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Evaluation of Food Safety Management Systems of Food Service Establishments within the Greater Accra Region

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***Abstract*—**Food contaminated with biological, chemical and physical hazards usually leads to foodborne illnesses which in turn increase the disease burden of developing and developed economies. Restaurants play a key role in the food service industry and violations in application of standardized food safety management systems in these establishments have been associated with foodborne disease outbreaks. This study was undertaken to assess the level of compliance to the Code of practice that was developed and implemented after conducting needs assessment of the food safety management systems employed by the Food Service Establishments in Ghana. Data on pre-licence inspections were reviewed to assess the compliance of the Food Service Establishments. During the period under review (2012-2016), 74.52% of the food service facilities in the hospitality industry were in compliance with the FDA's code of practice. Main violations observed during the study bordered on facility layout and fabrication (61.8%) and this is because these facilities may not have been built for use as a food service establishment. Another fact that came to the fore was that the redesigning of the facilities to bring them into compliance required capital intensive investments, which some establishments are not prepared for. Other challenges faced by the industry regarded issues on records and documentations, personnel facilities and hygiene, raw materials acquisition, storage and control, and cold storage.

***Keywords*—**Assessment, Accra, food safety management systems, restaurants, hotel.

I. Introduction

CONTAMINATION of food with biological, chemical and physical agents is a serious threat to the health and economic growth of both developed and developing countries, as the resulting foodborne disease increases the disease burden on the economy [1], [2]. Therefore, ensuring the safety of food in our food supply chain is paramount. Food safety in restaurants involves the application of standard practices in a standardized set-up, which when violated could result in foodborne illnesses [3]. In a study conducted in Nigeria, the manager and head chefs responsible for food hygiene of four classes of restaurants agreed that not cleaning and sanitizing food equipment, utensils and food contact surfaces; not washing hands before cooking or serving food; eating under cooked or raw food are some of the circumstances that could cause foodborne illnesses [4].

During the past few decades, there has been an increase awareness on the significance of food safety. This is due to the rise in the number of occurrence of foodborne diseases, media reporting of several food-related events undermining public trust, and increased concern on the importation of contaminated food and feed due to trade liberalization. As a result, many countries have reinforced their regulatory requirements and introduced new guidelines for food safety management based on Hazard Analysis Critical Control Points (HACCP) [5]. An evaluation of New York City restaurant letter-grading program on restaurant hygiene, food safety practice and public awareness indicated notable improvements in compliance with some specific requirements. It also showed an improvement in sanitary conditions during unannounced inspections [6].

Restaurants have been associated with outbreaks of foodborne disease [7]-[11]. As a result, most public health agencies require food safety certification for restaurants as well as the workers. Certification is done by inspecting the food safety management systems employed in the operations of the restaurants.

In 2008, the Food and Drugs Authority (FDA) formerly Food and Drugs Board, with funding from Food and Agriculture Organization (FAO) conducted an assessment of food safety management systems employed by the hoteliers and restaurateurs in the Greater Accra Region. The assessment revealed that the industry had no food safety management system in place. The FDA then engaged the industry to implement a food safety management system based on the principles of HACCP. Despite this measure, concerns were still raised on the safety of foods from restaurants. A study conducted by randomly sampling 675 outbound international tourists at the departure lounge of the Kotoka International Airport between February and March, 2010 indicated that tourists were concerned about the sanitary conditions of foods in Ghana [12]. In view of this, the FDA in 2010 published a Code of Practice for food service establishments in the hospitality industry and instituted an annual licensing scheme for the food service industry in the country [13]. Since its implementation, no documented performance assessment has been done for restaurants involved in this certification scheme. However, a study conducted in Ghana using desktop literature review identified restaurants as one of the sources of foodborne diseases. The study also indicated limited use of prerequisite measures and food safety management systems within food establishments [14]. This study is therefore aimed at assessing the food safety management systems of hoteliers and restaurateurs within the Greater Accra region during 2012

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and 2016. The study will help identify the level of compliance to the Code of Practice for food service establishments in the hospitality industry as well as areas where the hoteliers and restaurateurs have challenges. The knowledge from this assessment will help guide implementation of appropriate public health interventions for the food service industry.

