International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor (2018): 7.426

Assessment of Knowledge, Attitude and Practice of Foodhandlers on Hazard Analysis Critical Control Point in Fast Food Establishments in Kaduna Metropolis, Kaduna State, Nigeria

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Abstract: ***Knowledge, attitude and practice of food handlers about food safety is one of the key factors that could be considered in reducing the prevalence of foodborne diseases in both developed and developing countries. Hazard Analysis and Critical Control Point (HACCP) is considered as important tools that can be used to reduce the emergence and re-emergence of foodborne diseases since its inception in 1960s. This study assessed its implementation in Kaduna Metropolis among food handler in fast food establishments. The method use in this study is descriptive cross-sectional survey using multistage sampling techniques to select 217 food handlers from various fast food establishments in Kaduna Metropolis. The result of the study revealed that majority of the food handlers has no knowledge of HACCP (97.7%) and 57% has no knowledge of quality control. The minority of those with knowledge of quality control only 34% practice it during storing of food products and only 1.6% practice HACCP. The need to introduce HACCP as a working tools to fast food establishments in Kaduna cannot be over emphasize hence it will help in reducing the spread of foodborne diseases. It is recommended that fast food establishments in Kaduna Metropolis need to be train on HACCP and its implementation should be made compulsory to all fast food establishments***

Keywords: Knowledge, Attitude, Practice, HACCP, Foodborne, Fast food establishments

1. Introduction

Numerous studies have highlighted the need for food safety training and education for food handlers, due to lack of knowledge on microbiological, chemical and physical food hazards, i.e. optimal food storage temperatures, risks of cross contamination and the importance of personal hygiene (Bas et al., 2006).These assessments were based on the Knowledge, Attitude and Practice (KAP) approach, as knowledge (K) is believed to be the precursor that influences an individual's practice (P) and the information will lead to a change in attitude (A) and consequently a change in behaviour (Bas et al., 2006). Although food hygiene training programs gave exposure and increased knowledge about food safety to food handlers and regulatory agents, this did not always translate into positive changes in some food handlers behaviours(Green et al., 2005).It is suggested that the implementation of strategies by combining surveillance and monitoring, good manufacturing practices (GMP) and good hygiene practices (GHP), the use of International Organization for Standardization (ISO) method 9001, hazard analysis critical control point (HACCP) and Total Quality Management (TQM) (Soon *et al.*,2011), all which can contribute to significant impact on the prevention of foodborne outbreaks (Osimaniet al., 2011).In Nigeria food safety act is mandated to be carried out by a number of Ministries at Federal and State Governments' levels, i.e. Federal Ministry of Health (FMH), Federal Ministry of Agriculture and Rural Developments, Federal Ministry of Environment, Federal Ministry of Science and Technology, Federal Ministry of Industry, Trade and Investment, their state ministries and relevant Departments at the LGAs. This has been the practice since 1917 to the present date (FMH, 2014). In the act each government establishment was mandated to carry out certain functions in order to ensure effective implementation of food safety in the country. However, the measures to educate our food manufacturers, particularly on training about food hygiene practices are saddled to FMH and its state counterpart.

Therefore, it is highly relevant to gauge the extent of food safety knowledge, particularly from food handlers due to the increased labour demand in the food service sector, and the impact on the general health status of the public.This study aimed to explore the basic knowledge, attitude and practice of food handlerson Hazard Analysis and Critical Control Point (HACCP) as a measure to quality control, food safety and control of foodborne diseases through administration of a questionnaire with a series of pertinent questions.

Fast foods are prepared to-eat-foods. Food and Agricultural Organization (FAO) referred fast foods as foods which are prepared and served rapidly at fast food restaurants, shops, market, schools, occasions and other public gathering (FAO, 2002). Fast food establishments are considered with high esteem these days because it saves time for the customers who patronize them. The place for its preparations may come up with different menus that could be of interest to consumers. FAO, (2002) expressed that the preparation of fast foods involved eating in or off the premises with the minimum period between the requesting, preparation and time of service. The rapidity involved in food preparation

may rendered the food contaminated, improper cooked, excessive salts and oil that may result in foodborne disease spread among public.

The increasing number of Nigeria population migrating from rural to urban cities from the year 2000 to 2010 rose from 43.3 million to 73 million (NBS, 2015), and with women joining the workforce at the time to prepare meals at home become more demanding. This significantly increase the number of fast food establishments which also raise the rate of morbidity and mortality among the public due foodborne diseases (Laura, 2011). FAO (1995) advised that the place or area of meal preparation and services should be far from sources of contamination, e.g. rubbish heap, waste, dirty water and animals.

A number of studies were conducted on knowledge, attitude and practice (KAP) of food handlers with little associated to HACCP implementation in fast food establishments. A study postulated by Adesokan and Raji (2014) on safe meat-handling revealed that 23.6% of the respondents among the private organization heard about HACCP and 0.00% of the government meat processing plant heard no knowledge of HACCP and 81.8% of the private know improper handling of meat could pose health hazards with significant number (91.1%) of the government having same knowledge. The quality of food has been a challenge during, before and after its preparation up to consumption due to inadequate knowledge of food handling methods, insufficient processing equipment for food storage and preparation, exposure to fluctuating temperature and humidity which resulted in producing unwholesome food that can jeopardize the health of human. Another study by Ahmad *et al.*,(2018); revealed significant increase in knowledge of food handlers after training intervention were recorded from 46.7% to 53.3%, changes in food hygiene and environmental sanitation were 30.9% to 69.1% and 23.1% to 76.9% respectively observed among the street food vendors in SabonGari LGA of Kaduna state. Equally postulated by Otu, (2014), that knowledge of food handlers in Ahmad Bello University Zaria was good (94.3%), attitude was recorded at 75.9% but practicing of food hygiene was very poor (0.6%) with majority having fair practice (76.4%).Food protection is very significant if control of foodborne disease is to be achieving hence the protection should start from farm during harvesting to preparation and cooking up to table where the food will be consume. Amit *et al.,* (2018), highlighted that food vendors in Rawalpindi in Pakistan majority (61%) had no cover to their food given opportunity to flies contamination and the remaining (39%) had insufficient covering arrangements.

HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical and physical hazards from raw material production, procurement and handling, to processing, preparation, distribution and consumption of the finished product. A firm commitment to HACCP by top management provides company employees with a sense of the importance of producing safe food (WHO, 2002).

The system is designed for use in all segments of the food industry from growing, harvesting, processing, manufacturing, distributing and merchandising to preparing food for consumption. Prerequisites programs like good manufacturing practices (GMPs) are essential foundations for the development and implementation of successful HACCP plans. Food safety systems based on the HACCP systems have been successfully applied in food processing plants, retail food, stores and food service operations. It should be emphasized that HACCP is a preventive approach, and not reactive (WHO, 2002). So as to verify that the procedures are being implemented, inspection schedules, review plans, records and sampling should be incorporated into the methods, procedures and tests of the whole preparation process. Todd (1996) estimated that 5% of all foodborne illnesses may be traced to abusive industrial practices. Ninety five percent (95%) are associated with abusive practices in food service, restaurants or home preparation of foods. HACCP principles can be applied in food service establishments as implied by Bernard (2002), and can reduce the number of outbreaks of food-borne illness. The first Critical Control Point (CCP) of product is at the receiving area where those responsible must examine the condition of each item as it is unloaded, from known and approved suppliers who should have functional temperature indicators which should be checked to monitor abuse (Firestone, 1992). Food fried in badly abused oils may absorb the degraded fat, causing gastrointestinal distress. Complaints of this nature and studies on oil quality led to the development of regulations governing restaurants frying oils in developed countries like Europe (WHO.2005).

Flyers, (2008) says, the benefit underlying this system for all food sectors and consumers alike to the government include among others improved public health, more efficient and targeted food control, reduced public health costs, trade facilitation and increased confidence of the community in the food industry. To the industry, there will be increased consumer and government confidence, reduced legal and insurance costs, increased market access, reduction in production costs, improved staff-management commitment to the food safety and decreased business risks. To the consumer, there will be reduced risks of food-borne diseases, increased awareness of basic hygiene, increased confidence in the food supply chain and improved quality of life.

2. Materials and Method

Description of study area

Kaduna city is located in a tropical continental climate with distinct wet and dry seasons. The total population in the capital increased to 1,652,844 as projected in 2015 as against 169,125 in 1967 to a projected figure of 1,371,805 in 2009 from the 2006 population census.

Kaduna metropolis comprises of Kaduna North, Kaduna South and some part of Igabi and Chiku Local Government Areas.

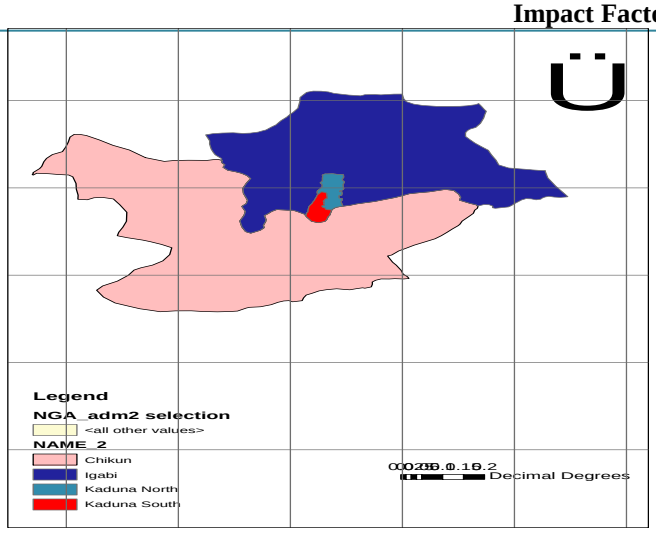


Figure 1: Local Governments areas that form Kaduna metropolis

Study design
The study was conducted using descriptive cross-sectional survey.

Community entry and advocacy:
An application letter was submitted to the Commissioner of Health and Human Resources, Kaduna state and approval was given before the commencement of the research.

Study population
The study population comprises of all registered fast food establishments in Kaduna Metropolis.

Inclusion criteria
All food handlers working in fast food establishments.

Exclusion criteria
Food handlers not working in fast food establishments such as food vendors are excluded from this study.

Sample size determination
The sample size for this study was determined using Fisher's formula at 95% confidence Interval and 0.05 degree of accuracy/margin of error.

Using the following formula:

$$n = \frac{z^2pq}{d^2}$$

Therefore, the sample size was calculated at 217.

Sampling technique
A multistage sampling technique was adopted in selection of respondents in this study.

Statistical analysis
Data obtained were analysed using Statistical Packages for Social Sciences version 20 for descriptive and inferential statistics at $p>0.05$.

