Lorinda OT, et al., J Food Sci Nutr 2020, 6: 071
DOI: 10.24966/FSN-1076/100071

HSOA Journal of Food Science and Nutrition

Research Article

Imported Chicken Value Chain in an Obesogenic Ghanaian Food Environment: Knowledge, Practices and Perceptions of Actors

Lorinda OT[1], Aidoo R[1], Yankyera KO[1], Apprey C[2], Annan RA[2] and Yamoah FA[3]*

[1]*Department of Agricultural Economics, Agribusiness & Extension, Kwame Nkrumah University of Science and Technology (KNUST), Ghana*

[2]*Department of Biochemistry and Nutrition, Kwame Nkrumah University of Science and Technology (KNUST), Ghana*

[3]*Department of Management, Birkbeck University of London, United Kingdom*

Abstract

In view of the critical role of food value chain stakeholders in the public effort to prevent unhealthy practices that give rise to high incidence of obesity and other health risks, this study examined imported chicken value chain practices, knowledge and perceptions of key actors. A combination of purposive and snowball sampling techniques was adopted to select candidates for personal interviews. The participants were twenty (20) wholesalers and thirty (30) food vendors who use imported frozen chicken for food preparation. The UNIDO framework was adopted to generate a comprehensive value chain map for imported frozen chicken. The study revealed that the imported chicken value chain is controlled by a few importers and large scale distributors with cold storage facilities and distribution logistics. Wholesaler and retailer stakeholders have good knowledge about (un) healthy food cooking and handling practices. However, a dichotomy exists between knowledge level and actual cooking and handling practices, resulting in the high prevalence of unhealthy practices. General indifference exists among food vendors about the contribution of their cooking and handling practices to the risk of obesity. The results have implications for education and training for food vendors and public health promotion to reduce the risk of obesity.

Keywords: Imported chicken; Value chain actors; Knowledge; Perception; Practices; obesity

***Corresponding author:** Fred A Yamoah, Department of Management, Birkbeck University of London, United Kingdom, Tel: +44 2039261551; E-mail: f.yamoah@bbk.ac.uk

Citation: Lorinda OT, Aidoo R, Yankyera KO, Apprey C, Annan RA, et al. (2020) Imported Chicken Value Chain in an Obesogenic Ghanaian Food Environment: Knowledge, Practices and Perceptions of Actors. J Food Sci Nutr 6: 071.

Received: June 03, 2020; **Accepted:** June 11, 2020; **Published:** June 22, 2020

Introduction

Agriculture generates the variety of commodities and ingredients that form the basis of our food and nutrition system in the world [1]. When food is not consumed by farmers themselves immediately after it has been harvested, it is handled, treated, stored, packed, transported, prepared, traded and consumed in a range of ways that affect its acceptability and nutritional quality. Various interventions are adopted by food value chain actors to improve diet quality and to promote sales. Value chain actors and their activities, therefore, have serious implications for food quality and acceptability by consumers. The agricultural value chain refers to the full range of activities that are required to bring a food product from conception, through the different phases of production, to delivery to final consumers and disposal after use [2]. Further, a value chain exists when all the stakeholders in the chain operate in such a way as to maximise the generation of value along the chain. According to Hawkes and Ruel [3], a food value chain is a form of food supply chain that involves a series of processes and actors that take a given food commodity from its production to consumption and disposal as waste. A value chain is commodity specific and as such, involves all actors engaged in the production, distribution/handling and consumption of that commodity. Chicken is an example of a very important food commodity for a typical Ghanaian household.

Globally, production of poultry meat has been rising rapidly [4]. Ghana and many other African countries are highly dependent on large quantities of frozen chicken imported from developed countries [5]. Indeed, Ghanaians have developed preferences for imported chicken as a major source of animal protein [6,7]. The consumption of chicken provides the nutrients needed for growth and maintenance and a range of health benefits. USDA [8], indicated that poultry meat (especially the imported frozen chicken) is one of the most consumed and highly preferred animal protein sources in Ghana due mainly to its low price and convenience. This trend of consumption is expected to increase due to rapid economic development and population growth. Poultry processing methods range from simple forms of transformation, such as slicing, roasting/smoking, or freezing, to highly extractive forms where the nutrients of the original ingredients are significantly depleted through various processes, such as deep frying. The high quantities of oil, salt and other additives and preservatives used in the processing and preparation of chicken for sale have led to serious public health concerns in Ghana, with many experts attributing the high rate of obesity in the country to the rapidly changing food environment.

The food environment in Ghana is becoming more obesogenic. An obesogenic environment has been defined as the sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations. Overweight or obesity is used to represent abnormal or excessive fat accumulation that has the potential to exert negative effects on health [9]. Though obesity is a complex health issue related to lifestyle and genetic factors, there is growing evidence linking obesity to the food environment (e.g., food availability, processing and marketing). High calories in diets due to the increased consumption of vegetable oils and fast foods, the lack of physical activity, the sedentary lifestyle and genetic factors all play a role in the development of obesity [10]. Fast-food restaurants have become very common in the food environment of developing countries like Ghana, especially in urban communities. Recent data reveal that the number of fast-food restaurants in Ghana has increased significantly over the past decade, particularly in middle-income communities [11]. The rapid growth in hotels, restaurants and fast food joints in urban centres has increased the demand for the so-called 'convenience' foods. However, foods characterised as convenient, attractive and ready-to-eat are considered problematic for public health [12,13]. Part of the problem is that their principal ingredients (oils, solid fats, sugars, salt, flours, etc.) make them excessive in total fat, saturated fats, sugar and sodium and short of micronutrients and other bioactive compounds as well as dietary fibre [12,14]. Also, processed and packaged foods often contain additives and preservatives to make the food more appealing and to enhance taste. However, additives and preservatives are often associated with foods with a reduced nutrient density and may be associated with both alleged and actual health problems [15,16]. Taken together, these foods increase the risk of various serious diseases/health conditions, such as obesity, hypertension, diabetes and heart failure, among others [17].