Fig. 1 Conceptual framework of possible factors affecting the compliance status of food safety management system of restaurants based on FDA licensing scheme

II. Method

A. Study Population and Design

The study involved a retrospective review of data on pre-licensed inspections, conducted by officers of the FDA between 2012 and 2016, of restaurants/hotel within the Greater Accra region. The pre-licensed inspections were conducted by FDA officers in accordance with the Code of Practice for Food Service Establishments in the hospitality industry [17]. Inspection details, including violations observed, are then entered into a database. Data from this database were obtained from the FDA and analyzed. The data obtained included compliance status after inspection, date of inspection and violations observed.

B. Data Collection Methods & Tools

Sequential review of data on inspections, carried out between January 1st, 2012 and December 31st, 2016, was conducted using data from the FDA inspections database. The database of the FDA had fields with headings such as, name of facility, address, location, classification, date of inspection, status, inspection type, regulatory issues, and name of inspectors. Each record in the database represented regulatory details of a food catering facility. The database was reviewed to obtain the name of facility, date of inspection, compliant status, inspection type, and violations observed using the data collection tool. The tool used for the data collection was designed as a line listing form with rows and columns. The columns had titles such as record number, name of facility, date of inspection, compliant status, inspection type and violations observed. Each row was used to record information on details of inspection conducted at a particular facility. The inspections were carried out in accordance with the 'Code of Hygienic Practice for Food Service Establishment' and violation observed were categorized into issues related to 'Layout and fabrication', 'Personnel Hygiene', 'Personnel Facilities', 'Raw Material Acquisition, Storage & Control', 'Cold Storage Facilities', 'Water Supply and Storage', 'Food Preparation Area', 'Pest Control, Utensils and Equipment', 'Pantry', 'Waste Management', and 'Records & Documentation'.

C. Data Processing & Analysis

The data were coded and refined using Excel 2016 and Epidata 3.1 software [18]. After checking for consistency and completeness of data (records with complete data on inspections), the records (1261 records) were then exported into EpiInfo 7 and analysed statistically. A data filter was set to only include data with inspection type as 'Pre-license', and these were used in the analysis. Baseline characteristics of the records on inspections were explored using simple descriptive method such as frequency distribution. The primary outcome variable was Compliance status defined as 'Recommended' or 'Not Recommended'. The exposure variables of interest were 'Layout and fabrication', 'Personnel Hygiene', 'Personnel Facilities', 'Raw Material Acquisition', 'Storage & Control', 'Cold Storage Facilities', 'Water Supply and Storage', 'Food Preparation Area', 'Pest Control, Utensils and Equipment', 'Pantry', 'Waste Management', and 'Records & Documentation' and these were dichotomized into 'yes or no' where 'yes' was defined as having a violation on the variable of interest and 'no' was defined for otherwise. The exposure and outcome variables in a particular year were each expressed as a percentage of the number of routine inspections carried out in that particular year. In comparing the compliance status and violations over the years, a chi square test was used to find significant differences ($p \leq 0.05$).

III. Results & Discussion

A total of 1,261 inspection records were retrieved from the FDA database and this covered the period between 2012 and 2016. Each facility was routinely inspected once a year (pre-licence) and subsequent follow-up inspections were conducted based on the level of compliance. Out of the 1,261 inspections, 1103 (87.71%) were pre-licence inspections and these were used in the analysis. The number of pre-license inspections conducted increased progressively over the period except in 2016 (2012: 122; 2013: 163; 2014: 278; 2015: 285 and 2016: 255). The average inspection conducted per month was 10 in 2012, 14 in 2013, 23 in 2014, 24 in 2015 and 21 in 2016.

