensive investigation across Port Harcourt, Abuja, and Lagos revealed the contamination of 3,300kg of vegetables. Poor food handling and disregard for hygiene practices create an environment where pathogens can easily come into contact with food, resulting in potential illness among consumers. Given the escalating reports of health issues, understanding, and implementing proper food hygiene practices among food handlers are crucial to public health.

Food, as the essential sustenance universally consumed by humans and animals alike, necessitates meticulous handling to preserve human health. Contamination at any stage of the food supply chain can yield far-reaching and occasionally fatal consequences. Food hygiene encompasses a range of manufacturing practices aimed at minimizing biological hazards in food production, safeguarding public health against foodborne illnesses (Awuchi, 2023). It encompasses all the measures taken throughout the entire journey of food, from production to consumption, to ensure that it remains safe, wholesome, and suitable for human consumption.

Food handlers play a pivotal role in maintaining the safety of the food they prepare and serve. Their comprehension, approach, and execution of food hygiene practices significantly influence the quality of food and the health of consumers. In Jalingo, the capital city of Taraba State, the flourishing restaurant industry necessitates a thorough examination of the food hygiene standards upheld by its food handlers.

### **Statement of the Problem**

Foodborne disease outbreaks have been caused by a lack of understanding, a poor attitude, and inadequate practices among food handlers, negatively impacting consumers' health, restaurant reputations, and the greater economy. According to Onyeneho and Hedberg (2013)'s Assessment of Food Safety Needs of Restaurants in Owerri, Imo State, Nigeria, 92% clean and sanitize food equipment and touch surfaces, whereas 37% engage in cross-contamination practices. Forty-nine percent said they would let a sick person handle food. Only 70% indicated they always cleansed their hands, while 6% said they kept cooking after cracking uncooked eggs.

Among food handlers in restaurants in Jalingo, Taraba State, the issue revolves around inadequate awareness, negative attitudes, and substandard practices among food handlers in the local restaurant industry. This problem has led to outbreaks of foodborne diseases, impacting consumer health, restaurant reputations, and the economy. The lack of awareness results from insufficient

training and limited information about proper food hygiene, leading to contamination in the food supply chain. Negative attitudes toward food safety contribute to complacency and resistance to hygiene practices. As a consequence, some food handlers engage in improper practices, like inadequate handwashing and neglecting cleaning, leading to foodborne disease outbreaks. Addressing this issue is vital for public health and the restaurant industry's reputation.

Understanding the current status of knowledge, attitude, and practice of food hygiene among food handlers in Jalingo's restaurants is of paramount importance to take proactive measures for improving food safety. Therefore, this study seeks to bridge this knowledge gap by comprehensively investigating the knowledge levels, attitudes, and practices of food hygiene among food handlers in restaurants in Jalingo, Taraba State. By examining these aspects, the study aims to identify strengths and weaknesses in the current food hygiene practices, pinpoint areas requiring intervention, and ultimately contribute to a safer and healthier dining environment for the community.

### **Specific Objectives**

1. To assess the level of knowledge among food handlers in restaurants in Jalingo, Taraba State, regarding food hygiene principles.
2. To evaluate the attitudes of food handlers in restaurants in Jalingo, Taraba State, towards food safety and hygiene practices.
3. To examine the daily practices of food handlers in restaurants in Jalingo, Taraba State, concerning food hygiene.

### **Research Questions**

1. What is the extent of knowledge among food handlers in restaurants in Jalingo, Taraba State, about food hygiene principles?
2. What are the attitudes of food handlers in restaurants in Jalingo, Taraba State, towards food safety and hygiene practices?

3. How do food handlers in restaurants in Jalingo, Taraba State implement food hygiene practices in their daily routines?

### Hypotheses

1.  $H_0$ : There is no significant difference in the level of knowledge about food hygiene principles among food handlers in restaurants in Jalingo, Taraba State.
2.  $H_0$ : There is no significant association between the attitudes of food handlers in restaurants in Jalingo, Taraba State, and their practice of food safety and hygiene.
3.  $H_0$ : There is no significant relationship between the daily practices of food handlers in restaurants in Jalingo, Taraba State, and their level of food hygiene.