Food value chain actors (including vendors and handlers) play a critical role in the food environment to either promote or prevent unhealthy practices that give rise to a high incidence of obesity and other public health risks [18]. These actors either create the demand for these convenient forms of food products, or they just respond to consumer demand for the so-called convenience foods without much regard for their potential obesogenic and other public health risks.

The demand for imported frozen chicken has increased over the past few years in relation to the preparation of most convenient and fast foods in Ghanaian urban centres. Value chain actors in the processing and distribution system of this food commodity are fast adapting and upgrading their processes and products to meet the growing demand for these convenient food forms. These foods are now processed to increase consumer taste; to enhance food texture, colour and flavour; and to reduce cost [19]. Consequently, high quantities of oil, salt and other food additives and preservatives are now used in Ghana to preserve, process and present commonly sold protein sources like imported chicken to the urban consumer. With value addition by these value chain actors, highly processed chicken loses much of its nutritional value, such as protein and fibre.

There is also growing evidence to suggest that consumers from developing countries are increasingly making unhealthy food choices especially due to a lack of knowledge about and an incorrect perception of healthy foods [20,21]. The knowledge level of intermediaries in the value chain (processors and traders) regarding the harmful effects of these food handling practices they undertake might be poor and this is likely to influence their perception of the effects of these practices on obesity and human health in general.

The current limited empirical information on the knowledge, practices and perceptions of key actors in the imported chicken value chain and how their current food-handling practices contribute to obesity in Ghana, is a major problem in the public efforts to reduce obesity levels in the country. Therefore, the purpose of this study was to examine the imported chicken value chain and assess the knowledge, practices and perceptions of selected actors in the chain.

Materials and Methods

Study area and data collection

The research was conducted in and around the Kumasi Metropolitan Area (KMA), the capital of the Ashanti Region of Ghana. The KMA was selected purposively due to its high human population and concentration of imported chicken value chain activities (trading, processing and consumption). The study employed both qualitative and quantitative data. Primary data were collected from selected frozen chicken value chain actors (distributors/wholesalers and food retailers) and the information covered demographic characteristics, value chain activities and the source of materials, as well as knowledge, practices and perceptions. A total of twenty (20) wholesalers and thirty (30) food vendors who use imported frozen chicken were selected from major market centres in the Kumasi metropolis for personal interviews (Table 1). In the selection of the wholesalers and food vendors, a purposive sampling method was first used to select four communities where the major market centres in the metropolis are located and where most of the imported chicken trading activities are undertaken. The snowballing technique was finally adopted to select the respondents through a reverse tracing approach (referrals from initially selected retailers).

Value Chain Actors	Selected Markets	Sampling Technique for Market Selection	Sample Size (n)	Sampling Technique for Selection of Respondents
Imported frozen chicken wholesalers	Bantama Market Asafo Market Central Market Atonsu Market	Purposive Sampling	20	Purposive sampling & Snowball
Food retailers using imported frozen chicken			30	
Total			**50**	

Table 1: Sample size and sampling strategy.

The study employed a structured questionnaire to conduct face-to-face in-depth interviews to elicit relevant information from the selected value chain actors. Key informants from Kumasi Metropolitan Assembly (KMA) and the Department of Food Science and Technology (KNUST) were also interviewed to understand various healthy food cooking and handling practices to be adopted by food vendors. Field observations were also made to be able to get first-hand information on what was happening on the ground regarding the practices of wholesalers and retailers.

Data analysis

Data obtained from the field were edited and coded appropriately using Statistical Package for the Social Sciences (SPSS-version 20.0).

Characteristics of the actors and food-handling practices were analysed using descriptive tools, such as arithmetic mean, frequencies and proportions and the results were summarised using tables and graphs. The frequency with which food handling practices are carried out was rated on a 5-point scale (1=always, 2=often, 3=quite often, 4=rarely and 5=never). Frequency of practice and reasons/motivation for actors to adopt different food handling and cooking practices were summarised using tables and simple narrations. The mapping of actors in the value chain and the description of their roles were done using the UNIDO [22], framework. At every operational stage, a link was drawn between the source of the major inputs used by an actor and by the receiver (distributor/consumer) of the generated product. A flow diagram was generated using directional arrows to show all the channels of distribution and the interrelationships among key actors as well as the product pathway from the input supplier to the final consumer. The roles of each key actor were described using simple narrations. Frequency distribution tables and simple narrations were used to present the identified food handling practices performed by each actor. Reasons and motivation for actors to adopt different food handling practices have also been summarised using simple narrations.

Actors' knowledge of healthy/unhealthy food cooking and handling practices was assessed by using a number of carefully constructed knowledge statements. Simple frequencies and proportions were used to examine respondents who answered correctly (i.e., agreed with positive statements and disagreed with negative statements). Actors answering above 80% of the statements correctly were deemed to have high knowledge level, 60-79% means good knowledge, 40-59% means adequate knowledge, and answering less than 40% correctly means low knowledge. Bar charts were used to project the knowledge levels exhibited by wholesalers and retailers in the imported chicken value chain. Perception indices were computed to examine actors' perceptions about the effects of their practices on obesity and the nutritional content of imported frozen chicken and its derived products by using a 5-point Likert scale (5=Strongly Agree and 1=Strongly Disagree) to rate/score carefully constructed perception statements. Scores for each of the statements were analysed using the simple arithmetic mean and overall perception indices for all actor categories were computed and illustrated using charts. Specific constraints that prevent value chain actors from adopting recommended healthier food cooking and handling practices were identified through key informant interviews and the results were summarised using simple narrations.