A. Compliance Status

Compliance status, which was indicated by the percentage of facility recommended after pre-license inspection, declined marginally during the period 2012 to 2014 (Fig. 2) and increased during the period of 2014 to 2016 (p-value of 0.009). The highest percentage of recommended facilities was observed in 2016 (80.78%) and the lowest was in 2014 (67.27%). During the period under review (2012-2016), the average compliance to the code of practice was 74.52% of all facilities inspected. Although the nominal number of complaint facilities increased over the period, percentage wise it turned out to decrease from 2012 to 2014. This occurrence indicates that these operators require more knowledge transfer or it could also mean that new establishments enrolled onto the certifications scheme over the time have not been engaged actively in implementing the Code of Practice. The percentage increase of facilities enrolled onto the certification scheme was 33.61% in 2013; 70.55% in 2014; 2.52% in 2015 and -10.52% in 2016. In 2015 and 2016, where marginal change in the percentage of facilities that enrolled onto the certification scheme was observed, the compliance status of the facilities increased. The FDA therefore needs to engage the new facilities or educate them on the Codes of Practice to increase their level of compliance to the Codes.

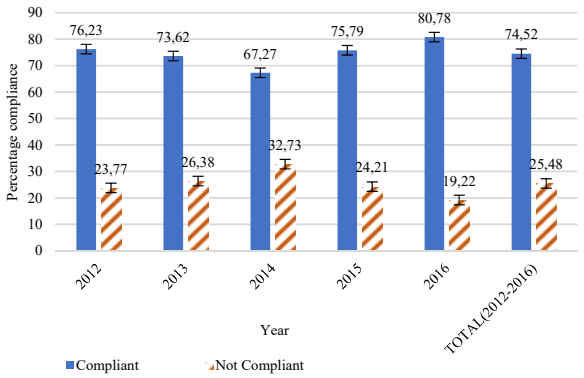

Fig. 2 Compliance status of catering facilities in the Greater Accra region: 2012-2016

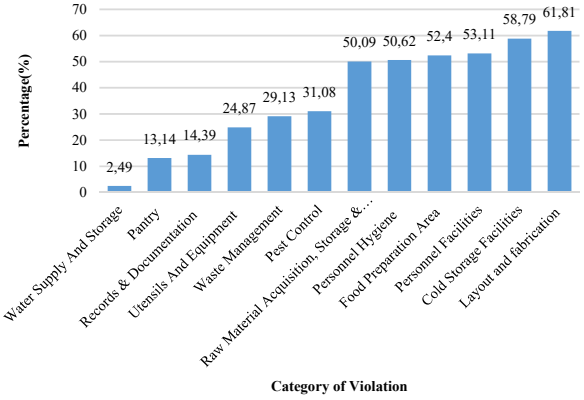

Fig 3 Distribution of the total violations over 2012-2016 into categories

B. Trend of Violations

Over this period (2012-2016), violations were recorded in all the categories. The highest percentage of violations (61.81%) was recorded on issues concerning layout and fabrication of the facilities and the lowest (2.49%) were on issues concerning water supply and storage (Fig. 3). Within the years, an increase in violations (p=0.0000) on issues concerning layout and fabrication and records & documentation was observed (Fig. 4). Decrease in violations was observed on issues concerning personnel hygiene, personnel facilities, raw material acquisition, storage & control, water supply and storage, food preparation area, pest control, cold storage facilities, utensils and equipment, waste management, pantry and waste management (Fig. 5).