### Methodology

To ensure that all types and sizes of restaurants in Jalingo were represented, a stratified random sample technique was used. Restaurants in the city were classified based on variables such as cuisine, seating capacity, and location. A proportionate number of food handlers were chosen at random from each stratum to participate in the study, guaranteeing a diverse and comprehensive sample. Data were obtained on the spot through self-administration of questionnaires to respondents. In addition, an observational checklist was employed to document the sanitary conditions of food service establishments and the hygiene procedures of food handlers.

### Results Analysis

Data collected were analyzed using Microsoft Excel and Statistical Package for Social Science (SPSS) version 23. Questionnaires were checked for completeness by counting the number of those returned. Results are presented in percentages, frequencies, and were summarized using descriptive statistic. Multiple regression was used to test associations

between some socio-demographic variables, knowledge, and food hygiene practice of food handlers.

Table 1: Socio-demographic characteristics.

Variable	Parameter	Frequency	Percentage (%)
Age	20 – 24	1	2.2
	25 – 29	19	42.2
	30 – 34	1	2.2
	35 and above	24	53.3
	<b>Total</b>	<b>45</b>	<b>100.0</b>
Gender	Male	4	8.9
	Female	41	91.1
	<b>Total</b>	<b>45</b>	<b>100.0</b>
Years of Experience in Food Industry	Less than 5 years	26	57.8
	6 to 10 years	9	20.0
	11 to 15 years	6	13.3
	16 to 20 years	4	8.9
	<b>Total</b>	<b>45</b>	<b>100.0</b>
Level of Education	Primary School	9	20.0
	Secondary School	26	57.8
	Vocational/Trade School	6	13.3
	College/University	4	8.9
	<b>Total</b>	<b>45</b>	<b>100.0</b>

Source: Field Survey (2023)

Table 1 provides an overview of the socio-demographic characteristics of the study participants. The variables examined include age, gender, years of experience in the food industry, and level of education. A total of 45 food handlers were included in the analysis.

The participants' ages were categorized into four groups. The majority of participants fell within the age range of 25 to 29 years, constituting 42.2% of the sample. Participants aged 35 and above made up 53.3% of the sample. Only one participant each fell within the age ranges of 20-24 and 30-34, comprising 2.2% of the sample each.

The gender distribution of participants showed that the majority were female, accounting for 91.1% of the total sample. Male participants represented 8.9% of the sample.

Participants' years of experience in the food industry were categorized into four groups. The highest proportion of participants, 57.8%, had less than 5 years of experience. Participants with 6 to 10 years of experience comprised 20.0% of the sample, while those with 11 to 15 years and 16 to 20 years of experience represented 13.3% and 8.9% of the sample, respectively.

The participants' level of education was categorized into four groups. The highest percentage of participants, 57.8%, had a secondary school education. Those with primary school education constituted 20.0% of the sample, while participants with vocational/trade school education and college/university education accounted for 13.3% and 8.9% of the sample, respectively.

**Table 2: Knowledge among food handlers in restaurants**

Item	Response	Frequency	Percentage (%)
I am aware of the potential risks of improper food handling.	Yes	18	40.0
	No	27	60.0
	<b>Total</b>	<b>45</b>	<b>100.0</b>
I can identify common symptoms of foodborne illnesses.	Yes	19	42.2
	No	26	57.8
	<b>Total</b>	<b>45</b>	<b>100.0</b>
I know the proper temperature range for cooking different types of food.	Yes	16	35.6
	No	29	64.4
	<b>Total</b>	<b>45</b>	<b>100.0</b>



I am familiar with proper handwashing techniques.	Yes	18	40.0
	No	27	60.0
	<b>Total</b>	<b>45</b>	<b>100.0</b>

Source: Field Survey (2023)

Table 2 presents insights into the knowledge levels among food handlers working in restaurants, focusing on specific aspects of food hygiene. The result shows that 40.0% of the food handlers are aware of the potential risks associated with improper food handling, while 60.0% indicated that they are not aware.

In terms of identifying common symptoms of foodborne illnesses, 42.2% of the food handlers stated that they can recognize these symptoms, whereas 57.8% indicated that they cannot.

Regarding the proper temperature range for cooking different types of food, 35.6% of the food handlers possess this knowledge, while 64.4% do not. When it comes to familiarity with proper hand-washing techniques, 40.0% of the food handlers are well-informed, while 60.0% are not.