Results and Discussions

Characteristics of respondents

Table 2 presents the demographic profile of imported chicken wholesalers and retailers who were the respondents sampled for the study. Consistent with a priori expectations, the intermediary segment of the imported chicken value chain was found to be dominated by women. Out of the 20 wholesalers who participated in this study, 90% were females and similarly, the majority of the retailers (87%) were females. This supports studies such as those by Soares et al. [23] and Baluka et al. [24], who have previously reported a higher proportion of females in food handling, since trading and processing are traditionally considered jobs for women in Ghana. A greater percentage (>70%) of both food retailers and wholesale traders were found to be in the economically active age bracket of 30 to 49 years. In terms of educational level, the majority of the wholesalers (60%) indicated secondary school as their highest level of education, while 47% of the food retailers indicated basic school as their highest level of education. This has implications for their knowledge level and perceptions regarding food handling practices and the impact of these on the nutritional content of food and on obesity. However, a previous study by Webb and Morancie [25], reported that irrespective of educational level, food handlers' knowledge and performance in healthy food practices were not adequate. Respectively, 70% and 57% of the wholesalers and retailers interviewed were married.

Variable		Wholesalers (n=20)		Retailers (n=30)		All (N=50)	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Gender	Male	2	10	4	13.3	6	12.0
	Female	18	90	26	86.7	44	88.0
Age	18-29	0	0	6	20	6	12.0
	30-39	10	43	20	66.7	30	60.0
	40-49	6	34	3	10	9	18.0
	50-59	4	13	1	3.3	5	10.0
Marital status	Single	2	10	17	56.7	19	38.0
	Married	14	70	5	16.7	19	38.0
	Divorced/ Separated	0	0	2	6.7	2	4.0
	Widowed	4	20	6	20	10	20.0
Level of education	No formal education	2	10	2	6.7	4	8.0
	Basic	6	30	14	46.7	20	40.0
	Secondary	10	50	12	40	22	44.0
	Tertiary	2	10	2	6.7	4	8.0

Table 2: Characteristics of imported chicken wholesalers and retailers.

Source: Survey Data, 2019.

The imported chicken value chain

Results from discussions with various actors and key informants in the imported chicken value chain revealed that the chain has undergone several developments over the years to produce diverse channels of distribution to the final consumer. Figure 1 shows the value chain map for imported chicken in the Kumasi Metropolis. The map shows the flow of goods and services of imported fresh chicken and processed products from importers in Tema (port city in Gt. Accra Region) to final consumers in Kumasi (Ashanti Region) through a sequence of intermediaries and linkages. The main activities in the imported chicken value chain include service provision, importation of frozen chicken, distribution (trading) of the fresh imported chicken, processing of fresh imported chicken into desirable forms and the distribution and sale of the desired imported chicken products to the final consumer. The main processed products derived from fresh chicken on the domestic market include grilled chicken, fried chicken, smoked/roasted chicken (khebab) and boiled chicken in soups and stews. Usually, wholesalers sell imported chicken in cartons to retailers in urban and satellite markets; retailers in turn sell the chicken parts to individual final consumers. In rural areas, retailers even slice or cut the already cut parts into smaller units to make them affordable to households in the lower income bracket.

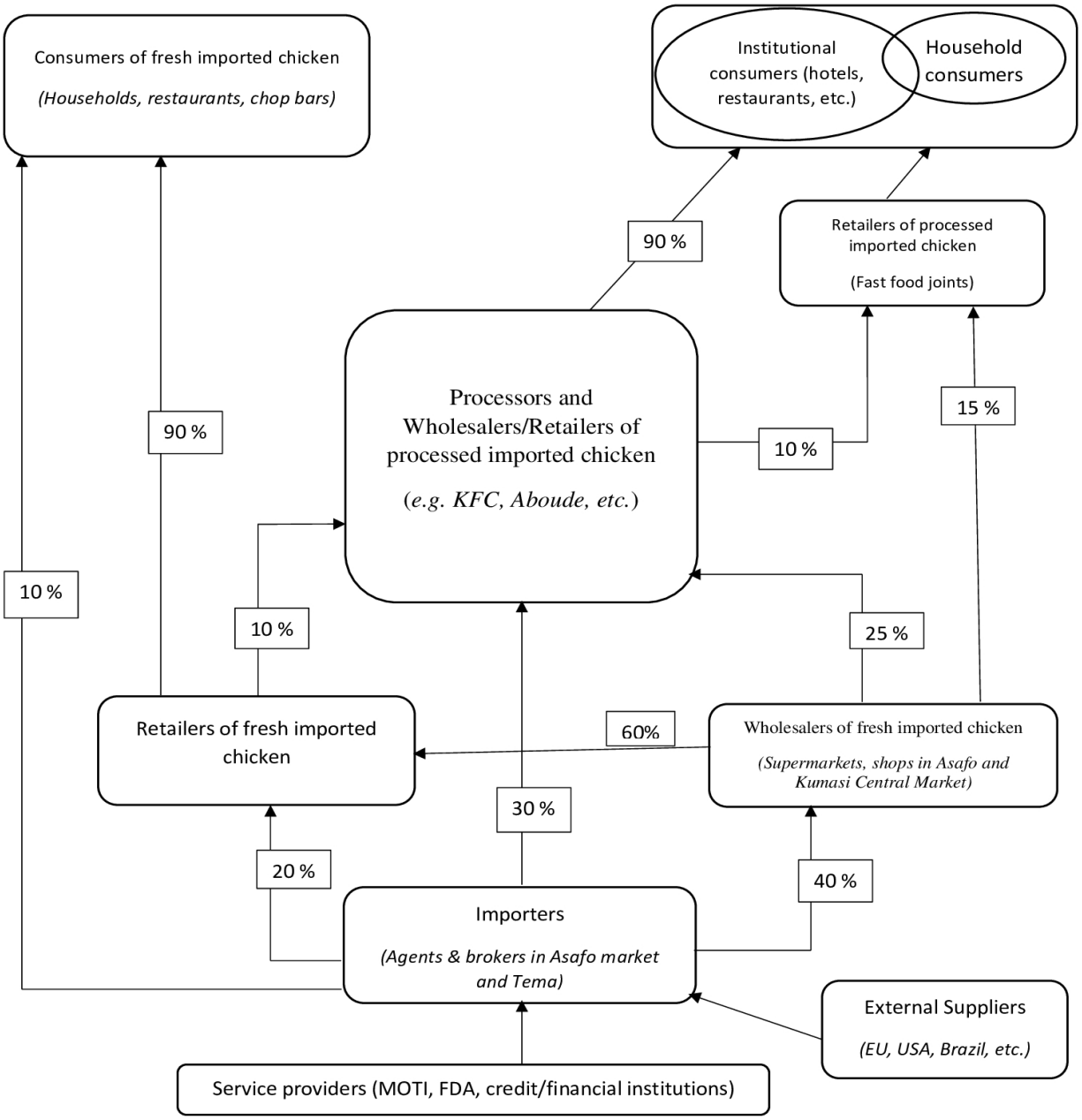

Figure 1: Imported chicken value chain map.

