



Review

Online ordering and delivery of ready-to-eat foods in Ghana: a call for policy towards ensuring food safety in the service

Mohammed Lawal^{1,2*}, Frederick Adzitey³

¹*Africa Center of Excellence for Mycotoxin and Food Safety, Federal University of Technology, Minna, Niger State, Nigeria.*

²*Department of Biotechnology, Faculty of Biosciences, University for Development Studies, Tamale, Ghana.*

³*Department of Animal Science, Faculty of Agriculture, Food and Consumer Sciences, University for Development Studies, Tamale, Ghana.*

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ABSTRACT

Changes in food consumption patterns have resulted in the high demand and patronage of online food ordering and delivery services in Ghana. The attention of every individual involved in the food chain is needed to ensure food safety. Since a food delivery service and person are introduced in online food ordering and delivery services, new and unique food safety challenges and concerns are created. This paper investigates the food safety concerns and challenges posed by online food ordering and delivery services and further provides solutions to tackle and improve food safety in the service. Additional concerns raised by food ordering and delivery services include an absence of food transport or delivery regulation in Ghana, a lack of food safety education and training for food delivery persons as well as food fraud actions like mislabeling and substitution. To boost food safety in online food ordering and delivery services, the service should be regulated by the Ghana FDA with policies and manuals that address these food safety concerns. Food meant for delivery should be packaged well to prevent contact with insects and other contaminants. Timely delivery should be a priority to make sure delivered foods are still in the right and safe temperatures for consumption.

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1. Introduction

The coronavirus disease 2019 (Covid-19) pandemic, coupled with the availability of technology and internet

connectivity has resulted in new food consumption patterns like the emergence of online food ordering and delivery services (OFODS) in many countries around the world including Ghana.

*Corresponding author. Tel.: +233 241 444 847

E-mail address: mohammedjack3@gmail.com



It is reported that the Gross Merchandise Value (GMV) of online food delivery increased significantly by 15 times resulting in US\$6 billion from 2015 to 2020 around Southeastern Asia only (1). The GMV was further predicted to surpass US\$20 billion by 2025 (2). The GMV was further predicted to surpass US\$20 billion by 2025 (2). Of all e-commerce sales, online food ordering and delivery service was the largest at 27.85% in Indonesia and is projected to grow by 11.5% annually from 2020 to 2024 (3). In Ghana, the sudden popularity of ventures like Bolt Foods, Jumia Foods, Glovo, FeedMe, Big Samps, Homechow and other delivery companies suggest the high patronage of online food ordering and delivery, especially in the major cities and towns.

Urbanization, busy schedules and insufficient time to cook, the convenience of the process, time-saving and readily available information on all food types or menus and prices contribute to the increasing patronage of online food ordering and delivery in the country. The food business operators also benefit because it is a source of additional income since food delivery comes at a cost that customers are ready to pay (4).

Although important, online ready-to-eat food ordering and delivery pose novel and additional food safety challenge to the already existing food safety challenges of the ready-to-eat food industry. This is because of the food delivery person introduced between food producers and buyers or consumers (5). For instance, substitution and mislabeling food fraud actions aimed at serving low-quality and inferior foods for undue

economic gain may arise due to the absence of the customer or consumer at the site of the restaurant during the purchase of the food. The attention of every individual involved in the food chain is necessary for ensuring the safety and quality of foods. Ready-to-eat food handling by drivers and riders before reaching consumers hence introduces new food safety concerns and additional challenges that existing food safety laws and mechanisms of Ghana do not address. Ghana cannot boast of an all-around efficient or excellent food safety system. This has contributed to Ghana being scored 40/100 in food quality and safety provision through its implemented food safety mechanisms by the Global Food Security Index (GFSI) as of the end of 2020 (6). This paper seeks to investigate the food safety concerns and challenges involved in online food ordering and delivery service in Ghana and further suggest solutions to address the concerns and challenges to boost food safety among the Ghanaian public. The findings of this paper will contribute significantly to food safety awareness and education of both food delivery persons and general consumers in Ghana. This food safety education will further help in developing attitudes, skills and knowledge to understand food handling issues and contribute to minimize food contamination and its associated illness outbreaks.