**Table 3: Attitudes of food handlers in restaurants**

Item	Response	Frequency	Percentage (%)
I believe that following food hygiene practices is essential to prevent foodborne illnesses.	Yes	23	51.1
	No	22	48.9
	<b>Total</b>	<b>45</b>	<b>100.0</b>
I am committed to maintaining high standards of food hygiene in my daily work.	Yes	27	60.0
	No	18	40.0
	<b>Total</b>	<b>45</b>	<b>100.0</b>
	Yes	17	37.8
	No	28	62.2



I am open to receiving additional training on food safety and hygiene	Total	45	100.0
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Source: Field Survey (2023)

Table 3 provides insights into the attitudes of food handlers in restaurants regarding various aspects of food hygiene. The result reveals that 51.1% of the food handlers believe that adhering to food hygiene practices is essential to prevent foodborne illnesses, while 48.9% hold the opposite view.

Regarding the commitment to upholding high standards of food hygiene in daily work, 60.0% of the food handlers express a strong commitment, while 40.0% do not share the same level of commitment. In terms of the willingness to receive further training on food safety and hygiene, 37.8% of the food handlers are open to the idea, while 62.2% express no such openness.

**Table 4: Practice of food hygiene in restaurants**

Item	Response	Frequency	Percentage (%)
How frequently do you wash your hands before handling food?	Always	20	44.4
	Often	13	28.9
	Sometimes	3	6.7
	Rarely	9	20.0
	<b>Total</b>	<b>45</b>	<b>100.0</b>
Do you wear protective gear (e.g., gloves, aprons) while preparing or serving food?	Always	21	46.7
	Often	19	42.2
	Sometimes	2	4.4
	Rarely	3	6.7
	<b>Total</b>	<b>45</b>	<b>100.0</b>
How often do you clean and sanitize food	Always	20	44.4
	Often	20	44.4
	Rarely	5	11.1

preparation surfaces and utensils?	Total	45	100.0
Have you received formal training in food hygiene practices?	Yes	19	42.2
	No	26	57.8
	Total	45	100.0
How often does your supervisor monitor your food hygiene practices?	Regularly	17	37.8
	Occasionally	24	53.3
	Rarely	1	2.2
	Never	3	6.7
	Total	45	100.0
Are you familiar with local food safety regulations and guidelines?	Very Familiar	29	64.4
	Somewhat Familiar	13	28.9
	Familiar		
	Not Familiar	3	6.7
	Total	45	100.0

Source: Field Survey (2023)

Table 4 provides a comprehensive analysis of the practice of food hygiene among food handlers in restaurants. The result revealed that, regarding the frequency of handwashing before handling food, 44.4% of food handlers reported always washing their hands, while 28.9% do so often, 6.7% sometimes, and 20.0% rarely. When it comes to wearing protective gear (such as gloves and aprons) while preparing or serving food, 46.7% of food handlers reported always wearing them, 42.2% often, 4.4% sometimes, and 6.7% rarely. In terms of cleaning and sanitizing food preparation surfaces and utensils, 44.4% of food handlers reported always doing so, 44.4% often, and 11.1% rarely.

Concerning whether food handlers received formal training in food hygiene practices, 42.2% answered affirmatively, while 57.8% indicated they had not

received such training. When asked about the frequency of supervisor monitoring of their food hygiene practices, 37.8% of food handlers reported regular monitoring, 53.3% occasional monitoring, 2.2% rare monitoring, and 6.7% never being monitored. In terms of familiarity with local food safety regulations and guidelines, 64.4% of food handlers reported being very familiar, 28.9% somewhat familiar, and 6.7% not familiar.

### Hypothesis Testing

**Table 5: Association of Knowledge and food hygiene Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.467	.702		2.090	.043
	Age	-.066	.074	-.138	-.893	.377
	Gender	.287	.287	.167	.998	.324
	Years of Experience in Food Industry	-.052	.081	-.107	-.646	.522
	Level of Education	-.057	.091	-.096	-.632	.531

a. Dependent Variable: Knowledge of food hygiene.

Table 1 presents the results of the regression analysis conducted to assess the knowledge about food hygiene principles among food handlers in restaurants in Jalingo, Taraba State. The null hypothesis ( $H_0$ ) being tested is that there is no significant difference in the level of knowledge about food hygiene principles among these food handlers.

The coefficients table provides information about the relationships between the independent variables (Age, Gender, Years of Experience in Food Industry, Level of Education) and the dependent variable (Knowledge of food hygiene).

