

## Survey on Good Hygiene Practices in Retail Meat Shops in Butwal Municipality, Nepal

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### ABSTRACT

*Present study was conducted to assess good hygiene practices in retail meat shops for safe and wholesome meat production as well to understand different roles performed by delegated institutions in ensuring quality meat production. A descriptive survey design was used to answer questions concerning the current status of meat hygiene and sanitation practices in the retail meat shops in Butwal municipality. Meat handlers from the meat shops were interviewed through a structured questionnaire. A total of 190 retail meat shops were analyzed randomly to assess their meat hygiene knowledge. It was found that 93.68% of the meat handlers had no regular health check up, 38.42% of the butchers didn't use protective clothes, 95.26% of meat shops had no evisceration facility, 77.37% of meat shops disposed their waste materials in open space nearby, 96.84% lack larium facilities and 99.47% did not follow ante-mortem and post-mortem inspection. There was a knowledge gap about Slaughterhouse and Meat Inspection Act 1999 within 96.32% of the meat handlers. The study recommends implementation of Slaughterhouse and Meat Inspection Act 1999 which has been approved in 1999 by the GoN to promote hygiene practices and animal welfare thereby improving the quality standard of meat shops and finally the quality of meat.*

**Keywords:** Food borne diseases, Hygiene practices, Meat and meat products, Retail meat shop, Slaughterhouse and Meat Inspection Act (SIMA) 1999, Zoonosis.

### INTRODUCTION

Food borne diseases are common in developing countries because of the prevailing poor food handling and sanitation practices, inadequate food safety laws, weak regulatory systems, lack of financial resources to invest in safer equipments, and lack of education for food-handlers (WHO, 2004). Bacteriological quality of meat and meat products is strongly influenced by the prevailing hygienic conditions during their production and handling. Food borne illnesses are prevalent in all parts of the

world and the toll in terms of human life and suffering is enormous. According to WHO, contaminated food contributes to 1.5 billion cases of diarrhea in children each year, resulting in more than three million premature deaths (WHO, 1999). Those deaths and illnesses are shared by both developed and developing nations.

In the absence of modern slaughterhouses in Nepal, animal slaughtering was common in streets, riversides and open pasturelands (Joshi, 2003). In 1999, the government legislated “Slaughterhouse and Meat Inspection Act 1999” which has been approved in by the then GoN to make meat inspection scientific and to ensure the production of safe and hygienic meat to safeguard the health of the consumer. But it’s unfortunate that till today, the act has failed to be implemented (The Himalayan Times, 17 November 2009). Some of the literatures claim that Slaughterhouse and Meat Inspection Act has not been enforced to date (TLDP, 1999; Joshi *et al.*, 2003; Pant, 2007; Parajuli, 2007; Joshi, 2009).

The major retail outlets of meat in Nepal are the butcher’s shops. Butchers slaughter goats and poultry in their premises with poor hygienic conditions (Upadhyaya, 2012). The meat available at retail outlets comes through a long chain of slaughtering and transportation, where each step may pose a risk of microbial contamination. The sanitary conditions of abattoirs and its surrounding environment are major factors contributing to bacterial contamination of meat.

Butwal municipality inaugurated to build the slaughterhouse to ensure the supply of safe, wholesome meat and meat products to consumers but is not yet operating as it is not completed. There are very few studies on standards of meat shops and their hygienic conditions in Nepal and there is a need to explore existing understanding and knowledge regarding importance of good hygienic practice of retail meat shops. So, this study was conducted to reveal hygienic status of meat shops and to add up in the existing knowledge and further, help in implementation of effective good hygiene practice in meat shops.

## **MATERIALS AND METHODS**

### **Sample selection**

A total of 190 retail meat shops were selected randomly form 376 meat shops in Butwal municipality for this study.

### **Data collection**

Data was collected from primary and secondary source.

## **Primary data collection**

The primary data was collected through, key informant interview, questionnaire survey, formal and informal discussion, direct observations.

