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Pre and post-slaughter animal handling by butchers in the Bawku Municipality of the Upper East Region of Ghana

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Abstract

The objective of this study was to determine the pre-slaughter handling of animals and the hygienic level of meat production in the Bawku Municipality of the Upper East Region of Ghana. Thirty one (31) semi-structured questionnaires were administered to collect information from butchers on ante-mortem and post-mortem carcass handling. Personal observations were also made to assess meat processing and handling conditions.

The results indicated that, the standard of handling animals and producing meat in the area was relatively low. There is inappropriate pre-slaughter handling such as trekking animals over long distance before slaughter without adequate rest, arduous means of transporting live animals, mixing of different groups and kinds of animals during transport and non-withdrawal of feed just before slaughter. There is also poor hygienic standard of meat processing such as dressing of carcasses on filthy floors, inappropriate means of transporting carcasses and cuts to sale points, and the use of un-sterilized knives and slaughtering equipments in the cutting and processing of meat. The government and all stake holders must ensure that standard and hygienic methods of handling and processing meat in the Municipality are adhered to.

Key words: Animal handling, ante-mortem, post-mortem, hygienic, standard

Introduction

Pre-slaughter animal handling involves all the activities animals are subjected to prior to sticking (Adzitey 2011). Such activities start from the farm (medication, veterinary inspection, feeding, provision of water or their redrawal, loading), through marketing (transportation, selling of animals) and finally to the abattoir (offloading, lairaging, veterinary inspection and slaughtering).

Although it takes several days and efforts for farmers to produce animals that are efficient feed converters, have short time to maturity with minimum production cost and good body conformation; poor pre-slaughter handling prior to killing will have adverse effect on meat quality, affects consumers acceptance of such meats and reduce profits of farmers, meat processers and all stakeholders (Warriss 2000; Adzitey and Nurul 2011). Carcass and meat quality defects such as pale soft exudative, dark firm dry meat, skin blemish, bloodspalsh, bruising, cyanosis, two-toning, high microbial load, spoilage of meat, broken bones and death may occur from improper animal handling (Warriss 2000; Adzitey and Nurul 2011; Adzitey et al 2011; Forrest 2010).

In the developed world, there exist strict legal regulations on the hygienic standards of handling and processing of meat. In most developing countries especially in rural communities, standard and hygienic methods of handling and

processing meats are given less attention even though they are or form part of the country's rules and regulations on animal and meat production. For instance in most rural areas of Ghana, perhaps due to certain constrains such as inadequate education, unavailability of portable water and reliable power (electricity) supplier, meat processing is traditionally carried out in unhygienic conditions. Slaughter methods are sometimes dictated by religious beliefs and local customs without inspection by qualified veterinary officer.

This study was therefore carried out to assess the quality and safeness of meat produced in the Bawku Municipality of the Upper East Region of Ghana, specifically how; animals are handled prior to slaughter, meat is handle after slaughter and level of meat hygiene practices. Butchers as used in this text refers to all who are involved in the selling of live animals, slaughtering and selling of meats/meat products.

Materials and methods

The Study Area

The study was conducted in the Bawku Municipality of the Upper East Region of Ghana, which is bordered to the North by Burkina Faso, to the East by the Republic of Togo to the South by the Garu-Tempane District, and to the West by Bawku West District.

The vegetation is the Sahel Savanna type characterized by tree species such as neem (*Azadirachta indica*), shea (*Butryspermum paradoxom*), baobab (*Adansonia digitata*), kapok (*Ceiba pentandra*) and dawadawa (*Parkia clappertoniana*).

Geographically, the area lies on latitude 11^{o} 0' North of the Equator and has an average annual rainfall of 800 mm per annum. The mean daily temperature is 32^{o}C but fluctuates between 25 and 45^{o}C. The area has a total human population of 307,917 with a population density of 124 persons per kilometer square.

Sampling Procedure

A total of thirty one (31) respondents (butchers) were selected purposively and interviewed using semi- structured questionnaires. Observations were also made to further assess the pre-slaughter handling, meat processing, and the handling of meat and meat products. The data collected was analyzed using descriptive statistics and the results presented in the form of percentages in tables.