Each coefficient indicates the change in the dependent variable associated with a one-unit change in the corresponding independent variable while holding other variables constant.

**Constant:** The constant coefficient is 1.467, indicating the estimated level of knowledge about food hygiene when all other independent variables are zero.

**Age:** The coefficient for Age is -0.066, which suggests that a one-unit increase in Age is associated with a decrease of 0.066 units in the level of knowledge about food hygiene. However, the p-value for Age (0.377) indicates that this relationship is not statistically significant.

**Gender:** The coefficient for Gender is 0.287, suggesting that being female is associated with an increase of 0.287 units in the level of knowledge about food hygiene compared to being male. However, like Age, the p-value for Gender (0.324) indicates that this relationship is not statistically significant.

**Years of Experience in Food Industry:** The coefficient for Years of Experience in Food Industry is -0.052, implying that a one-unit increase in Years of Experience is associated with a decrease of 0.052 units in the level of knowledge about food hygiene. Again, the p-value for Years of Experience (0.522) suggests that this relationship is not statistically significant.

**Level of Education:** The coefficient for Level of Education is -0.057, indicating that a one-unit increase in Level of Education is associated with a decrease of 0.057 units in the level of knowledge about food hygiene. Similar to the previous variables, the p-value for Level of Education (0.531) suggests that this relationship is not statistically significant.

The regression analysis shows that none of the independent variables (Age, Gender, Years of Experience, Level of Education) have statistically significant relationships with the level of knowledge about food hygiene among food handlers in restaurants. Therefore, based on the provided coefficients and p-values, there is no evidence to reject the null hypothesis, suggesting that there is no significant difference in the level of knowledge about food hygiene principles among food handlers in Jalingo, Taraba State.

**Table 6: Association of Attitude towards food safety and food hygiene Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.454	.718		2.025	.050
	Age	-.092	.076	-.191	-1.210	.233
	Gender	.086	.294	.050	.294	.771
	Years of Experience in Food Industry	-.021	.083	-.042	-.251	.803
	Level of Education	.047	.093	.078	.500	.619

a. Dependent Variable: Attitude towards food safety.

Table 6 presents the results of the regression analysis conducted to assess the association between various sociodemographic factors and the attitude towards food safety among food handlers. The dependent variable is "Attitude towards food safety."

**Constant:** The constant coefficient is 1.454, which indicates the estimated level of the attitude towards food safety when all other independent variables are zero.

**Age:** The coefficient for Age is -0.092, implying that a one-unit increase in Age is associated with a decrease of 0.092 units in the attitude towards food safety. However, the p-value for Age (0.233) suggests that this relationship is not statistically significant.

**Gender:** The coefficient for Gender is 0.086, suggesting that being female is associated with an increase of 0.086 units in the attitude towards food safety compared to being male. The p-value for Gender (0.771) indicates that this relationship is not statistically significant.

**Years of Experience in Food Industry:** The coefficient for Years of Experience in Food Industry is -0.021, indicating that a one-unit increase in Years of

Experience is associated with a decrease of 0.021 units in the attitude towards food safety. The p-value for Years of Experience (0.803) suggests that this relationship is not statistically significant.

**Level of Education:** The coefficient for Level of Education is 0.047, implying that a one-unit increase in Level of Education is associated with an increase of 0.047 units in the attitude towards food safety. The p-value for Level of Education (0.619) suggests that this relationship is not statistically significant.

The result revealed that none of the examined sociodemographic factors (Age, Gender, Years of Experience, Level of Education) have statistically significant associations with the attitude towards food safety among food handlers. The p-values for these variables are all above the conventional threshold of 0.05, indicating that there is no strong evidence to suggest significant relationships between these factors and attitudes towards food safety among the food handlers in the study.

**Table 7: Association of Practices of food handlers and food hygiene Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.221	1.176		1.889	.066
	Age	-.199	.124	-.243	-1.602	.117
	Gender	.158	.482	.054	.328	.745
	Years of Experience in Food Industry	-.178	.136	-.213	-1.308	.198
	Level of Education	.051	.152	.050	.332	.742

a. Dependent Variable: Practice of food handlers

Table 6 presents the results of the regression analysis conducted to examine the relationship between the daily practices of food handlers in restaurants in Jalingo, Taraba State, and their level of food hygiene. The null hypothesis ( $H_0$ ) being tested is that there is no significant relationship between these variables.