## **Key informant interview**

To develop further idea of the study site, informal discussion and interview with key informant was done, workers and other knowledgeable persons were taken as the key informants. The interview was focused on the hygiene practice in shop during the process, impacts of unhygienic meat in consumers and its possible health risks measures.

## **Questionnaire survey**

Among the 376 retail meat shops, 190 butcher shops were randomly selected (which accounts for about 50.53% of the total size). The method of survey was adopted from Czaja & Blair, 1996 where the interviewer introduced him/herself to the respondent and explained the purpose of the questionnaire and assured the respondent that the information would be handled confidentially before commencing with the questions. The interviewer also ensured that the respondent understood the objectives and importance of the study.

The questionnaire survey was focused on the personal and general hygiene practices, type of shop, storage of meat, hygienic practices during handling, sources of water used, slaughtering and marketing practices, cleaning and disinfection of equipment and premises as well as knowledge about Slaughterhouse and Meat Inspection Act (SIMA).

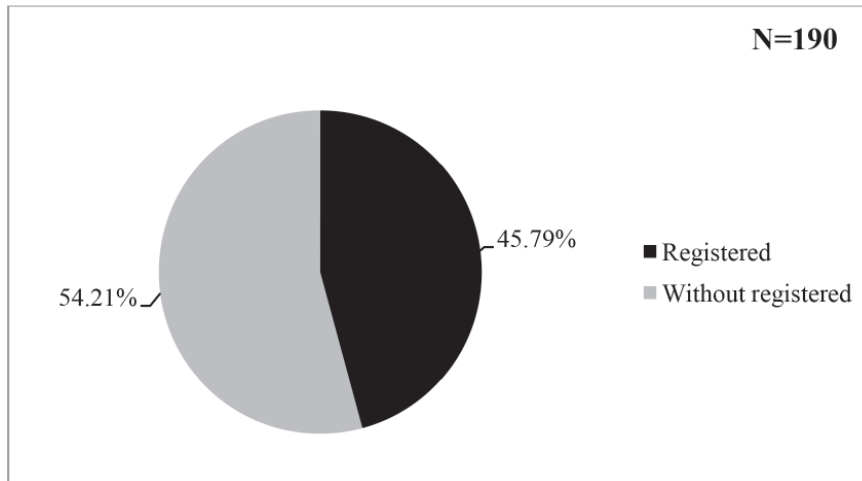
## **Statistical analysis**

Analysis was done by carrying out different statistical procedure for quantitative analysis of data as per required. The data collected was tabulated and analyzed statistically by using Statistical Package for Social Science (SPSS) and Microsoft-Excel.

## **RESULTS**

Results and discussion of the Questionnaire survey in Butwal municipality are presented below. A total of 190 retail meat shops out of 376 were analyzed on random basis.

**Status of registered meat shops**



**Fig. 1:** Status of registered meat shops

From the study, 45.79% meat shops were found to be registered in the municipality. Regulation of meat shops, slaughterhouse is primarily the function of municipal bodies in urban areas. It was found 93.16% responded that there was no effective monitoring system of meat shops (Figure 1).

**Educational status of meat handlers and training of meat handlers on meat handling practice and meat hygiene**

Table 1 summarizes 70% of the butchers did not have formal education and 17.55% of the meat handlers indicated that they had received training in meat handling practice and meat hygiene while the remaining 82.45% of the meat handlers did not take training regarding meat handling practice and meat hygiene.

**Table 1:** Information regarding educational status of meat handlers and training of meat handlers on meat handling practice and meat hygiene

Characteristics		Percentage (%)
Educational status (n=190)	Formal education	30%
	No formal education	70%
Meat handlers who receive training (n= 190)	yes	17.55%
	No	82.45%
Frequency of training, if yes	Once a year	17.02%
	Others	0.53%

### Practice regarding the hygienic status of the meat shop workers

On the survey on hygienic practice, 38.42% of meat shops personnel never used protective clothes whereas 61.58% of meat handlers were using personal protecting equipment (PPE) in the form of apron and all of them handled meat with bare hands without covering their hair with hair nets (Table 2).