Results and discussion

Age and educational status of butchers

The survey revealed that majority (45%) of the butchers, were within the ages of 41-50, followed by 31-40 (23%), 51-60 (16%) and 21-30 (13%). Only one butcher (3%), referred to as the chief butcher was above 60 years. The chief butcher is the head and coordinates all activities of the slaughter house. The butchering profession in the Municipality was dominated by the youth and middle aged men who are more energetic as the butchering business requires much physical strength. This study agrees with reports by Salifu and Teye (2006), who reported that the butchering profession is quite energy demanding and may involve a lot of traveling to livestock markets several times in a week hence the inability of older men to cope.

Furthermore 64% of the butchers had no formal education, 23% had primary and 13% had junior secondary school education. None of the butchers had senior secondary and tertiary education. The results established that, the butchers have low level of education and this could hamper the acceptability of modern slaughtering practices as well as adherence to strict hygienic and standard slaughtering practices. In other districts in Ghana, it has also been

reported that butchers had no formal education (Salifu and Teye 2006; Abuska 2006).

Sex and religious background of butchers

All butchers (100%) in the municipality were males and thus no female participates in the butchering and the selling of meat. In addition, butchering and meat selling in the Bawku Municipality was done by people of the Islamic faith, suggesting that only halal meats are produced from the slaughter houses in the study area.

Sources of animals for slaughter

The sources of animals for slaugher are shown in table 1. From table 1, majority (63%) of the butchers obtain their animals from the Bawku livestock market, 13% from the livestock market and farmers home, and 15% from the Bawku market and other places. Few animals (6%) are obtained from other countries such as Burkina Faso and Togo (Putong and Wagaa). Beyuo (1999) and Salifu and Teye (2006) also reported that butchers in the Tamale Metropolis, obtain their animals from livestock markets within the Metropolis, Upper East Region (Bawku) and Burkina Faso. Therefore, animal production is a potential source of employment for farmers in the Bawku Municipality.

Table 1. Sources of animals for slaughter

Sources of animals	No. of butchers	Percentage
Bawku animal market	19	63
Animal market and farmer home	4	13
Benduri, Garu and Bawku animal market	2	6
Bawku animal market and Widaana	2	6
Putong and Wagaa (Togo)	1	3
Pusiga and Bawku animal market	1	3
Burkina Faso only	1	3
Bawku, Worinynga, Siabon and Garu	1	3
Total	**31**	**100**

Transporting of animals to slaughter house/slab

Majority (56%) of the butcher's trek their animals on foot to the slaughter house from the place of purchase. Nineteen percent (19%) of them use bicycles and sometimes trekking, while 10% of them use trekking and push trucks especially during accidents (Table 2). In general, trekking animals on hooves over long distances and the use of bicycles are the major means of transporting live animals to slaughter points. Such poor transportation means have also been reported in the Tamale Metropolis and the Garu-Tempane District (Beyuo 1999, Abuska 2006; Adzitey et al 2011).

Most (61%) butchers do not mix their animals during transport, because they buy them only from the Bawku livestock market. Thirty nine percent (39%) of the butchers often mix their animals from different markets or farm during and after transport.

The arduous means of transporting live animals and mixing animals of different groups are not appropriate as they may induce stress on the animal before they reach the point of slaughter. Consequently, carcasses or meats from such animals are prone to meat quality problems like pale soft exudative (PSE), dark firm dry (DFD) and shorter shelf life.

Table 2. Means of transporting animals

Means of transport	Number of butchers	Percentage
Trekking on hooves	17	56
Trekking and	6	19

bicycles		
Trekking and push trucks	3	10
Cargo and KIA trucks	2	6
Bicycles and motor bikes	1	3
Carts, trekking and push truck	1	3
Trekking and cargo trucks	1	3
Total	**31**	**100**

Duration of feed and water withdrawal before slaughter and lairaging

Feeding of animals till slaughter was practiced by 59% of the butchers, 2-3 hours before slaughter (3%), 1 hour before slaughter (3%), and 30 minutes to slaughter (3%). Thirty two percent (32%) of the butchers redraw feed throughout the night prior to slaughter. FAO (1991) specifies the withdrawal of feed 12-24 hours before slaughter. This will reduce the risk of contaminating the carcass with the gut content during evisceration, and reduce processing time and cost. The results revealed that most of the butchers were not following the recommendations as specified by (FAO 1999).