Research instruments
The instrument used for data collections was semi-structured self-administered questionnaire. This study considered 217semi-structured questionnaires administered to food handlers in fast food establishments in Kaduna Metropolis. However, 194 questionnaire were retrieved and work on. 23 of the questionnaires were not retrieved/used due to absent of some food handlers and some did not attempt any question. The questionnaire for the food handlers were divided into sections; A, B, C, D. Close-ended questions were used in the questionnaires. The first part of the questionnaire relates to demographic information about the respondents. The other parts assessed the knowledge of food handlers, foodborne infections and various safety practices. Data on demographic questions for food handlers were grouped according to personal hygiene, knowledge of HACCP, hygiene practices and attendance to specific training workshops on HACCP.

Data collection procedure
Fifteen (15) trained EHOs drawn from Kaduna Metropolis were trained as research assistants (RAs) in this study.

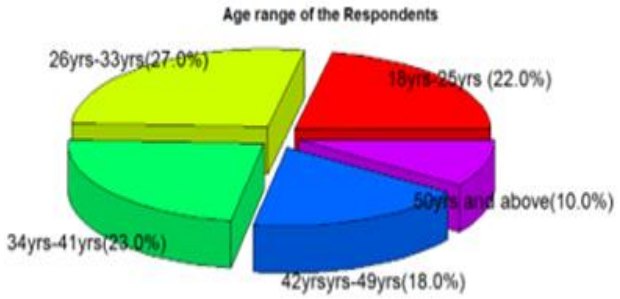
Statistical analysis
The completed questionnaires were analysed and statistical inferences and estimations were done. The analysis consisted of quantitative data that include mean, frequency tables, chi-square test and analysis of variance (ANOVA). All the analysis was carried out with SPSS 20.

Validity of the instruments
Prior to the administration of the research instruments, the questionnaires were peer reviewed and pre-tested before been Administered to respondents.

Reliability of the instruments
A pre-test of the data instruments was conducted among fifty (50) fast food establishments at Kano metropolis in Kano state. This was done to determine the quality of information in the instruments.

Ethical consideration
Permission to conduct this research was obtained from the Ministry of Health and Human Services Kaduna State before visiting the fast food establishments. The purpose and nature of the study were explained to each respondent after which consent was sought and obtained. Each of the respondents was assured of the confidentiality of the information he/she may volunteer.

3. Result and Discussion



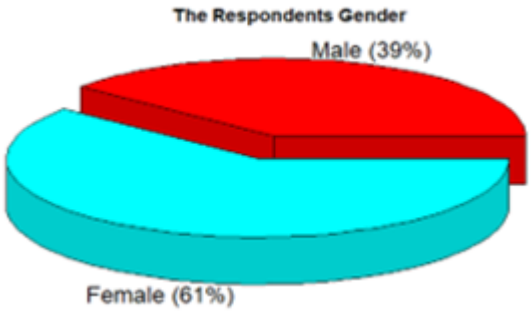


Figure 2: Presents the age of respondents in fast food establishments in Kaduna metropolis indicating the range between highest and lowest percentage 26yrs – 33yrs (27%) and 50 yrs. (10%). The figure indicates that the highest number of respondents was between the ages of 26 – 33yrs.

The representation of gender as illustrated from the figure indicates Male (39%) and female (61%). This also reveals that the highest respondents were female. The responses reveals that women have the highest number working in fast food establishments in Kaduna Metropolis.

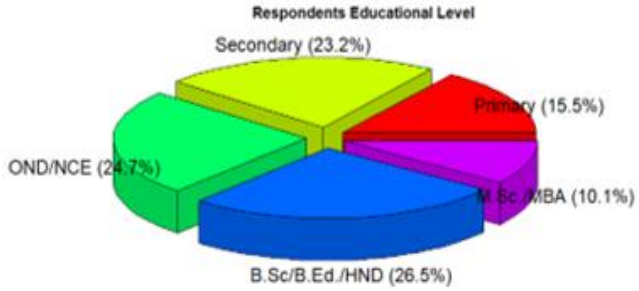


Figure 3: Percentage distribution of marital status and educational qualification of respondents from fast food establishments in Kaduna Metropolis

Figure 3 presents the marital status of respondents indicating the percentage range between divorcees (5.2%) to married (37%). The figure indicates that the highest percentage of respondents were married couples (37%).

The representation of the Educational level of respondents as illustrated from the figure indicates the range between MSc/MBA (10.1%) to BSc/B.Ed./HND (26.5%). This also revealed that the highest number of respondents were those with BSc/B.Ed./HND (26.5%).

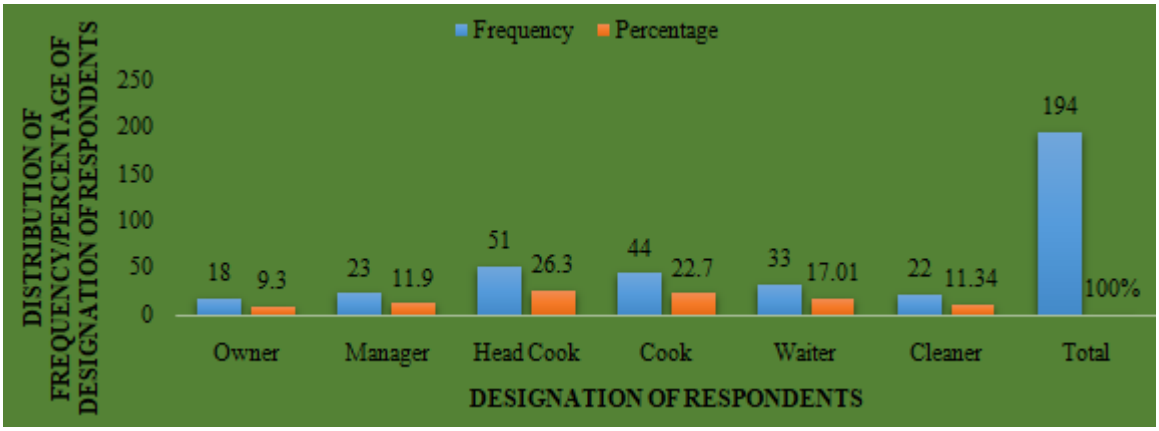


Figure 4: The distribution of frequency and percentage (%) of respondent's designation in fast food establishment in Kaduna Metropolis