Source: Authors' construct based on Field Data, 2019.

In the chicken cold chain business, the number of firms involved in importation and wholesaling are few, constituting about 12%, with the retailers of fresh and processed chicken forming a dominant segment of about 78%. However, these are the big players in the chain with very high storage capacities and resources in terms of finance, transport and other distribution logistics. Conversely, many retailers in the business have very limited cold storage capacities and financial resources. The frozen chicken is mostly imported from Brazil, Europe and the United States of America with a smaller amount coming from China. Some of the big players engaged in frozen chicken importation and distribution include Adommbroso, Alhaji Salia and Sarfo Nyame enterprises, who have their headquarters in the main seaport city of Tema. Processors/wholesalers inform importers about the sizes and forms of chicken they should supply to fit their various processing activities and consumer demand.

Importers or their agents supply directly to big wholesalers, supermarkets and processors under different contract arrangements, which are mostly verbal. These contracts spell out the responsibilities of trading partners in terms of time of delivery, prices and payment terms.

The imported chicken supplied by the importers enters the local market to be sold in its raw state by wholesalers and retailers to food vendors, households/individual consumers and institutional buyers, such as schools, restaurants, supermarkets and hospitals. At that node of the chain, fresh imported frozen chicken is sold in cartons/boxes based on standardised sizes and weight demanded by buyers.

The main processed products derived from fresh chicken on the domestic market include grilled chicken, fried chicken, smoked/roasted chicken (khebab) and boiled chicken in soups and stews. When identified and mapped, the linkages reveal that the main markets in Kumasi within which most trading activities are performed include the Central market, Asafo market, Bantema market, Atonso market and Ahodwo market, among others. These market centres have different supermarkets and shops of different capacities engaged in the wholesaling of imported chicken. From these shops/supermarkets, smaller business enterprises across different communities in and around Kumasi who are engaged in the retailing of imported chicken source their supplies on a weekly or bi-weekly basis. Many fast food joints across Kumasi city also procure imported frozen chicken from either the big wholesalers in the main markets or from smaller shops in satellite markets to prepare food for the consuming public. The common foods served with chicken in Kumasi include different types of rice meal (fried, plain, jollof, waakye) and fufu. Whereas the fried and grilled chicken forms are commonly served with rice meals, fufu consumers are usually served with chicken in boiled soup (usually light tomato soup). The smoked/roasted (khebab) chicken is usually taken with either soft drinks or alcoholic beverages at pubs/drinking spots, which are very common along the main streets in Kumasi; usually these are consumed in the evenings and during weekends.

An important channel of distribution of imported chicken in Kumasi is through the giant Kentucky Fried Chicken (KFC), which has a number of branches in the city where ultra-processed chicken products of different kinds and flavours are retailed to final consumers. During weekends and holidays, different branches of KFC in Kumasi and other fast-food joints, like Aboude restaurant (which uses a lot of chicken), are patronised by many youth and family members, who consume large quantities of chicken with sugar-sweetened beverages (SSBs). The implications of this changing consumption/dietary pattern for obesity are quite obvious.

In the larger enabling business environment, the Ministry of Trade and Industry (MOTI) is tasked with formulating and implementing policies regarding the importation of frozen chicken from other countries and the Food and Drugs Authority (FDA) is responsible for quality assurance in the internal trade and distribution of imported chicken within the country. Periodically, the FDA visits traders (wholesalers and retailers) and processors to ensure that some basic food safety standards, product quality specifications and sanitary control measures are followed. The public health unit of the Kumasi Metropolitan Assembly periodically organises training programs for traders and food vendors to promote public health. Financial resources (credit) are supplied by both formal and informal financial institutions to some actors in the chain to enhance their operations.

Unhealthy cooking and handling practices along the imported chicken value chain

To examine the practices and key drivers along the imported chicken value chain that contribute to the obesogenic food environment, food handling and cooking practices performed by each actor were identified. Frequency of practice and reasons/motivation for actors to adopt different food handling and cooking practices are summarised in table 3. Generally, unhealthy food cooking and handling practices are more common at the retail node of the chain than at the wholesale node. This is because it is at the retail node that there is an interface between the trader and the final consumer. At this point, different retailers try to stay relevant in the marketplace by responding to consumer preferences and tastes developed over many years.

Unhealthy Practices	Frequency of Practice				Main Reasons for Practising
	Food Vendor/ Retailer (n=30)		Wholesalers (n=20)		
	Mean	Std. Deviation	Mean	Std. Deviation	
Cooking Practices					
Deep frying for a prolonged time	1.62	1.185	4.50	1.051	Increase palatability to appeal to consumers; increase shelf life
Addition of artificial additives during cooking	1.62	0.660	3.60	1.465	Increase palatability; that is the only method I know
Using too much cooking oil and fat during cooking	2.53	1.414	3.70	1.380	Increase palatability; that is the only method I know, appealing to consumers
Cooking with too much salt	4.31	0.471	4.70	0.470	I do that by mistake
Extra frying for consumers	4.34	0.602	5.00	0.000	That is what the consumer wants
Cooking with too much spices	3.16	1.081	4.40	0.681	Increase palatability and that is the only method I know
Handling Practices					
Serving consumers with extra fat	4.06	1.318	5.00	0.000	That is what the consumer wants
Serving consumers with extra salt	4.66	0.483	5.00	0.000	That is what the consumer wants

Table 3: Unhealthy cooking and handling practices that contribute to obesity.

