CONSUMER PREFERENCE FOR SWINE OFFALS AND ITS HEALTH IMPLICATIONS IN KUMASI, GHANA

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ABSTRACT

Global meat consumption rate had doubled in most countries over the last five decades. In Ghana, total animal production has also increased over the last decade with consumption of pork and its offals becoming prominent. Therefore this study aims to evaluate factors that influence consumer preference for pig offals and the associated public health risks. One hundred (100) respondents in the Kumasi Metropolis were randomly selected through structured questionnaires and samples of offals randomly collected, sectioned, processed and examined for any histopathological indicators. Data collected were analyzed through the use of descriptive statistical tools. The results showed that edible offal preferential consumption exist within the increasing demand and value supply chain with the liver (32%) and stomach (23%) being the most preferred offal. Factors such as nutritional value, delicacy, availability, cost and level of education are noted to influence the purchasing power and preference of consumers. The consumers are less conscious regarding the risks stemming from the common zoonotic diseases and health concerns. Histological assessment of the most preferred offals (liver) showed no remarkable histopathological changes. Based on this, the preference for pig livers may not be associated with considerate health risk.

Keywords: Consumer, Histopathology, Kumasi, Pig offal preference

INTRODUCTION

Meat is a term most often used to describe the skeletal muscle tissue of an animal meant for consumption. It is mostly composed of roughly 75% water, 20% protein, and 5% fat, carbohydrates, and assorted proteins. Meat is not homogeneous as different types of meat vary in composition depending on the source and fatty acid composition (De-Smet et al., 2002).

Meats have been reported to be high in nutritional value ranging from amino acids, vitamins, minerals, anti-oxidants such as ubiquinone among others. As such, reports have showed that over the last five decades, meat consumption rate in some countries such as China have doubled, while other have shown significant increase in meat consumption per capital. Although Ghana showed a slight meat consumption per capital drop from 10.6 % to 9.9 % within the same period of review while total meat production had increased from 77,723 tonnes in 2001 to 244,742 tonnes in 2010 (Brown, 2009; Adzitey, 2013). Pork meat is known to be the fourth most consumed meat type after game, chicken and beef respectively. However, with a population growth rate estimate of 0.912% as at 2013, a population density growth of 36 persons per square
In 1970, the population density in Ghana was 78 persons per square kilometer. By 2012, this had increased to 78 persons per square kilometer according to Wikipedia, Ghana Embassy, and the World Bank. This growing global concern for wildlife conservation has led to a shift in the types of meat consumed by Ghanaians. While the consumption of wildlife meat was once predominant, it is now gradually being replaced by other meat sources such as chicken and beef over the last decade (Adzitey, 2013).

Moreover, the increased consumption of meat has also led to an increase in associated health risks. Infectious and non-infectious diseases have been on the rise, such as Creutzfeldt-Jakob disease, colorectal cancers, helminthosis, cardiovascular diseases, macular eye degeneration (Engelking, 2015) and others. These diseases are related to the increased demand for meat offal both globally and locally.

Meat offal, also known as assortment or organ meat, is a term used to describe meat from smooth muscles and internal organs such as gut, digestive tracts, lungs, heart and kidney. Offal is a rich source of amino acids, vitamins, minerals, and some miniaturized scale supplements, making it a highly bioavailable source of nutrition that cannot be adjusted for by plant-derived pro vitamins (Biesalski, 2005).

However, public health implications of pig offal could mask the nutritional benefits of meat in a developing country such as Ghana. Issues of meat safety and quality have not received the same level of attention as compared to developed countries, leading to the reemergence of zoonotic infectious diseases (Adzitey, 2013). The incidence of offal-borne diseases continues to adversely affect health and productivity in the country and beyond. Offal could be a source of some zoonotic diseases such as cysticercosis, brucellosis, fascioliasis, tuberculosis, and others as it is often consumed undercooked (Phiri et al., 2006).

To this end, this study was designed to assess factors that influence consumer preference for offal across major determinants such as occupational, educational, and tribal background and to assess the associated potential risk.

**MATERIALS AND METHODS**

**Study Design:** The survey is a cross-sectional study, which sought to evaluate the preferential consumption of pig offal and associated diseases in the various retailed markets in the Kumasi metropolis. Structured questionnaires were administered to 100 consumers of pig offal who were randomly selected prior to sample collection. Based on data from preferential consumption survey for specific pig offal, samples of such were collected from selected butcher shops and vendors within the metropolis for histopathological assessment.

**Study Area:** The Kumasi metropolis has an area of approximately 254 square kilometers and is located between latitudes 60°35′ and 60°40′N and longitudes 10°30′ and 10°35′E (Figure 1). It was purposely selected because it is a densely populated city with a non-Muslim working class who have the means to afford animal protein. The city plays a major role in the food chain of Ghana as compared to the northern region of Ghana where a greater percentage of its population are Muslims and often pigs produced within the northern area are sent down to Kumasi where it has a ready market. 50 – 60% of pigs in Ghana are concentrated in the Ashanti and Brong-Ahafo regions of Ghana and over 90% of this lot is made up of Ashanti black pigs (Frimpong et al., 2012).

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**Figure 1:** Map showing the various locations in Kumasi metropolis (Wikipedia, 2015)
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Study Population: Adult grown-up members who demonstrated preference for pig offal were subsequently selected for this investigation, also included are sellers of the offal within Kumasi metropolis. Pig offal especially the livers used for histological assessments were obtained from randomly selected retailers or merchants in the Kumasi metropolis.