Figure. 4 represents distribution of frequency/percentage (%) of respondent's designation in some selected fast food establishments in Kaduna Metropolis. The range indicated that owners or proprietors of the premises have the lowest percentage of (9.3%), managers (12%), head cooked (26.3%), cook (23%), waiter (17.01%) and cleaner had (11.3%). From the presentation, it indicated that the highest percentage of respondents were head cooked with 26.3% followed by cook. Therefore, more attention must be focus on head cook and cooked hence their responsibilities in the fast food establishments' required adequate and effective knowledge and practicing of food hygiene and HACCP principles for the control of food-borne diseases to succeed.

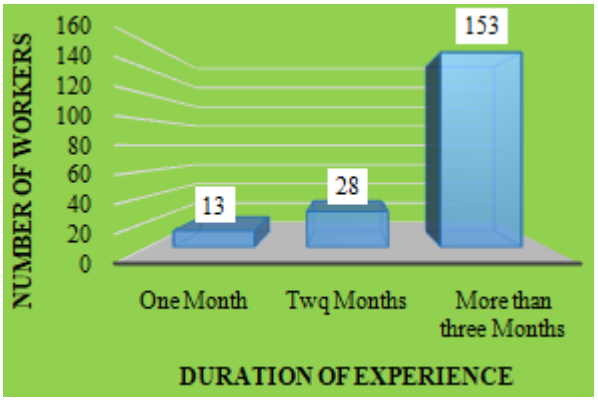


Figure 5: Duration of experience of the respondents in fast food establishment in Kaduna Metropolis

Figure 5 represents the period of respondents experience in their various areas of operation as indicated. Those workers with less experience of one (1) month was (6.59%) and those with two 2 months (14.28%) while those with three (>3) months and above were recorded at 78.83%. This also reveals that the highest respondents in terms of experience in their respective areas are those with more than three months in the service (78.83%). Therefore, the tendency of food contamination may be high among those inexperienced workers unless there is negligence on the side of experienced ones and or the management of the establishments. It is, therefore, very imperative for the management and the law enforcement agencies to focus their attention more on the training of all food handlers in the state considering the role they might play in disease dissemination; so as to reduce further spread of food-borne diseases.

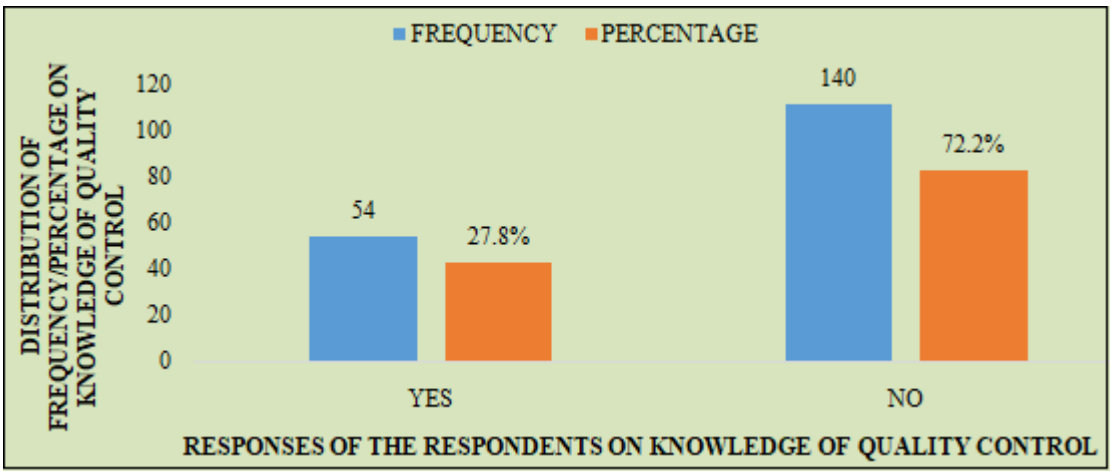


Figure 6: Evaluation of the knowledge of quality control by food handlers in the fast food establishments in Kaduna Metropolis

Figure 6 the responses of respondents to the knowledge of quality control. It indicates that 27.8% of the respondents had the knowledge of quality control 72.2% did not. This, therefore, established that the majority of the respondents had no previous knowledge of quality control. The result reveals that a significant number of food handlers did not know how to safeguard their products from being contaminated and they did not know about other factors that may lead to its contamination. Food contamination could occur during any of the food preparation stages either in the raw material, during processing, packaging, storage, and or distribution. The role of HACCP in this regards cannot be overemphasized hence having the knowledge of HACCP and its effective implementation favours quality control and upgrade the quality of the food thereby preventing the spread of food-borne diseases to consumers.