Note: *Ranking scale for practice frequency: (1=Always, 2= Often, 3= Quiet often, 4= rarely and 5=Never)

Source: Generated from Field data, 2019.

From table 3, wholesalers never deep-fry their chicken for a prolonged time, but retailers/food vendors reported that they do this. The reason behind this unhealthy practice of deep frying chicken for a prolonged time was mainly to increase palatability of the chicken by making it crispy in order to increase consumer appeal. It is also meant for the product to cook very well and be able to store longer just in case the fried chicken is not sold on the same day it is prepared. In terms of using too much additives during cooking, the wholesalers rarely do that. However, food vendors often use too much additives during cooking to enhance the taste of the food. The majority of the food vendors also indicated that the only method they know to increase the palatability of their food is to use a lot of additives during cooking. Apart from natural spices like chilli pepper, garlic and ginger, Monosodium glutamate (MSG) is the commonest food additive or spice used by food vendors in Ghana. The MSG comes in different forms under different trade names in Ghana (e.g. Maggie cube, Onga,

Remmie, etc.). MSG consumption has been associated with weight gain and metabolic syndrome in some observational studies [26]. It is said to be safer for consumers when used in moderation. Other additives used to process chicken meat include artificial colours, flavours and sodium nitrate. Artificial food coloring is used to brighten and improve the appearance of food. However, it may promote hyperactivity in sensitive children and can cause allergic reactions [27]. Frequently found in processed meats, sodium nitrite acts as a preservative to prevent the growth of bacteria while also adding a salty flavor and reddish-pink color. When exposed to high temperature and in the presence of amino acids, nitrites can turn into nitrosamine, a compound that can have negative effect on health. Some studies suggest that nitrosamine exposure may be linked to a higher incidence of type 1 diabetes [28].

With respect to using cooking oil, the wholesalers reported that they rarely use it. However, food vendors often add too much oil during cooking, indicating that it preserves the food from spoilage and increases consumer appeal. When asked whether they do extra frying of the chicken for consumers, the wholesalers stated that they never extra fry, whereas food vendors stated that they extra fry the chicken for consumers though only rarely and only at the request of the consumer. Extra frying occurs when customers request the vendor to fry the meat a second time (double frying) if they think it is not hard or crispy enough. Both wholesalers and retailers rarely serve buyers with extra fat unless it is requested by the latter. In terms of serving the chicken to consumers with extra salt, the respondents (wholesalers and food vendors) indicated that they never serve extra salt to buyers.

Knowledge of actors along the imported chicken value chain

Figure 2 and table 4 show the level of knowledge of actors on food cooking and handling practices. Generally, the knowledge level of wholesalers and retailers is very high in the imported chicken value chain. However, the knowledge level about un (healthy) food cooking and handling practices was very high at the retail node of the chain compared to the wholesale segment even though wholesalers had a higher level of education than retailers. In terms of the unhealthy cooking practices, 60% of the wholesalers and 57% of the food retailers indicated correctly that deep frying the chicken for a very long time can affect the nutritional quality of the food adversely. This means that about 43% of the retailers did not know that deep frying affects the quality of food adversely. This has serious implications for consumers who buy chicken that is deeply fried from such retailers in the Ghanaian food environment. The majority of the wholesalers (60%) and retailers (76.7%) were knowledgeable about the use (misuse) of additives and preservatives during cooking. The respondents were aware that using too much additives and preservatives during cooking can affect the consumer by promoting obesity and other health problems. These results also show that about 20-30% of the retailers had little or no knowledge about the adverse effects of too much additives and preservatives in food preparation. The respondents (wholesalers-60% and retailers-70%) also knew that storing cooking oil in a moist container and in sunlight can affect the quality of the oil. All the wholesalers and 93% of the retailers were aware that using the same oil for a prolonged period of time had adverse consumer health implications (Figure 2). However, Clayton et al. [29], reported that about 63% of food-handlers demonstrating knowledge about food safety did not show a corresponding positive behaviour towards food safety practices. This shows that food-handlers might not necessarily be practising strict food safety procedures during food cooking and handling even when they provide answers to show that they are knowledgeable in this study.

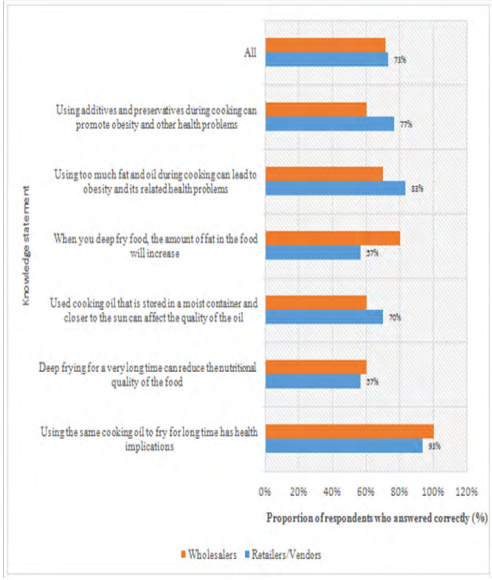

Figure 2: Chain actors' knowledge of unhealthy food cooking and handling practices.

Source: Generated from field data, 2019.

Correct Knowledge Statement	% of Retailers/ Vendors in Agreement	% of Wholesalers in Agreement
Not washing your hands before touching food will contribute to food contamination.	77%	30%
When handling food, it is essential that you use gloves	60%	40%
Cleaning utensils using detergents can decrease the risk of food contamination.	87%	80%
When storing chicken, freezing changes the quality	73%	50%
Cooking food using microwaves at a long cooking time can reduce the nutritional value.	90%	80%
When serving, wiping your hands with clean cloth matters.	50%	40%
Storing food in a dirty, moist container that is not airtight can affect the quality of the food.	93%	80%
It matters where chicken are stored in the refrigerator	67%	40%
When you freeze chicken for a long period, the nutritional content is affected.	37%	60%
Nutrients can be washed out of food by fluids that are poured away during cooking.	63%	90%
Overcooking of food can reduce the nutrients in the food.	70%	50%
Cooking for a long period with a lot of water can negatively affect nutrient retention.	67%	60%
Eating too much smoked chicken can cause cancer and its related health problems.	57%	50%
All	**70%**	**61%**

Table 4: Chain actors' knowledge about other general food safety issues/practices.