Fifty two percent (52%) of the butchers give their animals water few hours before slaughter while 48% do not give their animals water at all prior to slaughter. The practice of giving animals water some hours to slaughter agrees with the recommendation made by Ledger and Payne (1990) that, clean water should be freely available to animals throughout the waiting period till slaughter. Butchers who give water mentioned benefits of the practice as follows; it makes processing of rumen and intestine easier, it promotes proper bleeding to enhance meat storability and also it makes flaying very easy.

There was no recognized lairage in the Bawku abattoir. This means that, the standard practice of holding animals prior to slaughter is not being followed. Naamwintome (1998) reported that no butcher in the Northern, Upper West and Upper East Regions of Ghana examine an animal in lairage since this facility is non-existing. Additionally, Abuska (2006) reported that, the Garu main slaughter slab in the Upper East Region has no lairage and the conventional system of lairaging before slaughter does not exist. Nevertheless, 52% of the butchers said they do rest their animals throughout the night before bringing them the next morning for slaughter. Resting animals prior to slaughter enables them to recover from stress experienced during transportation and other forms of handling and reduces the incidence of meat quality problems such as if pale soft exudative and dark firm dry meats.

Pre-slaughter inspection and veterinary certification

All the butchers (100%) indicated that, they do obtain veterinary certificates from the animal markets before transporting their animals and these animals are inspected before slaughter. However, observation made at the slaughter house shows that, ante-mortem inspection of animals is not properly done as animals with injury and minor source of deformities and illnesses were seen being passed for slaughter. Most often veterinary inspectors give slaughter permits without thorough inspection. Nonetheless, butchers in the study area envisage ante-mortem inspection as a means of preventing zoonotic and other forms of diseases that can be contracted from the consumption of contaminated meat.

Stunning and religious method of slaughter

Stunning of animals prior to sticking was not practiced in the study. This is due to the total dominance of Muslims in the slaughtering, butchering and meat business. The butchers admitted that, stunning animals before slaughter is against their religion and slaughter requirements. They did not have much knowledge about the stunning of animals and the benefits on the quality and shelf life of meat. Stunning makes animals temporarily unconscious if properly

done so that they will not feel pain during sticking. It reduces struggling, eases slaughtering operations and promotes effective bleeding. Stunning in particular has been embrace by the animal activist as a way of promoting animal welfare, while some religious bodies (e.g. Muslims and Jews) disagree with stunning on religious grounds. Payne (1990) reported that, slaughter routine in many parts of the world is sometimes dictated by religious beliefs and local customs which was evident in this study.

Dressing of carcasses

Majority (68%) of the butchers dressed their carcasses by skinning or flaying, 16% by singeing and 16% use both flaying and singeing methods. It was observed that, flaying of small ruminants (mainly sheep and goats) is done by inflating air from the mouth through holes on the limbs. After which a knife is used to remove the skin from the carcass. The gaseous pocket on the surface of the carcass is thought to make the meat more attractive in appearance to local consumers. The danger of contaminated air penetrating the deeper parts of the carcass is considerable when the air is forced through by the mouth of the butcher instead of using a pump. Nonetheless, the butchers explained that, most consumers prefer flayed meat to singed meat due to the introduction of the scent of the material used and possibly meat poisoning in singed meat.

The results also indicated that, 65% of the butchers dress their carcasses (large ruminants) on the bare floor in the abattoir,16% of them dress their carcasses on unclean slaughter slabs and 19% of the carcasses are dressed on both the slaughter slab and bare floor. Carcasses were washed with unclean water during dressing, the slaughter floor and slabs were always smeared with blood, rumen contents and other waste from previous dressing. These practices increase the risk of carcass contamination. Sulley (2006) and Abuska (2006) reported that all slaughter men in the Tamale and Garu-Tempane district abattoir, respectively do not hoist their animals during carcass dressing although there were hoisting facilities.

Furthermore, the results revealed that, majority (74%) of the butchers hang their meat up on the hall after dressing, 20% of them leave their meat on the floor for post-mortem inspection to be carried out and 6% of them either hang or place the meat on the floor. The practice of leaving dressed carcass or meat on filthy slaughter slab is unhygienic, exposes meat to contaminants and the risk of being a source of foodborne pathogens, although meat inspectors (veterinary and public health inspectors) do inspect the meats after dressing.