Sample Size Determination: The sample size required was determined using the formula: 
\[ n = \frac{t^2 \times p(1-p)}{m^2} \]
where \( n \) = required sample size, \( t \) = confidence level at 95% (standard value of 1.96), \( p \) = estimated prevalence in the project area was estimated at 5% (0.05) since there was no previous report on the condition in Ghana and \( m \) = margin of error at 5% (standard value of 0.05). Therefore, 
\[ n = \frac{(1.96)^2(0.05)(0.95)/0.05^2} = 73 \]
The adequate sample size is 73 and 100 respondents were sampled.

Experimental technique: The sampling lasted for five (5) months and a total of one hundred (100) well-structured questionnaires adapted from previous study with offals or ruminants (Ayroe et al., 2016) was modified, pre-tested and administered as a tool for evaluation of the preference of selected participants to swine offals. The respondents’ data was collected and analysed for preferential consumption of such offals.

Histopathological Assessment: The most preferred pig offal samples (liver) were randomly collected from various retail points and preserved in 10% buffered formalin, routinely processed and stained with Haematoxylin and Eosin (H&E) for histopathological evaluation using light microscopy (Dellman and Brown, 1987).

Data Analysis: The data collected was analysis in percentages utilizing the Statistical Package for Social Sciences (SPSS) version 20.0 suits and Microsoft Office Excel was used in the plotting of graphs.

RESULTS

Educational Impact on Preference: The educational background of respondents had impact on preferential consumption with reference to traditions and their purchasing power. Education plays a very important role in the preference of the various pig offals which is in cognisance of the health implication of the offals to the consumer (Figure 2).

The Source of Pig Offal: The fundamental sources of retail offal among others include open market (49.0%), butchers shop (39.0 %), own animal (3.0%) and the super market (9.0%). Pig offals were comparatively cheap and the proximity of offals access point to the consumer defines the patronage of the offal (Table 1).

Table 1: Major sites for the purchased of swine offals in Kumasi, Ghana

<table>
<thead>
<tr>
<th>Where do you often get your pig offals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open market</td>
<td>49</td>
<td>49.0</td>
</tr>
<tr>
<td>Butchers shop</td>
<td>39</td>
<td>39.0</td>
</tr>
<tr>
<td>Super market</td>
<td>9</td>
<td>9.0</td>
</tr>
<tr>
<td>Own animals</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Specific Preferential Consumption of Offal: Despite the fact that buyers of pig offals were from different walks of life, with different foundations, special utilization of offal exists among the respondents in Kumasi. Many respondents showed strong preference for the liver (32%) however, the heart was the least preferred offal accounting for 3% (Figure 3).
The reasons assigned by respondent for their preferences were nutritional value 41%, delicacy 53% and cost 5% (Figure 4). It implies that the cost factor has little influence in the purchasing of the offal. However, the nutritional value and the delicacy appear to have an influence on the offal purchase.

**DISCUSSIONS**

This investigation evaluates consumer preference of pig offals in Kumasi. In this study it was observed that preferences for offal do not always coincide with the actual dietary and food consumption pattern of the respondents. The preferred offal was the liver which further showed that the level of education positively impacted on the preference as most respondent were influence by knowledge of the delicacy and nutritional value than cost (Ayroe et al., 2016).

In this study also, it was observed that the source of the offals was more from the open market than butchers or supermarket which showed that accessibility, varieties and affordability of the offals in the open market might have accounted for the preference observed hence the consumers’ proximity to the pig offal sales points and affordability of offals may influence the purchase of offal from the cold stores as described in similar study in ruminants (Ayroe et al., 2016).

The preference shown in the study differ from similar studies with ruminant offals where forestomach was the most preferred (Ayroe et al., 2016), the forestomach of goats or cattle gives varieties than that of pig.

The occupation of respondent also positively influenced the choice for the liver as most of the respondent are experienced and are aware of the nutritive value than other offals. In a similar study from Ghana on the preference of offals from small ruminants, occupation of the respondents had correlated positively with preference (Ayroe et al., 2016).
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Figure 5: The influence of occupation on preference of pig offals in Kumasi, Ghana

Figure 6: The influence of tribe on preference of pig offals in Kumasi, Ghana

Figure 7: Gross and histopathological assessment of the most preferred offal (liver). Gross picture of the liver with milky spots (A) and photomicrograph of tissue section stained with Haematoxylin and Eosin (B and C) showing a normal liver. Mag. x 100
The tribal influence may not be easily ascertained as a result of the choice of study area where the Ashanti including Akan constituted the majority of the respondents. The pathological assessment of the most preferred offals also revealed that hepatic abscess associated with milk spots is not commonly encountered as most of the histological screening of the tissue revealed no significant pathological change hence it could be that livers from pigs in this area of study are safe.

Conclusions: This survey revealed that preferential consumption of pig offals exists within the Kumasi Metropolis. Preference for offal does not generally concur with the genuine dietary and sustenance utilization design. Various variables informed the purchasers’ inclination for the stomach (23%) and the liver (32%) which was the preferred consumable offals in this study. Delicacy, taste, nutritional value and educational background were noted to play a role in the buying force and inclination of purchasers. Histopathological assessment revealed no conceivable risk connected with the consumption of the most preferred of offals (liver). Based on this assessment, it is strongly recommended that pig offals especially liver should be patronize by consumers since its health risk are minimal.

REFERENCES