Source: Field survey data, 2019.

The majority of wholesalers and food retailers in this study knew the importance of general sanitary practices, such as regular hand washing, wearing of gloves and detergent use. This awareness of such important hygienic practices is essential because the hands of food-handlers can serve as a medium to spread food borne diseases through poor personal hygiene or cross-contamination [30,31]. Therefore, it is prudent to combine proper hand washing with the wearing of gloves and other hygienic practices to minimise the risk of contamination during food handling [32,33].

Perceptions of actors along the imported chicken value chain

Figure 3 illustrates the perception of the wholesalers and food retailers about the contribution of their food handling and cooking practices to the risk of obesity. On a 5-point Likert scale (5=strongly agree and 1=strongly disagree), both wholesalers and food vendors were largely indifferent to or unsure about the contribution of various negative cooking and handling practices to the risk of obesity. They strongly agreed to most of the negative statements related to practices that expose consumers to the risk of obesity. For instance, both wholesalers and retailers had the perception that cooking with too much oil and also not draining the oil from the chicken meat after deep frying improves the taste of the product. Food vendors with this perception are likely to continue in these unhealthy food cooking practices in the chicken value chain.

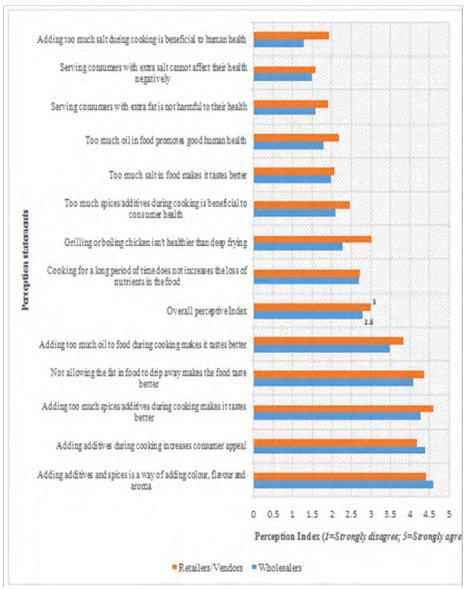

Figure 3: Chain actors' perceptions on practices that contribute to the risk of obesity.

Source: Generated from survey data, 2019.

Also, the vendors had a positive perception about the use of additives and spices to improve the taste of chicken products. While this view might be correct, it only suggests how difficult it would be to discourage their excessive use to minimise the negative health risks faced by consumers of such products. An interaction with some of the respondents (food retailers) indicated that consumers prefer to purchase processed chicken (fried) from them because of its spicy and delicious taste. However, some of the respondents were of the opinion that, though adding too much cooking oil during cooking makes the food taste better and increases its appeal to consumers, this practice has a negative implication for the consumers' health. However, they continue do it because that is what some of their consumers/customers prefer. The wholesalers disagreed that grilling or boiling imported chicken is less healthy than deep frying the imported chicken. The wholesalers had the perception that grilling or boiling takes away most of the fat in the chicken compared to deep frying, which rather adds extra fat to the chicken. This perception implies that deep frying is likely to continue despite its potential obesogenic properties. From figure 3, it may be evident that value chain actors have a negative perception about too much salt and fat. They rightly disagreed with the positive statements about too much salt and extra fat in relation to human health.

Comparing the knowledge and practices of key chicken value chain actors, a huge gap was observed. This contrast could possibly be explained by the neutral perceptions regarding the contribution of the unhealthy practices along the chain to the risk of obesity. Many of the food vendors did not consider their current unhealthy practices to have anything to do with the risk of obesity among consumers in the food environment. In the face of this reality, behaviour change is likely to be quite difficult unless vigorous public sensitisation and educational campaigns as well as training programs are embarked upon.

Interaction with the wholesalers revealed that even though they face challenges like inadequate cold storage facilities and weak regulatory guidelines, limited knowledge about the recommended food handling and cooking practices and limited access to food safety training were the main constraints they faced in their attempt to improve on their current practices. For food retailers, limited access to better food handling and safety training is the most constraining factor in their bid to implement healthier food handling practices.

Conclusion and Recommendations

The study has provided a detailed value chain map for imported frozen chicken for KMA and Ghana in general. The chain is largely controlled by a few importers and large-scale distributors with huge cold storage facilities and transport logistics. Medium-scale wholesalers and retailers/food vendors play a critical role in the value chain by linking the major distributors to different categories of consumers/customers. The majority of the wholesalers of imported chicken and food retailers who use imported chicken have good knowledge about (un) healthy food cooking and handling practices. However, their current cooking and handling practices, especially at the retail node of the value chain, are largely unhealthy, thereby exposing consumers to serious risks of obesity. This dichotomy between knowledge and practice is not surprising, since the retailers/vendors were generally indifferent/unsure about the perceived contribution of their current food cooking and handling practices to the risk of obesity. Limited access to healthy food handling and safety training as well as weak regulatory guidelines on better cooking methods hamper retailers' efforts to implement healthy food cooking and handling practices to promote public health. In addition to periodic sensitisation and vigorous educational campaigns, special training programs on healthy food cooking and handling practices should be delivered periodically to food vendors in urban communities to promote healthy diets and reduce exposure to the risk of obesity in Ghana. The Public Health Unit of Metropolitan/Municipal/District Assemblies and Food and Drugs Authority (FDA) should collaborate closely with nutrition experts in this regard to ensure that we achieve and sustain behavioural change among value chain actors in the food industry.