Table 1: Knowledge of Quality Control by the respondents from fast food establishments in Kaduna Metropolis

Item: Do you know of any quality control measures for food establishments?		
Level	Number of respondents	Multiple Proportion Test
Yes	83 (43%)	*Chi-square* = 12.348 *df* = 1 *p-value* = 0.0004416*
No	**111 (57%)**	
Item: If yes, which of the measure		
Good Manufacturing Procedure (GMP)	12 (17.6%)	*Chi-square* = 72.169 *df* = 4 *p-value* = 0.0000001*
Good Agricultural Procedure (GAP)	3 (4.4%)	
Standard Operation Procedure (SOP)	8 (11.8%)	
Standard Sanitation Operation Procedure (SSOP)	7 (10.3%)	
Hazard Analysis Critical Control Point (HACCP)	38 (55.9%)	
Item: Where would you apply this quality control strategy in your food establishment?		
Receiving food products only	32 (22.7%)	*Chi-square* = 10.317 *df* = 3 *p-value* = 0.01606*
Storing food products only	49 (34.7%)	
Kitchen during cooking only	27 (19.1%)	
All of the above	33 (23.4%)	
Item: From where did you learn these strategies?		
National Food and Drug Administration and Control (NAFDAC)	27 (84.4%)	*Chi-square* = 27.562 *df* = 1 *p-value* = 0.000001*
World Health Organization /Food Organization and Agriculture (WHO/FOA)	5 (15.6%)	
Item: In what conditions did you display your products?		
Chilled cabinet	46 (23.5%)	*Chi-square* = 28.212 *df* = 3 *p-value* = 0.0000001*
Room temperature	60 (30.8%)	
Displayed hot	28 (14.5%)	
Temperature of the cabinet	**60 (31.1%)**	
**compare with 0.05 level of significant*		

Table 1 represents the assessment of the knowledge of respondents about measures of quality control. The result shows that 43% of the respondents indicated that they had knowledge of quality control and 57% were ignorant of quality control. The result of Chi-square is 12.348 with *df* = 1 and the p-value is 0.0004416. The *p*-value is less than 0.05 level of significant when compared. The result, therefore, shows that the majority of food handlers didn't have knowledge of food quality control. This is very dangerous for the business and the general public, hence food contamination and spread of food-borne diseases are imminent.

On the question whether respondents knew the type of quality control measures? The result of respondents revealed that GAP has 4.4% being the lowest and 55% HACCP is the highest. The Chi-square test revealed that 72.169 has *df*= 4 and *p*-value of 0.0000001 that is less than 0.05 level of significant when compared. This result also shows no significant relationship between knowledge of food handlers and the type of quality control measures. The responses of the respondents as indicated by the result show that the majority had no knowledge on the type of quality control measures. It further revealed that majority of fast food joints in Kaduna metropolis do not implement HACCP as part of their quality control measures.

The responses of the respondents on where to apply the quality control strategy in their areas of operation show that 19.1% being the lowest that chose kitchen, 34.75% being the highest that chose to apply the strategy during storing of food products. The result was subjected to Chi-square test it revealed = 10.317 and the *df*= 3 with *p*-value = 0.01606 which is greater than 0.05 levels of significance. The result, therefore, indicated a significant relationship between food handlers and application of quality control strategy in the fast food establishment in Kaduna metropolis. Correspondingly, the result revealed that storing of food products is the most used quality control strategy in fast food establishments in Kaduna metropolis. This may not be unconnected to the protection taken in order to prevent food from spoilage. However, 23.4% of the respondents reveals that the strategy will be applied in all the areas of food preparation. The sources of respondent's information on quality control strategy were also assessed in order to know which among the regulatory agencies has passed the ideas to food handlers. The information obtained from the respondents based on the knowledge of quality control strategy reveals that 15.6% received from WHO/FOA and 84.4% from NAFDAC. The Chi-square test revealed 27.562 with *df*= 1 and a *p*-value of 0.000001. The result was compared to 0.05 level of significance and it established that there is a significant positive relationship between the sources of information of respondents and NAFDAC. This indicates that NAFDAC had passed the information to the majority of food handlers more effectively than any other organization.

In responding to the question raise on the conditions used in displaying products at the fast food establishments. The responses of the respondents show 14.5% displayed their products hot i.e. in a hot holding container and 31.1% in temperature of the cabinets. The Chi-square test established that Chi-square = 28.212, *df*= 3 and *p*-value = 0.0000001. This result was compared to 0.05 level of significance and it revealed that there is a significant relationship between conditions of displaying products and standard temperature as a set of by WHO/Codex this is considered necessary because maintaining an adequate temperature of the food prevent microbial growth.

Table 2: Knowledge of HACCP and its Implementation by respondents from fast food establishments in Kaduna Metropolis

Item: Does this organization practice HACCP?		
Level	Number of respondent	Multiple Proportion Test
Yes	3 (1.6%)	*Chi-square* = 596.76 *df* = 1 *p-value* = 0.00000001*
No	**191 (98.4%)**	
Item: Does workers in your organization has the knowledge of HACCP system as food safety program?		
Yes	4 (2.3%)	*Chi-square* = 389.12 *df* = 1 *p-value* = 0.0000001*
No	**190 (97.7%)**	
Item: Are you aware that you are legally required to make sure that your food safety procedures / system should be based on the principles of 'HACCP'?		
Yes	2 (1.2%)	*Chi-square* = 244.13 *df* = 2 *p-value* = 0.0000001*
No	82 (42.1%)	
Not Attempted	110 (56.7%)	

**compare with 0.05 level of significant*

Table 2: Presents the assessment of whether the fast food establishments practice HACCP in their daily activities. The responses of the respondents established that 1.6% of the respondents indicated that their organization practice HACCP and 98.4% do not practice HACCP. The result of Chi-square is 596.76 and *df* = 1 the p-value is 0.00000001 which is less when compared with a 0.05 level significance. The result attested that there is no significant relationship between the fast food establishments and practicing of HACCP. The result, as indicated above has demonstrated that the majority of the fast food establishments do not practice HACCP, this attests to the findings of abundant bacteria in the isolated samples of various food items collected from the fast food establishments in Kaduna Metropolis.