**Table 2:** Practice regarding hygienic status of the meat shop workers

Characteristics		Percentage (%)
Wearing Protective cloths	Yes	61.58%
	No	38.42%
Cutting instrument	Stainless steel	1.05%
	Iron	98.95%
Jewellery materials	Not worn	15.79%
	Worn	84.21%
Handling money	Self (with bare hands)	96.84%
	Cashier	3.16%
Eating habit during handling meat	Yes	60.53%
	No	39.47%

**Table 3:** Practice regarding slaughtering facility and meat storage in meat shops.

Characteristics		Percentage (%)
Species available	Single	92.63%
	More than one	7.37%
Lairage facility	Yes	3.16%
	No	96.84%
Evisceration facility	Yes	4.74%
	No	95.26%
Hot and cold water available	Yes	94.74%
	No	5.26%
Leftover meat	Store in refrigerator	78.95%
	Not store	21.05%
Covering off meat	Yes	71.58%
	No	28.42%
cleaning covering cloth, if yes	Once daily	70.53%
	Twice daily	1.05%

**Table 4:** Practice regarding hygienic status of meat shop environment

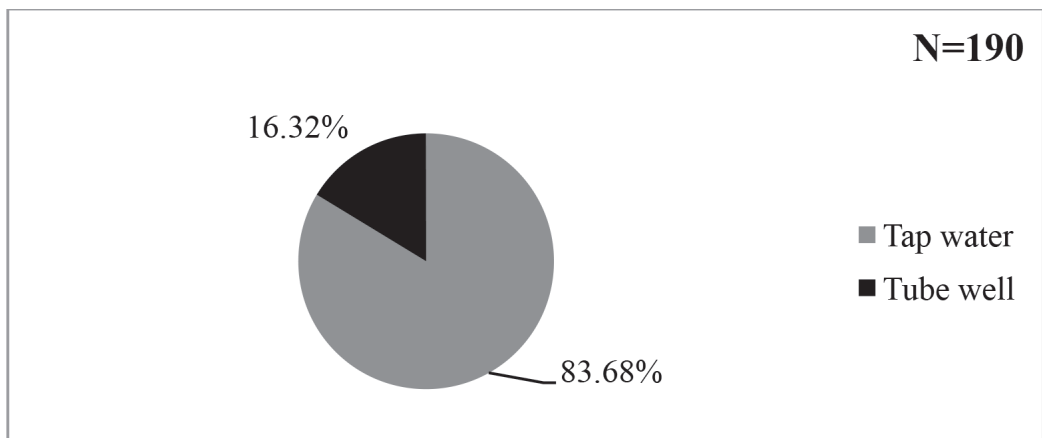
Characteristics		Percentage (%)
Control of fly and rodents	Yes	50%
	No	50%
Disposal of waste	Open space nearby	77.37%
	Municipal sewer	22.11%
	Soak pit	0.53%

**Table 5:** Practices regarding cleaning and disinfection process

Characteristics		Percentage (%)
Ceilings periodically cleaned	Yes	2.63%
	No	97.37%
Surfaces of wall, partitions and floor	Impervious	3.16%
	Non impervious	98.84%
Means of disinfection	Only with water	79.47%
	water and detergent	20.53%

**Main sources of water supply**

From the survey, it was found that 83.68% shops were connected to the municipality water supply which is the main supplier of the water control system while 16.32% used water from tube wells (Figure 2).



**Fig. 2:** Main sources of water supply

### Practice regarding slaughtering facility and meat storage in meat shops

According to the survey, 92.63% of meat shops sold meat of single species, 3.16% of meat shops had a lairage facility and 4.74% of meat shops had evisceration facility. It was found 94.74 % of meat shop had hot or cold water as required, 78.95% of meat shops had a refrigerator for the storage of all leftover meat but the rest 21.05% had no such provision and 71.58% of meat shops were found covering the meat with red cloths and among them 70.53% cleaned the red cloth once daily (Table 3).