Acknowledgement

This paper was generated from a bigger research project dubbed "Researching the Obesogenic Food Environment (ROFE) in South Africa and Ghana: Its drivers and policy levers", which was financially supported by the International Development Research Center (IDRC), Canada.

References

1. Ruel MT, Alderman H, Maternal and Child Nutrition Study Group (2013) Nutrition-sensitive interventions and programmes: How can they help to accelerate progress in improving maternal and child nutrition? Lancet 382: 536-551.
2. Kaplinsky R, Morris M (2001) A handbook for value chain research. Paper prepared for the International Development Research Centre (IDRC).
3. Hawkes C, Ruel M (2011) Value chains for nutrition. 2020 Conference: Leveraging Agriculture for Improving Nutrition and Health.
4. Food and Agriculture Organization (2014) Poultry Sector Ghana, FAO Animal Production and Health Livestock Country Reviews.
5. Food and Agriculture Organization (2009) The state of food and agriculture: Livestock in the balance.
6. Banson KE, Muthusamy G, Kondo E (2015) The import substituted poultry industry; evidence from Ghana. International Journal of Agriculture and Forestry 5: 166-175.
7. Kwadzo G, Dadzie F, Osei-Asare Y, Kuwornu JKM (2013) Consumer preference for broiler meat in Ghana: A conjoint analysis approach. International Journal of Marketing Studies 5: 66-73.
8. United States Department of Agriculture (2015) Historical population and growth rates in Population for baseline countries/regions 1969-2014. Washington DC, USA
9. Marinou K, Tousoulis D, Antonopoulos AS, Stefanadi E, Stefanadis C (2010) Obesity and cardiovascular disease: from pathophysiology to risk stratification. Int J Cardiol 138: 3-8.
10. Hawkes C (2006) Uneven dietary development: Linking the policies and processes of globalization with the nutrition transition, obesity and diet-related chronic diseases. Glob Health 2: 4.
11. Mchiza ZJ, Steyn NP, Hill J, Kruger A, Schönfeldt H, et al. (2015) A review of dietary surveys in the adult South African population from 2000 to 2015. Nutrients 7: 8227-8250.
12. Baker P, Friel S (2014) Processed foods and the nutrition transition: Evidence from Asia. Obes Rev 15: 564-577.
13. Monteiro CA, Moubarac JC, Cannon G, Ng SW, Popkin B (2013) Ultra-processed products are becoming dominant in the global food system. Obes Rev 14: 21-28.
14. Webster JL, Dunford EK, Neal BC (2010) A systematic survey of the sodium contents of processed foods. Am J Clin Nutr 91: 413-420.
15. World Health Organization (2016) Evaluation of certain food additives and contaminants. Eightieth Report of the Joint FAO/WHO Expert Committee on Food Additives. World Health Organization, Geneva, Switzerland.
16. Bearth A, Cousin ME, Siegrist M (2014) The consumer's perception of artificial food additives: Influences on acceptance, risk and benefit perceptions. Food Quality Preferences 38: 14-23.
17. World Health Organization (2013) Global Action Plan for the Prevention and Control of No communicable diseases 2013-2020. WHO, Geneva, Switzerland.
18. Iwu AC, Uwukwe KA, Duru CB, Diwe KC, Chineke HN, et al. (2017) Knowledge, attitude and practice of food hygiene among food vendors in Owerri Imo State, Nigeria. Occupational Disease and Environmental Medicine 5: 11-25.
19. Monteiro CA, Levy RB, Claro RM, Castro IR, Cannon G (2010) A new classification of foods based on the extent and purpose of their processing. Cad Saude Publica 26: 2039-2049.
20. Mirmiran P, Azadbakht L, Azizia F (2007) Dietary behaviour of Tehranian adolescents does not accord with their nutritional knowledge. Public Health Nutr 10: 897-901.
21. Zaborskis A, Lagunaite R, Busha R, Lubiene J (2012) Trend in eating habits among Lithuanian school-aged children in context of social inequality: Three cross-sectional surveys 2002, 2006 and 2010. BMC Public Health 12: 52.
22. United Nation Industrial Development Organization (2009) Agro-value chain analysis and development. The UNIDO Approach. UNIDO, Vienna, Austria.
23. Soares LS, Almeida RC, Cerqueira ES, Carvalho JS, Nunes IL (2012) Knowledge, attitudes and practices in food safety and the presence of coagulase-positive staphylococci on hands of food handlers in the schools of Camaçari, Brazil. Food Control 27: 206-213.
24. Baluka SA, Miller R, Kaneene JB (2015) Hygiene practices and food contamination in managed food service facilities in Uganda. African Journal of Food Science 9: 31-42.
25. Webb M, Morancie A (2015) Food safety knowledge of foodservice workers at a university campus by education level, experience, and food safety training. Food Control 50: 259-264.
26. He K, Zhao L, Daviglus ML, Dyer AR, Horn LV, et al. (2008) Association of monosodium glutamate intake with overweight in Chinese adults: The INTERMAP Study. Obesity (Silver Spring) 16: 1875-1880.
27. Schab DW, Trinh NHT (2004) Do Artificial Food Colors Promote Hyperactivity in Children With Hyperactive Syndromes? A Meta-Analysis of Double-Blind Placebo-Controlled Trials. J Dev Behav Pediatr 25: 423-434.
28. Bahadoran Z, Ghasemi A, Mirmiran P, Azizi F, Hadaegh F (2016) Nitrate-nitrite-nitrosamines exposure and the risk of type 1 diabetes: A review of current data. World J Diabetes 7: 433-440.
29. Clayton DA, Griffith CJ, Price P, Peter AC (2002) Food handler's belief and self-reported prices. Int J Environ Health Res 12: 25-39.
30. Baş M, Ersun AŞ, Kıvanç G (2006) The evaluation of food hygiene knowledge, attitudes, and practices of food handlers in food businesses in Turkey. Food Control 17: 317-322.
31. Frobisher FR, Fuerst Õs (1983) Microbiology in health and disease: Foods as vectors of microbial disease. Sanitation in food handling (15th ed.). W.B. Saunders Company. Philadelphia, USA.
32. Montville R, Chen Y, Schaffner DW (2001) Glove barriers to bacterial cross-contamination between hands to food. J Food Prot 64: 845-849.
33. United States Department of Agriculture (2015) Historical population and growth rates in population for baseline countries/regions 1969-2014. Washington DC, USA.