In responding to a question raised on food handler's knowledge of HACCP system as a food safety program. The responses as indicated by the respondent's ranges between 2.3% - 97.7%. It established that 2.3% of the workers had acknowledged that their organization has knowledge of HACCP system as a food safety program and 97.7% indicated that they did not have such knowledge. The Chi-square test established that Chi-square is 244.13, *df*= 2 and p-value = 0.0000001. This result (*p*-value) was compared to 0.05 level of significance which revealed that there is no significant relationship between the food handler's knowledge of HACCP and operational system use in a food safety program. The inadequate knowledge of food handlers with regards to the implementation of HACCP principles in fast food establishments in the study area may contribute to the high incidence of foodborne diseases among the populace and therefore need urgent government interventions.

In responding to a question raised on workers' awareness that they are legally required to make sure that their food safety procedures/system should be based on the principles of 'HACCP. The responses as indicated by the respondents ranged between 1.2% - 56.7%. This established that 1.2% of the workers acknowledged that workers were aware that they are legally required to make sure that their food safety procedures/system should be based on the principles of 'HACCP and 56.7% were not aware of the legal requirement. The Chi-square test established that Chi-square = 244.13, *df* = 2 and p-value = 0.0000001. This result was compared to 0.05 level of significance which revealed that there is a significant relationship between workers' awareness and the legal requirement that their implementation of food safety procedures based on HACCP principles. The result pointed out that the worker were aware of the legality that their food safety procedure should be based on HACCP principle.

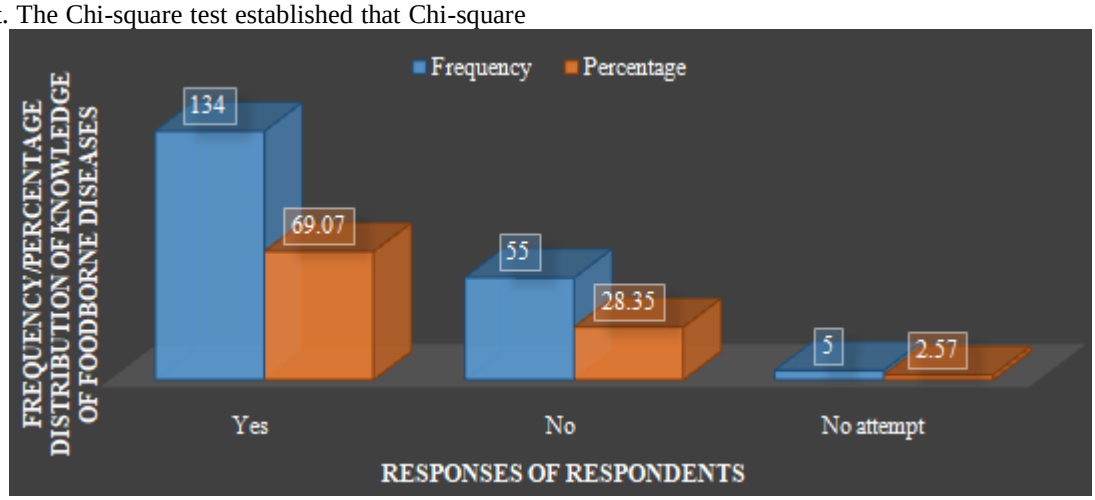


Figure 7: Frequency and percentage distribution of responses on knowledge of Food Borne Infections in fast food establishments in Kaduna Metropolis

Figure 7 show the representation of respondent's knowledge on foodborne infections. The responses indicated that 134 (69.07%) established that they had previous knowledge of foodborne infections and 55 (28.35%) revealed that they have no knowledge of foodborne infections while 5 (2.57%) did not attempt the questions.

From the presentation above it clearly established that majority of the respondents had previous knowledge of foodborne infections. It is imperative to state that worker's knowledge on foodborne infections is an essential factors that can be consider in food safety and foodborne disease prevention and control.

4. Discussion

The demography of the respondent as presented in this study revealed the age of respondents indicating the range between 26yrs - 33yrs (27%) and 50 yrs. (10%) these indicated that the highest number of respondents was between the ages of 26 - 33yrs. The representation of gender as illustrated indicates Male (39%) and female (61%). This also revealed that the highest respondents were female. The results of this study show that more females are involved in the fast food business. Adewunmi*et al.,* (2014) reported a study among food vendors in selected Secondary Schools in Ogun State, Nigeria that 100% of food handlers were females. Other studies in Nigeria also reported the same (Afolaranmi*et al.,* 2010). However, Kasturwar and Shafee (2011) reported that 62.7% of food handlers assessed in a Rural Private Medical College in India were males. From these studies, it is clear that the majority of food handlers in food establishments were female and this could be attributed to the number of factors which include the nature of the job and mostly female employees are known to maintain proper personal food hygiene and are also more trained to be in the kitchen as considered in some community. These studies were different from the study carried out by Kasturwar and Mohd (2012) on knowledge and practices of hygiene among food handlers found that the majority of food handlers 52(62.7%) were males and 31 (37.3%) were females. This was similar to the findings of studies conducted among food handlers in Nigeria, Slovenia and Malaysia (Chukuezi, 2010; Zain *et al.,* 2002; Nee *et al.,* 2011). This similarity indicated that the majority of the food handlers were middle-aged people, i.e. between 26 - 33yrs. This could be due to higher number of this age group or their ability to perform their duty effectively. This study indicated that the highest percentage of respondents were married couples with 37.8%.