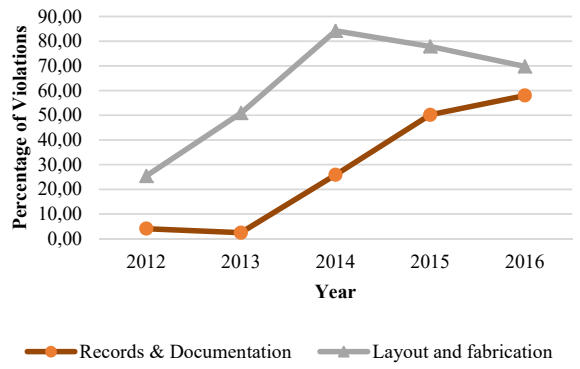

Fig. 4 Category of violations that Increased over the period: 2012-2016

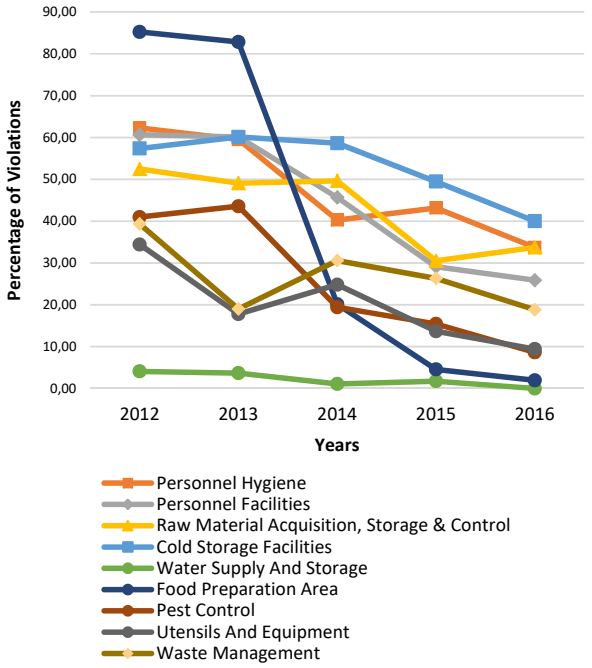

Fig. 5 Category of violations that Deceased over the period: 2012-2016

Most restaurants in Greater Accra may not have been built for use as restaurants. This is indicated by the high number (61.81%) of facilities recording violations with regards to their layout and fabrications. Usually residential facilities were converted to restaurants, resulting in limitation in implementing corrective actions required for compliance with FDA's Code of Practice. These corrective actions are usually capital intensive and may require authorization from property owners. These challenges coupled with poor maintenance culture could account for the increase in violations observed with regards to layout and fabrications over the period (2012-2016).

Challenges with issues of records and documentation were observed to progressively increase from 2013 to 2016 (4.1% to 58.04%). Despite the continual recommendations made on the need to keep records and documentation on all aspect of the food operations, this is continually and increasingly violated by the operators. This could be due to the lack of understanding on the requirements stated in the Code of Practices or the operators not seeing the need for the records and documentation, as the lack of records and documentation does not affect their certification status. A study conducted in Accra to evaluate the food hygiene knowledge attitudes and practices of food handlers in food businesses concluded that food handlers do not put their knowledge into practice [15]. However, further studies need to be conducted to ascertain the cause of this trend.

Over the years (2012-2016), the Food Service Establishments improved marginally with compliance to sections of the Code that were not capital intensive. Compliance with issues concerning personnel hygiene, personnel facilities, raw material acquisition, storage & control, water supply and storage, food preparation area, pest control, pantry and waste management increased over the period (2012-2016). This could probably be due to improve knowledge of operators after the first-year inspection and the subsequent implementation of corrective actions. This implies that the education given to these operators by the FDA inspectors is impacting positively on the industry by improving the operators' knowledge on food safety management, which is incorporated in the Code of Practice. A study conducted to examine the relationships between food safety knowledge and restaurant workers' characteristics indicated that certification improves the food safety knowledge of workers [7], [16].

IV. Conclusion

The compliance status of restaurants was fairly good during the period under review (2012-2016). On the average, 74.52% of the food service facilities in the hospitality industry were compliant to the FDA's Code of Practice during the period under review. Challenges with compliance were observed on all issues but was high with issues regarding 'Layout and fabrication' and 'Records & Documentation', where more than 50% of the facilities recorded violation for the last two consecutive years (2015 and 2016).

V. Limitations

Inspections were conducted by different inspectors hence violations to the Code maybe subject to the inspector interpretation and leniency. The number of catering facilities inspected may only be a fraction of catering facilities that actually operate in the Greater Accra Region as some facilities may be operating without the prior knowledge of FDA.

VI. Competing Interests

The author declares that he has no competing interest as far as this work is concerned. All views expressed in this work are views of the author and does not represent the views or position of any institution.

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