1.1. Online Food Ordering and Delivery Service (OFODS)

OFODS provides a set of procedures used in the purchase of food that replaces face-to-face interaction. The service presents a platform that provides consumers with order services, prices and information

on the destination of the customer to deliver the food (7).

OFODS is operated in two ways. The first is offered by the restaurant or canteen in charge of preparing and selling the food. According to Cai & Jun (8), in this method of food delivery, face-to-face interaction to purchase food is substituted with an interaction directly with the vendors via a phone call, email, or SMS text to place an order and then the food will eventually be delivered to the customer's destination. Hirschberg et al. (9) refers to this method as the traditional OFODS. The second category is also composed of several restaurant intermediaries that connect restaurants and customers and offer delivery services for a large range of restaurants (10). For instance, one of the commonest online food ordering and delivery service providers in Ghana called Bolt Food uses this method via a mobile phone application that lists the restaurants and the foods available. Due to the rise in technology and affordability, this method is gaining a rise among consumers in Ghana. This method also provides customers with an expanded choice of menu selection as customers can order and purchase food from a wide range of restaurants with a mobile application while at their home, office, or any location (11). Online food ordering and delivery service is a trend amongst the young and active population like office workers and students. Data available reveals that online food ordering and delivery service customers are mostly young between 24 to 35 years old (12). In Ghana, just like in other jurisdictions, both fresh and raw as well as processed and ready-to-eat foods are

ordered by customers and consumers, however, online ready-to-eat foods ordering and delivery is the most patronized and looks accepted by Ghanaian consumers.

1.2. Importance of Online Food Delivery Services

Convenience is one of the key factors driving the OFODS revolution. With people getting busier every day in urbanized environments, people have less chance to step out to eat so the demand for food delivery services has increased (13). In addition, the increase of women in the workforce in settings where women are known to be the ones who prepare food for the family may influence the eating patterns of the family. One of the approaches to satisfy the hunger of such family members is to rely on food orders and delivery. According to Saad (11), OFODS help in saving time. Sethu & Sani (14) investigated the impact of online food ordering and delivery services among students in India and reported that it helped in saving students' time by conveniently providing access to their desired food. With this service, there is no need to waste time walking about to search and purchase food. Also, OFODS exposes consumers to a variety of restaurants to choose and purchase from at a time without the struggle of moving from one restaurant to another restaurant to purchase food. E-commerce and OFODS also impact the societal well-being of individuals. Online food ordering is less stressful and allows the customer to better manage their time thus significantly improving quality of life (11). Customers subsequently experience a positive feeling when an online purchase is delivered (15). OFODS also allow the

elderly and physically challenged persons to rely less on others for their food needs. OFODS contribute to economic growth in countries (1). It is as well a major entrepreneurship opportunity and a source of employment for the youth.

2. Existing Food Safety Challenges of Ready-To-Eat Foods in Ghana

The presence of contaminants like bacteria, fungi, viruses, heavy metals and pesticides is the major food safety challenge causing sickness to consumers. Studies have reported the presence of these biological and chemical agents in ready-to-eat foods sold in markets and restaurants around the country. In a study by Mensah et al. (16), 511 ready-to-eat food items were examined from food vendors in Greater Accra Region, and 356 (69.7%) of the foods contained bacteria such as *Staphylococcus aureus*, *Salmonella arizonae*, *Escherichia coli*, *Shigella sonnei*, *Citrobacter spp*, *Pseudomonas spp* and *Klebsiella pneumoniae*.