Nel*et al.,* (2004) highlighted the education of food handlers as a crucial line of defence in the preventions of most types of food-borne illnesses. In his study, only 6.9% of the vendors interviewed were illiterates and others had achieved a variety of educational levels. This conforms to the Worsfold and Griffith (2003) which observation that complying with food hygiene regulations can be achieved if food handlers are adequately educated. In this study representation of the Educational level of respondents range between MSc/MBA (10.1%) to BSc/B.Ed./HND comprising (26.5%). This also reveals that the highest respondents were those with BSc/B.Ed./HND with 26.5%. This result clearly indicates that the majority of food handlers in the study area were educated at graduated levels and this will facilitate learning about food safety if given the opportunity as pointed out by Nel*et al.,* 2004 and Worsfold and Griffith, 2003.

The study considers the designation of respondents indicating range between the owners (9.3%) to head cooks

(26.30%). The presentation indicated that the highest number of respondents was head cooks making up 26.30%. The representation of Experience of respondents in their various areas of operations as illustrated in the study that range from one month 13(6.59%) to more than three months 153(78.86%). This also reveals that the highest respondents in term of experience in their respective areas were those with more than three months in the service. These put the food at risk as food handlers have little experience in food production, thereby posing a potential threat to the consumers.

The responses of respondents on the knowledge of quality control have indicated that 42.99% of the respondents had previous knowledge of quality control and 57.01% did not. This, therefore, established that the majority of the respondents had no previous knowledge of quality control. In another study that corroborated with this finding classifying the respondents as having moderate knowledge of food safety and hygiene with a mean score of 57.8% (Nee *et al*., 2011). Contrary findings were obtained in studies conducted in Malaysia and Iran also study conducted in Korea that found out 49.3% of food handlers had poor knowledge of food safety (Zain *et al.*, 2002). In a Thailand as outline by Cuprasittrut *et al*., (2011), only 13.0% of the respondents had good knowledge of food safety. Poor knowledge of quality control results in improper handling of food, thereby posing a potential hazard to the health of consumers.

The assessment of respondents on their knowledge of HACCP, this study established that 2.3% indicated their knowledge of HACCP and 97.7% revealed their ignorant. This study is supported by Adesokan and Raji (2014) on their study on safe meat-handling that 23.6% of the respondents among the private organization heard about HACCP and 0.00% of the government meat processing plant heard no knowledge of HACCP and 81.8% of the private know improper handling of meat could pose health hazards with significant number (91.1%) of the government having same knowledge.This clearly indicated that majority of fast food establishments in Kaduna Metropolis had no knowledge of HACCP and its benefits to their business and measures against the control of food borne diseases. This is in agreement with WHO (2002) which pointed out that a firm with HACCP knowledge and committed to its implementation provides company employees with a sense of the importance of producing safe food like many quality assurance programs. This corroborated with study by Bryan and WHO (1992) that highlighted that HACCP is an important and reliable system of reducing risks of foodborne diseases and wastage. The knowledge of food handlers on HACCP and its full implementation, reduce food wastage, increase and control its quality and prevent and control food borne diseases. The system can equally be used by food regulatory agencies in ensuring food safety in the food industry.

A similar study was done in small and micro enterprises on assessment of food handlers' knowledge on food hygiene in South Africa and found that the average correct answers were at 46% lower compared to this study that found an average of 67% to be knowledgeable in food hygiene practices. Knowledge of food hygiene is crucial because poor practices have been shown to be significant contributory factors to foodborne illnesses in various food retailers (Taylor *et al.*, 2000). In the same way, concluded by Rudder (2006) that lack of knowledge and understanding of the principles of food safety couple with language difficulties, were significant barriers to promoting food safety and that supportive activities can make a significant impact in practices.

5. Conclusion

This study concluded that majority of fast food establishments in Kaduna Metropolis have no knowledge of Hazard Analysis and Critical Control Point (HACCP).

6. Recommendation

Studies from different scholars have indicated the increase in spread of foodborne diseases with high morbidity rate. It has also indicated that the easy way of controlling the spread of foodborne diseases is the implementation of HACCP in food establishments. This measure will effectively reduce the emergence and re-emergence of foodborne diseases in the community hence physical, chemical and biological assessment of food will start from raw materials up to it intake.

References

[1] Food and Agriculture Organization. 2002. The developing world's new burden: Obesity, food and agriculture organization of the United Nations. http://www.fao.org/FOCUS/E/obesity/obes1.htm (accessed May 4, 2006)
[2] Worsfold, D. and Griffith, C. J. (2003). A Survey of Food Hygiene and Safety Training in the Retail and Catering Industry. Nutririon and Food Science. Vol. 33, pp 68-79.
[3] WHO (2005): Guidance on Regulatory Assessment of HACCP. WHO/FSF/FOS/05.5.
[4] Adewunmi AR, Ajayi JO, Omotoso BOA (2014). Assessment of the hygienic practices of food vendors and government intervention in selected secondary schools from Abeokuta South Local Government Area of Ogun State, Nigeria. J. Sci. Multidiscip. Res. 6(1):2277-0135.
[5] Afolaranmi TO, Hassan ZI, Bello DA, Misari Z (2015). Knowledge and practice of food safety and hygiene among food vendors in primary schools in Jos, Plateau State, North Central Nigeria. J. Med. Res. 4(2):016-022
[6] Amit Kumar Singh, NarendraPratap Singh and Chaturvedani, A.K. 2018. Food Safety and Hygiene Practices Among Street Food Vendors in Noida, Uttar Pradesh, India. Int.J.Curr.Microbiol.App.Sci. 7(09): 2340-2347. doi: https://doi.org/10.20546/ijcmas.2018.709.291
[7] Bas¸, M., Ersun, A.S¸., &Kivanç, G. (2006). The evaluation of food hygiene knowledge, attitudes, and practices of food handlers in food businesses in Turkey. Food Control, 17, 317e322.