Advances In Industrial Biotechnology | ISSN: 2639-5665

Advances In Microbiology Research | ISSN: 2689-694X

Archives Of Surgery And Surgical Education | ISSN: 2689-3126

Archives Of Urology

Archives Of Zoological Studies | ISSN: 2640-7779

Current Trends Medical And Biological Engineering

International Journal Of Case Reports And Therapeutic Studies | ISSN: 2689-310X

Journal Of Addiction & Addictive Disorders | ISSN: 2578-7276

Journal Of Agronomy & Agricultural Science | ISSN: 2689-8292

Journal Of AIDS Clinical Research & STDs | ISSN: 2572-7370

Journal Of Alcoholism Drug Abuse & Substance Dependence | ISSN: 2572-9594

Journal Of Allergy Disorders & Therapy | ISSN: 2470-749X

Journal Of Alternative Complementary & Integrative Medicine | ISSN: 2470-7562

Journal Of Alzheimers & Neurodegenerative Diseases | ISSN: 2572-9608

Journal Of Anesthesia & Clinical Care | ISSN: 2378-8879

Journal Of Angiology & Vascular Surgery | ISSN: 2572-7397

Journal Of Animal Research & Veterinary Science | ISSN: 2639-3751

Journal Of Aquaculture & Fisheries | ISSN: 2576-5523

Journal Of Atmospheric & Earth Sciences | ISSN: 2689-8780

Journal Of Biotech Research & Biochemistry

Journal Of Brain & Neuroscience Research

Journal Of Cancer Biology & Treatment | ISSN: 2470-7546

Journal Of Cardiology Study & Research | ISSN: 2640-768X

Journal Of Cell Biology & Cell Metabolism | ISSN: 2381-1943

Journal Of Clinical Dermatology & Therapy | ISSN: 2378-8771

Journal Of Clinical Immunology & Immunotherapy | ISSN: 2378-8844

Journal Of Clinical Studies & Medical Case Reports | ISSN: 2378-8801

Journal Of Community Medicine & Public Health Care | ISSN: 2381-1978

Journal Of Cytology & Tissue Biology | ISSN: 2378-9107

Journal Of Dairy Research & Technology | ISSN: 2688-9315

Journal Of Dentistry Oral Health & Cosmesis | ISSN: 2473-6783

Journal Of Diabetes & Metabolic Disorders | ISSN: 2381-201X

Journal Of Emergency Medicine Trauma & Surgical Care | ISSN: 2378-8798

Journal Of Environmental Science Current Research | ISSN: 2643-5020

Journal Of Food Science & Nutrition | ISSN: 2470-1076

Journal Of Forensic Legal & Investigative Sciences | ISSN: 2473-733X

Journal Of Gastroenterology & Hepatology Research | ISSN: 2574-2566

Journal Of Genetics & Genomic Sciences | ISSN: 2574-2485

Journal Of Gerontology & Geriatric Medicine | ISSN: 2381-8662

Journal Of Hematology Blood Transfusion & Disorders | ISSN: 2572-2999

Journal Of Hospice & Palliative Medical Care

Journal Of Human Endocrinology | ISSN: 2572-9640

Journal Of Infectious & Non Infectious Diseases | ISSN: 2381-8654

Journal Of Internal Medicine & Primary Healthcare | ISSN: 2574-2493

Journal Of Light & Laser Current Trends

Journal Of Medicine Study & Research | ISSN: 2639-5657

Journal Of Modern Chemical Sciences

Journal Of Nanotechnology Nanomedicine & Nanobiotechnology | ISSN: 2381-2044

Journal Of Neonatology & Clinical Pediatrics | ISSN: 2378-878X

Journal Of Nephrology & Renal Therapy | ISSN: 2473-7313

Journal Of Non Invasive Vascular Investigation | ISSN: 2572-7400

Journal Of Nuclear Medicine Radiology & Radiation Therapy | ISSN: 2572-7419

Journal Of Obesity & Weight Loss | ISSN: 2473-7372

Journal Of Ophthalmology & Clinical Research | ISSN: 2378-8887

Journal Of Orthopedic Research & Physiotherapy | ISSN: 2381-2052

Journal Of Otolaryngology Head & Neck Surgery | ISSN: 2573-010X

Journal Of Pathology Clinical & Medical Research

Journal Of Pharmacology Pharmaceutics & Pharmacovigilance | ISSN: 2639-5649

Journal Of Physical Medicine Rehabilitation & Disabilities | ISSN: 2381-8670

Journal Of Plant Science Current Research | ISSN: 2639-3743

Journal Of Practical & Professional Nursing | ISSN: 2639-5681

Journal Of Protein Research & Bioinformatics

Journal Of Psychiatry Depression & Anxiety | ISSN: 2573-0150

Journal Of Pulmonary Medicine & Respiratory Research | ISSN: 2573-0177

Journal Of Reproductive Medicine Gynaecology & Obstetrics | ISSN: 2574-2574

Journal Of Stem Cells Research Development & Therapy | ISSN: 2381-2060

Journal Of Surgery Current Trends & Innovations | ISSN: 2578-7284

Journal Of Toxicology Current Research | ISSN: 2639-3735

Journal Of Translational Science And Research

Journal Of Vaccines Research & Vaccination | ISSN: 2573-0193

Journal Of Virology & Antivirals

Sports Medicine And Injury Care Journal | ISSN: 2689-8829

Trends In Anatomy & Physiology | ISSN: 2640-7752

Submit Your Manuscript: https://www.heraldopenaccess.us/submit-manuscript