Cleaning and washing of meat cutting tables, equipments and the frequency of personal cleaning

Majority (49%) of the butchers use knives to scrap off chipped meat, accumulated fat and dirt on their cutting tables and slaughtering equipments. Thirty five percent (35%) of the butchers indicated that, they clean their meat cutting tables and slaughtering equipments by scrubbing the surface with water, sponge and detergent. The remaining 16% apply both cleaning methods. Even though the butchers responded that they clean their tables and equipments, they were seen with blood stains, accumulated fat and dirt with flies hovering over the meat, tables and equipments.

With regards to the frequency of cleaning, 32% of the butchers wash and change their clothes and aprons once in a week, 30% of them wash or change their clothes and aprons every 2-3 days, and 19% change every day. Interestly, the remaining 19% of the butchers admitted that they change their aprons “when they feel it is dirty”.

Thus butchers in the study area do not observe adequate hygiene. Furthermore, the quality of meats produced in the study area is questionable due to the use of dirty clothings/aprons, unclean hands and some dirty slaughtering equipments. In the Tamale abattoir, Sulley (2006) reported that, personnel at the abattoir do not use and/or wear clean aprons, clothing, boots, mesh gloves and hair cap during meat processing. Such poor slaughtering and marketing of meats might have resulted in the isolation of various pathogens in beef, mutton and chevon sold in various markets of the Tamale Metropolis (Adzitey et al 2011). For good hygienic practices and production of high quality meat, butchers should maintain clean hands, wear clean protective clothing to cover both their body and hair, and used thoroughly cleaned and regularly sterilized slaughtering knives and equipments.

Transporting of meat to sale points

The popular means of transporting carcass from the abattoir to sale points is by the use of motor bikes and bicycles (33%). Other means include; push trucks, basins on butcher's heads, on the hands and shoulders of butchers (Table 3). Abuska (2006) reported similar practices in the Garu-Tempane District since there are no meat vans in this area. The bicycles, basins and most especially push trucks were always seen with blood stains from the previous meat transported.

Table 3. Means of transport of meat to sale points

Means of transport	Number of butchers	Percentage
Basins on the head	1	3
Hands and shoulders	1	3
Basins and push trucks	2	6
Motor bikes and heads	2	6
Push trucks only	6	19
Motor bikes, bicycles and push trucks	9	30
Motor bikes and bicycles	10	33
Total	**33**	**100**

Methods of preventing meat contamination

The most popular method of preventing meat contamination is by the use of polythene sheets (46%) to cover meats. This practice is common during periods of cool weather. Other methods of preventing meat contamination include covering of meat with used fertilizer sacks (32%), setting fire so that the smoke and heat would drive flies away (6%), covering meat with used cement papers (6%) and covering with polythene sheets and used fertilizer sacks (10%). It was realized that, the same materials were use every day without proper cleaning. These materials were always seen with smears of blood from previous use and thus instead of preventing contaminations they serve as potential sources of contaminants.

Methods of preserving meat

Refrigeration is the major (65%) preservation method employed, followed by hanging the meat up overnight under ambient temperature (23%). Six percent (6%) of the butchers particularly kebab sellers often leave their meat in airy places for the next day, while another 6% of the butchers practice both refrigeration and hanging over night (Table 4). Abuska (2006) reported that in the Garu-Tempane District, any unsold meat at the end of the day is stored at ambient temperature on roof tops over night. Butchers need adequate educations on preservation methods so as to enable them reduce the level of meat spoilage during storage.

Table 4. Meat preservation

Preservation method	Number of butchers	Percentage
Refrigeration and Hanging	2	6
Leaving in airy places	2	6
Hanging up overnight	7	23
Refrigeration	20	65
Total	**33**	**100**

Conclusion and recommendation

Meat production in the study area is confronted with problems of inappropriate pre-slaughter handling of animals, slaughtering process and unhygienic meat handling.

- Such practices include the use of unsterilized and improperly cleaned knives and equipments, use of lorry tyres for singeing, dressing of carcass on filthy slaughter floor, and hanging of meat in open places overnight; and thus meat produced in the study area could be contaminated before getting into the food chain.
- Meats from the study area should be thoroughly cooked (cooking to an internal temperature of 72°C for 15 minutes) before consumption to prevent food poisoning and foodborne diseases.
- The Government of Ghana, Ministry of Health and Ministry of Food and Agriculture should enforce the law that ensure good animal handling pre-slaughter and the operation of standard methods of slaughtering and handling of meats.

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