[8] Bernard A, (2002): An industry Perspective on Assessment of HACCP in the United States. National Food Processors Association, USA/ZVZ/00.968
[9] Centers for Disease Control and Prevention, Department of Human Services (2002): Food-borne diseases. Atlanta Georgia, 1-5.
[10] Chukuezi OC (2010). Food Safety and Hygiene Practices of Street Food Vendors in Owerri, Nigeria. Stud Soc. Sci. 1:50-57.
[11] FAO. 2002b. The State of Food and Agriculture 2002. FAO Agriculture Series No. 34. Rome
[12] FAO/WHO (2002): Sharing information on national experiences in the general field of risk management (Paper submitted by the delegation of France) Global forum of food safety regulators (Agenda item 4.4) 1- 4
[13] Firestone D., Stier, R.F. & Blumenthal, M.M (1991): Regulation of frying fats and oils. Food Technology, 45:88-94.
[14] Flyers L, (2008): Minimizing the cost associated with monitoring. Food Technology Systems ltd. United Kingdom, London. Personal Presentation.
[15] Food Codex Alimentarius Commission (1995 a, b). International Harmonization of Food Safety and Labeling Standards.
[16] Green, L., Selman, C., Banerjee, A., Marcus, R., Medus, C., Angulo, F. J., et al. (2005). Food service workers' self-reported food preparation practices: an EHS-Net study. International Journal of Hygiene and Environmental Health, 208, 27e35.
[17] Hanson LA, Zahn EA, Wild SR, Döpfer D, Scott J, Stein C. Estimating global mortality from potentially foodborne diseases: an analysis using vital registration data. *Popul Health Metr*. 2012;10(1):5. Published 2012 Mar 16. doi:10.1186/1478-7954-10-5
[18] HK. Adesokan, AOQ. Raji (2014) Safe meat-handling knowledge, attitudes and practices of private and government meat processing plants' workers: implications for future policy; Department of Veterinary Public Health and Preventive Medicine, University of Ibadan, Nigeria
[19] KasturwarNB ,Mohd. Shafee (2012) Knowledge, Practices and Prevalence of MRSA among Food Handlers; Professor, Dept. of Community Medicine, NKP Salve Institute of Medical Sciences, Nagpur, Maharashtra. Associate Professor, Dept. of Community Medicine, CAIMS, Bommakal, Karimnagar; International Journal of Biological & Medical Research
[20] Kasturwar NB, Shafee M (2011). Knowledge, Practices and Prevalence of MRSA among Food Handlers. Int. J. Biol. Med. Res. 2(4):889-894
[21] Moh'd Zain, M., &Naing, N. N. (2002). Sociodemographic characteristics of food handlers and their knowledge, attitude and practice towards food sanitation: a preliminary report. Southeast Asian Journal of Tropical Medicine and Public Health, 33, 410e416.
[22] National Bureau of Statistics; November 2015
[23] Nee, S. O., &Sani, N. A. (2011). Assessment of knowledge, attitudes, and practices (KAP) among food handlers at residential colleges and canteen regarding food safety. SainsMalaysiana, 40(4), 403e410.
[24] Nel, S., Lues, J. F. R., Buys, E. M., & Venter, P. (2004). The personal and general hygiene practices in practices in the deboning room of high throughput red meat abattoir. Food Control, 15, 571e578.
[25] Osimani A, Babini V, Aquilanti L, Tavoletti S, Clementi F. 2011. An eight-year report on the implementation of HACCP in a university canteen: impact on the microbiological quality of meals. Int J Environ Health Res. 21:120–132.
[26] Rudder, A. (2006). Food Safety Risk Assessment of Ethnic Minority Food Retail Businesses. Food Control, 17(3) 189-196.
[27] ShimaaAbdelrahim Khalaf1 , SafaaRabea Osman1 , Ahmed M. Abbas2 *, Taghreed Abdul-Aziz M. Ismail3 (2018) Knowledge, attitude and practice of oral healthcare among pregnant women in Assiut, Egypt; 1Department of Community Medicine, Faculty of Nursing, 2Department of Obstetrics and Gynaecology, Faculty of Medicine, 3Department of Community Medicine and Public Health, Faculty of Medicine, Assiut University, Egypt
[28] Soon, J. M., Singh, H., & Baines, R. (2011). Foodborne diseases in Malaysia: a review. Food Control, 22, 823e830.
[29] Suleiman, OtuSadiq (2014) Food hygiene practices among food handlers in Ahmadu Bello University (A.B.U.), Zaria.
[30] Taylor, E.V.; Holt, K.G.; Mahon, B.E.; Ayers, T.; Norton, D.; Gould, L.H. Ground beef consumption patterns in the United States, FoodNet, 2006 through 2007. J. Food Prot. 2012, 75, 341–346.
[31] Todd ECD (1996): Worldwide surveillance of foodborne disease, the need to improve, Journal of Food Protection, 59: 82–92.
[32] WHO (2002): Sharing information on national experience in the general field of risk management. Global forum of food safety regulations (Agenda item 4.2) G.f 01/4.
[33] WHO (2005): Guidance on Regulatory Assessment of HACCP. WHO/FSF/FOS/05.5.