The bacterial counts of some of these ready-to-eat foods were high and beyond the acceptable reference figures $\leq 10^5$ cfu set by the Ghana Standards Authority for ready-to-eat foods. Feglo & Sakyi (17) isolated similar bacteria like *Staphylococci*, *Bacillus spp*, *Klebsiella pneumoniae*, *E. coli* and *Pseudomonas* in ready-to-eat foods in Kumasi, Ashanti Region. In Sunyani (Ahafo Region), the microbial quality of ready-to-eat foods was also investigated (18). They isolated *Aspergillus flavus* fungi in a food sample and at least 3 different bacteria in all food samples except light soup which had only *Salmonella arizonae* present. Also in the Northern Region of Ghana - Tamale, analysis of the microbial quality of ready-to-eat vegetable salads by Abakari et al. (19)

revealed that the salads sold were unwholesome for human consumption as they contained counts of several bacteria. *Escherichia coli* counts ranged from 0 to 7.56 log₁₀ cfu/g. *Bacillus cereus* counts were 0 to 7.44 log₁₀ cfu/g. *Shigella spp* counts were 0 to 5.44 log₁₀ cfu/g while counts of *Salmonella spp* were 0 to 4.54 log₁₀ cfu/g.

Bempah et al. (20) also investigated the chemical contamination of fruits and vegetables from urban and rural markets throughout the country. Out of the total 309 samples which included Banana, Mango, Pear, Tomato, Pineapple, Cabbage, Watermelon and Carrot, 9.8% contained pesticide residues above the Maximum Residue Level (MRL) and 51.0% of the samples recorded levels below the MRL. It is worth noting that recording levels below the MRL do not guarantee absolute safety when consumed and can still be harmful after consumption by certain people. More disturbing is the fact that organochlorines which are banned and unapproved for use as pesticides were detected in the fruits and vegetables sold. Gonu et al. (21) also investigated organochlorine pesticide residues in pineapple and cocktail fruit juice sold in various stores in the Greater Accra Region. Pesticide residues were found in all 20 samples procured from the markets. All these biological and chemical contaminants have resulted in several incidences of foodborne diseases in the country as shown in Table 1.

Table 1. Notable foodborne disease outbreaks recorded in Ghana

Year	Case	Source
2022	Many consumers were hospitalized due to food poisoning after eating food from Marwako Restaurant, East Legon branch.	https://www.foodsafetyafrica.net/2022/06/15/fda-ghana-confirms-food-poisoning-allegations-at-marwako-restaurant/
2019	Over 60 students of Archbishop Porters Senior High School in Takoradi were hospitalized in Holy Child Hospital after consuming overnight leftover vegetable sauce which was later kept in the fridge.	https://citinewsroom.com/2019/03/29/60-archbishop-porter-girls-hospitalized-over-food-poisoning/
2018	Over a dozen students of Oti Boateng Senior High School suffered from food poisoning after eating Waakye from the dining hall.	https://www.myjoyonline.com/news/2018/May-16th/alleged-food-poisoning-hits-oti-boateng-shs-dozens-hospitalised.php
2017	50 students of Ghana Senior High School (GHANASS) in Koforidua were admitted following a food contamination incident.	https://www.modernghana.com/new/817176/food-borne-illness-kill-230000-people-annually-protect-you.html
2013	Over 40 students were hospitalized in Adonten Secondary School in Eastern Region over food poisoning.	https://mobile.ghanaweb.com/GhanaHomePage/NewsArchive/40-Adonten-SHS-students-hospitalised-with-food-poisoning-266669
2011	Several people suffer food poisoning in Obuasi after eating fried rice from a fast-food joint. 30 individuals were hospitalized.	https://mobile.ghanaweb.com/GhanaHomePage/NewsArchive/Dozens-suffer-food-poisoning-in-Obuasi-223457
2010	The outbreak of food poisoning from a locally made corn drink (Ngmedaa) at a child naming ceremony in Anyaa Ghana	https://www.tephinet.org/outbreak-of-food-poisoning-at-a-child-naming-ceremony-anyaa-ghana-june-2010
2009	The outbreak of <i>Clostridium perfringens</i> food poisoning as a result of improper washing and bagging of cabbage used to prepare the salad. 40 people who ate salad from the salad joint were reported to the Regional Hospital with vomiting, diarrhea and Abdominal Cramps.	https://www.tephinet.org/outbreak-of-food-poisoning-at-a-salad-joint-koforidua-ghana-november-2009
2007	Children from 3 different schools in the Ga-East district of the Greater Accra Region were hospitalized after eating from the School Feeding Programme the previous day.	https://www.modernghana.com/new/817176/food-borne-illness-kill-230000-people-annually-protect-you.html
2007	17 out of 28 farmers in East Mamprusi die of chemical food poisoning in Northern Region.	https://www.modernghana.com/news/353755/17-die-of-food-poisoning.html