### Practices regarding reporting of illness and routine medical examination

Figure 3 summarizes the practice of meat handlers regarding disease reporting. 16.32% of the meat handlers had the habit of reporting illness. There was no legal procedure which enforces the meat handlers for reporting illness. Only 6.32% of the meat handlers indicated that they went for routine medical examinations.

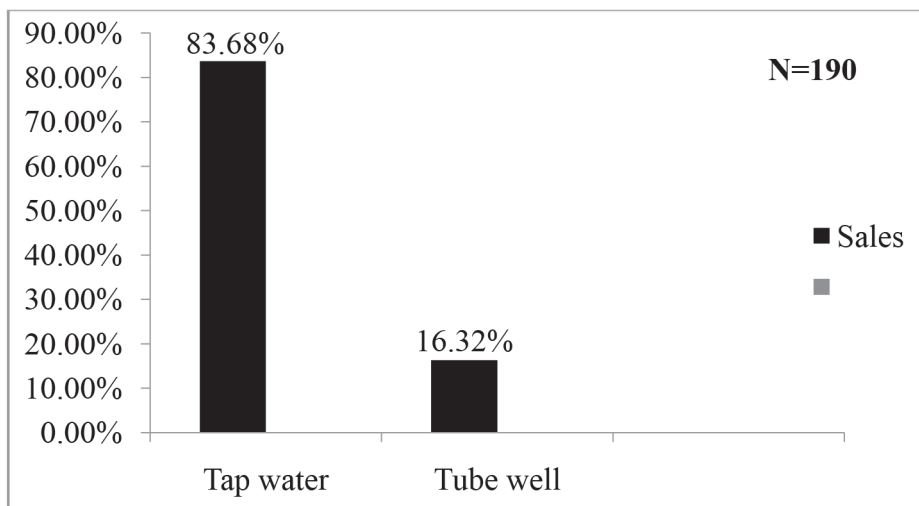


Fig. 3: Reporting illness

### Practices regarding washing hands

Upon asking the respondents, 98.42% of meat handlers never washed their hands after handling suspected meat and those who washed their hands used only water and soap.

### Practice regarding the hygienic status of the meat shop environment

It was found 50% of meat shops were not protected against dogs, rodents and insects. Further observation showed that there was no proper waste disposal system as a result, the pile up paunch contents and other solid wastes, faeces, horns, scraps of

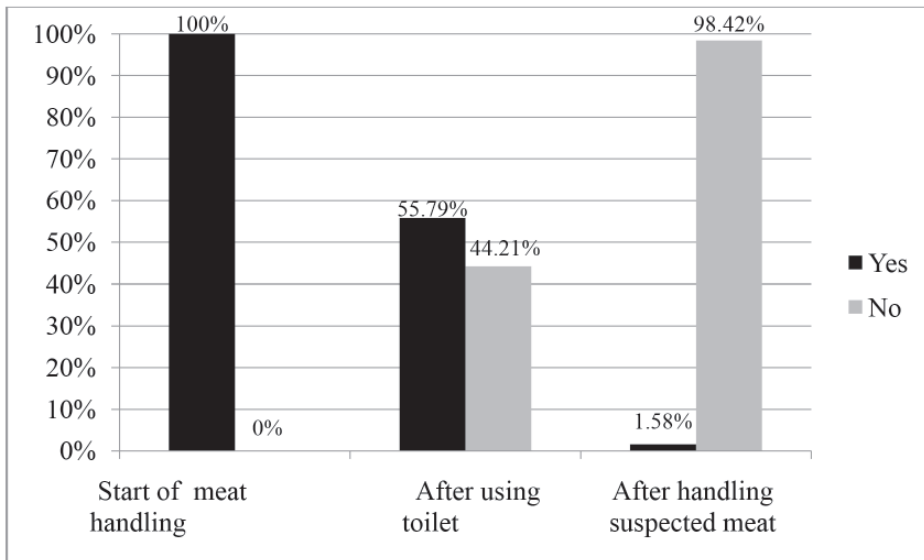
tissue and other solid wastes were found near the meat shops which may serve as the residence for rodents, cats, and dogs. Only 22.11% of the meat shops responded that there was municipal system for the disposal of waste materials (Table 4).