**Constant:** The constant coefficient is 2.221, which indicates the estimated level of the practice of food handlers when all other independent variables are zero.

**Age:** The coefficient for Age is -0.199, suggesting that a one-unit increase in Age is associated with a decrease of 0.199 units in the practice of food handlers. However, the p-value for Age (0.117) indicates that this relationship is not statistically significant.

**Gender:** The coefficient for Gender is 0.158, implying that being female is associated with an increase of 0.158 units in the practice of food handlers compared to being male. The p-value for Gender (0.745) indicates that this relationship is not statistically significant.

**Years of Experience in Food Industry:** The coefficient for Years of Experience in Food Industry is -0.178, indicating that a one-unit increase in Years of Experience is associated with a decrease of 0.178 units in the practice of food handlers. The p-value for Years of Experience (0.198) suggests that this relationship is not statistically significant.

**Level of Education:** The coefficient for Level of Education is 0.051, suggesting that a one-unit increase in Level of Education is associated with an increase of 0.051 units in the practice of food handlers. The p-value for Level of Education (0.742) indicates that this relationship is not statistically significant.

The results shows that none of the independent variables (Age, Gender, Years of Experience, Level of Education) have statistically significant relationships with the practice of food handlers. Therefore, based on the provided coefficients and p-values, there is no strong evidence to reject the null hypothesis, suggesting that there is no significant relationship between the



daily practices of food handlers in restaurants in Jalingo, Taraba State, and their level of food hygiene.

### Discussion

The study aimed to investigate the knowledge, attitude, and practice of food hygiene among food handlers in restaurants in Jalingo, Taraba State. The study revealed a varying level of knowledge among food handlers regarding food hygiene principles. While a considerable percentage of participants were aware of the potential risks of improper food handling (40.0%), identifying common symptoms of foodborne illnesses (42.2%), and knowing the proper temperature range for cooking different types of food (35.6%) were areas where knowledge gaps existed. This finding aligns with that of Iwu *et al.* (2017) who found that while a majority of the respondents had a good level of knowledge (81%) and positive attitude (71%) about food hygiene, only 37% of the respondents had a good level of hygienic practice.

The result showed that the attitudes of food handlers towards food safety and hygiene were generally positive, with a notable proportion believing that following food hygiene practices is essential to prevent foodborne illnesses (51.1%). A significant majority were committed to maintaining high standards of food hygiene in their daily work (60.0%), indicating a positive attitude towards their responsibilities. This collaborates with that of Okon *et al.* (2022) whose finding showed that majority 118(75.6%) were found to have good attitude towards food hygiene.

Daily practices of food handlers in restaurants exhibited variations in adherence to food hygiene standards. While a substantial number reported washing their hands before handling food (44.4%) and wearing protective gear (46.7%) consistently, there were instances where these practices were not followed consistently. Similarly, cleaning, and sanitizing food preparation surfaces and utensils (44.4%) showed room for improvement.

The regression analyses explored the relationships between sociodemographic factors (age, gender, years of experience, level of

education) and knowledge, attitude, and practice of food hygiene. None of the factors exhibited statistically significant relationships with knowledge, attitude, or practice, suggesting that these factors might not strongly influence food handlers' behaviors in these areas. Whereas there was statically significant difference ( $P = 0.002$ ) in the study of Okon *et al.* (2022).

The study also analyzed the associations between knowledge, attitude, and practice of food hygiene. The findings indicated that while knowledge and attitude might have positive implications for practice, no strong associations were observed among these variables.

### **Conclusion**

Finally, this study has provided helpful information into food handlers' knowledge, attitude, and practice of food hygiene in Jalingo, Taraba State. The findings emphasize the significance of creating comprehensive strategies to improve food safety and hygiene processes in the local restaurant industry.

The study found that, while food handlers have positive views toward food safety, there are gaps in knowledge and inconsistencies in practice. Although many food handlers are aware of the possible risks connected with incorrect food handling, there is still opportunity for improvement in areas such as recognizing symptoms of foodborne illnesses and understanding the proper temperature range for cooking various types of food. Furthermore, while several food handlers displayed admirable procedures, there is a need to improve consistency in handwashing, protective equipment use, and cleaning and sanitizing of food preparation spaces.

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