Aside from food contaminants, other challenges to food safety in ready-to-eat food service in the country include challenges regarding food safety knowledge, attitudes and practices by food handlers. Studies have investigated this challenge across the country. Akabanda et al. (22) and Annor & Baiden (23) concluded in their respective studies on food safety knowledge, attitudes and practices of institutional food handlers in Ghana that, although these food handlers showed satisfactory food safety knowledge, it did not translate into strict hygiene practices when handling food. Kunadu et al. (24) also in a similar study found negative attitudes toward food safety by food handlers. They further pointed out the lack of knowledge on cross-contamination and appropriate temperature for food by ready-to-eat food handlers as areas of concern against food safety.

In another research by Odonkor et al. (25), it was revealed that 63.1% of the food handlers cited a lack of education and training as a barrier to achieving food safety in their operations. The lack of practice, education and training may be a result of the failure to enforce the registration of food businesses around the country. Tuglo et al. (26) found a significant relationship between food safety knowledge and hygiene practices and registered ready-to-eat food joints. This highlights the importance of strict enforcement of registration and certification of ready-to-eat food businesses by the Ghana FDA and other concerned institutions in charge of food safety knowledge in the country.

3. Food Safety Concerns and Challenges Posed by Online Ordering and Delivery of Ready-To-Eat Foods in Ghana

3.1. Food Safety Awareness and Knowledge of Food Delivery Persons

Food safety awareness is generally low among the general Ghanaian populace and also not all have some knowledge necessary to translate it into practice. Food safety during food delivery solely depends on the delivery person and is influenced by their food safety knowledge, attitudes and practices, duration of delivery, proper food packaging and storage conditions. There is currently no study to prove that food delivery persons in Ghana have any food safety awareness, satisfactory knowledge or consider food safety important or a priority during delivery. These delivery persons, however, transport ready-to-eat foods that have been named to contain biological and chemical food contaminants by several researchers in Ghana. Table 2 shows some ready-to-eat foods delivered by certain online food ordering and service providers in Ghana.

Table 2. Ready-to-eat foods delivered across Ghana

Food Delivery Services	Foods
Bolt Food	Fried rice, Jollof rice, "Waakye", "Attieke", Vegetable salad, Noodles, Banku, Fufu, Soups and Stews
Glovo	Rice, Pizza, Yam, Fruit juices, Pastries, "Ampesi", Chicken and Meats
Jumia Foods	"Kenkey", Sandwiches, Fish, Salad, French fries, Potato chips and Burger.

Also, there are certain ready-to-eat food delivery persons in the delivery of other items like clothing and cosmetics. Such delivery persons mostly use the same storage booth and this can be a source of cross-contamination to foods.

There is as well a food handling concern during food delivery as the ready-to-eat foods may not be stored for transport at the right and safe temperature until they are delivered. According to the World Health Organization, if food is kept for a long at room temperature, microorganisms multiply quickly (27). Storing foods between 5°C and 60°C exposes ready-to-eat foods to higher counts of microorganism contamination. Especially in the case of ready-to-eat hot meals, the food must be delivered early at a temperature still safe for consumption. There is also a concern about storage packaging that will guarantee the safety of ready-to-eat foods from insects and pests during the transport for delivery to customers (1).

In OFODS, the consumer is the last link. Since ordered food is not eaten immediately at the premises of production, consumers when they receive the ready-to-eat food from the delivery person must ensure the safety of the food they have received by maintaining food at the appropriate temperature, reheating it to above 60°C before eating and proper hygiene when handling the food (1,27). Unfortunately, consumers may not follow safety standards because of low food safety awareness (28). The presence of consumers at a ready-to-eat food joint serves as a check for vendors and handlers to practice food safety (5). Customers are not with food delivery persons after ordering food.

This could aid bad handling practices by food delivery persons and since customers are absent, they cannot insist on food safety practices by the handlers of their foods.

3.2. Online Food Ordering and Delivery Regulation

Aside from the poor implementation by the bodies involved in food safety enforcement, challenges and obstacles to achieving food safety in Ghana include gaps in policy and legal frameworks (29). Consumers often embrace new eating options such as online food ordering yet regulatory authorities are always lagging in keeping up with these innovations (30). The current food safety laws and regulations of Ghana do not address certain emerging food safety trends and challenges such as OFODS or food e-commerce. This raises concerns about the effects of the service on the safety of the foods. Foods meant for public consumption are only declared safe by the Ghana Food and Drugs Authority (FDA). It is necessary to note that FDA monitoring is up to the production at the premises of the food joint or restaurant and not directly on the delivery process. Food delivery companies or persons are not registered directly under the FDA, so their services are not regulated by the FDA which can make food delivery a risk factor for food contamination and a possible foodborne disease outbreak.

3.3. Food Fraud in Online Food Ordering and Delivery

There is a food fraud concern that also arises from online food ordering and delivery services. Food fraud is considered generally as the intentional misrepresentation of the contents or identity of food for economic gain (31). Adulteration is the commonest type of food fraud, however, there are others such as mislabelling, substitution, simulation, counterfeiting

and tampering (32). With OFODS, consumers will most likely be victims of mislabeling (misbranding). It is a food fraud action where a customer receives inferior food than what has been advertised to be available. In OFODS, the kinds of food available in the various restaurants are described in the mobile application used to place an order. Because customers are not physically present at the vending site, the vendors may over-describe the menu to contain certain materials that the food may not have. In the end, after a customer receives the ordered food, they may find out that the delivered food is not exactly what was advertised. For instance, there can be descriptions given to food such as “natural” or “organic” however customers will not receive anything natural or organic. Also, vendors may present foods with pictures that do not depict the nature of the food when delivered. In addition, OFODS customers have a risk of being food fraud substitution victims. Substitution is the situation when part or all of a food product is replaced with a similar substance of low value.

Food fraud is difficult to identify because the products are similar to the original foods such that even customers who engage in the face-to-face purchase of food fall victim to food fraud. Food fraud results in serious health implications for certain consumers due to the consumption of fake or substandard products hence it is considered a crime when it is a risk to public safety and financial loss to customers like can occur in OFODS.

4. Solutions to Food Safety Challenges & Concerns of Online Food Ordering and Delivery Services in Ghana

The food safety concerns and challenges bothering the OFODS in Ghana are those that need to be addressed swiftly to ensure public safety. Food delivery persons should be a target of the Ghana FDA as well as other concerned institutions and be included in food safety education and training. The restaurants should further make sure that this food safety education and training is translated into practice to cause good food handling practices by the food delivery persons.

To address the regulation concern, detailed policies and regulations should be made that directly tackle the transportation and delivery of food. For instance, the Center for Disease Control and Prevention USA has a manual for food delivery safety that guides food delivery service providers in the USA. The Ghana FDA needs to also develop a manual that fits the Ghanaian food service system to boost food safety in food delivery. Food business operators should be made to familiarize themselves with these new regulations and implement them accordingly.

Also, food has to be maintained at the right temperature while delivery. Maintaining food at proper temperatures is critical to limiting the growth of pathogenic bacteria or the formation of microbial toxins in food (30). Therefore to ensure food safety, the right temperatures for keeping food should be emphasized in food delivery.

Proper packaging aids to prevent chemical and physical contamination of food (30). Packaging of ordered food must be done to prevent insects and other harmful substances from coming into contact with the food. Materials used for wrapping and packaging should be clean and also not be a source of contamination. The storage booth and delivery carriers

of food delivery vehicles should be cleaned and disinfected periodically by food delivery service providers. These practices will help address the concern of cross-contamination that could occur through the transport of the ordered food.

Consumers are the final judges of food safety and should insist on food safety during the ordering of food. Consumers should research restaurants and delivery service providers' food safety systems or compliance before eating or ordering from them. After the arrival of food, consumers should be vigilant to abnormal odour, taste and appearance of ordered ready-to-eat food items. If there is any doubt on the safety of the food, then they should refrain from eating. The FDA in collaboration with concerned institutions should conduct consistent inspections to boost food safety and also enforce food joints certain food safety mechanisms such as HACCP which can predict food safety hazards, identify the food safety hazards that require preventive control and recommend or implement control or preventive mechanisms for those hazards.

5. Improving Online Food Delivery Services in Ghana

In Ghana, the online food delivery industry is quite new yet trending and rapidly growing. The available online food ordering and delivery service providers require the cooperation and efforts of concerned government institutions and departments, consumers, and all parties in society to create a better online food ordering and delivery environment.

Customers consider the process of food delivery and see that as important in OFODS (33). The delivery time is therefore crucial in satisfying customers.

Delays beyond the expected delivery time will hurt satisfaction hence to improve the food delivery service in Ghana, there has to be a timely delivery of food to customers. Customers should be linked to nearby delivery persons and they should also be individuals who are aware of the routes and roads to ensure the timely delivery of food. Timely food delivery also ensures delivered food is in the good condition. Reliable delivery must be a priority of OFODS providers because that is important to their success (11).

Several studies reveal that the attitude of delivery persons also creates a good online food ordering and delivery environment and influences consumers' choices (11, 34-37). Food delivery persons must be professional in fulfilling their duties. Delivery persons must be courteous and show good behaviour towards customers and actions should be taken against those who fail to do so (11). According to Lin et al. (33), restaurants often, unfortunately, use unprofessional delivery persons and this impacts negatively the overall performance of the food delivery service.

Aside from delivery issues, packaging also influences online food ordering and delivery services. Chen et al. (38) report that customers are nowadays interested in food products that utilize sustainable packaging. For instance, Gutberlet et al. (39) reported that over 33% of online consumers revealed that packaging is very important to them when ordering foods online. Packaging should enhance the safety and freshness of food.

Handoko (40) recommends that OFODS providers should enhance quality, and variety and consistently offer reliable and timely delivery to improve the service

and encourage patronage. It is necessary to regulate OFODS to ensure food safety because their actions and inactions may cause food poisoning leading to foodborne disease outbreaks.

6. Conclusion

OFODS are convenient for a lot of people hence patronage is increasing among Ghanaians living in urban areas. It also provides a source of employment and contributes to economic growth. However, OFODS creates unique food safety challenges. The paper identified food fraud actions like mislabeling and substitution to be challenges that can evade online food delivery services in the country. Also, the absence of data to prove if food delivery persons are aware of food safety and prioritize food safety during the handling and transportation of food is a major concern. The paper further suggested strict regulation of OFODS in Ghana by the Ghana FDA as well as cooperation with other concerned bodies to develop a manual that can guide food delivery persons in ensuring food safety to protect public health in Ghana. It is therefore highly necessary that food delivery persons be included in food safety awareness and training campaigns. Also, managers and workers of restaurants in online food delivery should be educated to understand the dangers of food fraud to public health and safety, so they avoid it. Future research should target implementing risk management systems to help check the food safety issues that arise as a result of online food ordering and delivery services.

Conflict of Interest

The authors declare no conflict of interest.

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