**Practices regarding cleaning and disinfection process**

In this study, 97.37% of meat handlers indicated that they never cleaned or disinfected the wall surfaces, ceilings, ventilation while 2.63% indicated that the wall surfaces were being cleaned and disinfected periodically. Upon questioning the meat handlers regarding the procedures of cleaning and disinfection, 20.53% of them indicated that water and detergent were used to clean and disinfect the surfaces while 79.47% of meat handlers indicated that they use only water to disinfect the surfaces (Table 5).

**Meat handler’s knowledge about SIMA (1999)**

Ante-mortem (AM) inspection was altogether absent. The respondents (the butcher shop owners and workers) were asked if they knew the provision in SIMA (1999). It was found that only 3.68% were well known about SIMA (Figure 5).



**Fig. 4:** Practices regarding washing hands

**DISCUSSION**

The study was carried out to assess the safety knowledge and practices in handling of meat. Personal and meat shop hygiene, waste disposal system, training and hygienic regulation of the meat shops were included in the study. In the current study, 17.02% of the meat handlers received training once a year from the municipality. This finding



has raised the key issue of illiteracy. If more educated people start these industries, then there is likeliness of adoption of safety measures and hygienic practices. Training and education of food handlers regarding the basic concepts and requirements of personal hygiene plays an integral part in ensuring a safe product to the consumer (Adams & Moss, 1997). To ensure this, there should be some form of induction training with regular updating and refresher courses for the food handlers. Meat handlers should furthermore understand the risks associated with contamination of food by microbiological hazards.

The purpose of wearing overalls is to protect both the food products and the meat handler from cross contamination. However, this study showed that 38.42% of the meat handlers did not wear aprons and they all handled food with their bare hands. Because meat handlers are probable sources of contamination for microorganisms, it is important that all possible measures should be taken to reduce or eliminate such contaminations. Hands are rarely free from micro-organisms (especially the bacteria *Staphylococcus aureus* that are present on the skin, nose and hair), it is of utmost importance that soap (preferably in a dispenser) and hot running water are used for this purpose, thus aiming to reduce the microbiological load on hands (Desmarchelier, Higgs, Mills, Sullivan, & Vanderlinde, 1999). To ensure that the meat handlers wash their hands with hot water and soap, Van Zyl (1998) suggested that soap and hot water, at 45°C, should always be available at the washing-basins. Poor personal hygiene practices such as negligence to wash hands after visiting the bathroom may result in up to 10<sup>7</sup> pathogens under the fingernails of the food handler. Organisms originating from infected food handlers include *Salmonella spp.*, *Shigella spp.*, *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus* and faecal *streptococci* (Lawrie, 1998). However, in this study, 55.79% of meat handlers were found to wash their hands atleast after using toilet (Figure 4).

The aim of meat inspection is to provide safe and wholesome meat for human consumption (Herendaet al., 2000). AM and meat inspection is concerned with three main areas: public health, animal health and animal welfare but 99.47% of meat shops in this study were found not to follow any practice of examination of live animals before and after slaughter. And, only 0.53% of meat shops were found to practice inspection at least after slaughter. In general, the level of understanding of meat hygiene/ meat inspection is very low (Figure 5).

The AM examination of animals represents 50% of meat inspection and it improves meat quality by making post-mortem (PM) examination more efficient (Kotwal & Agrawal, 2007). This is due to the fact that the judgment of a food animal whether it is fit for slaughter or not is initially made on the basis of AM findings. The

provision of a veterinary inspection of the live animals prior to slaughter is a basic legal requirement of most meat inspection system (Gracey *et al.*, 1999) and lack of practice of AM inspection therefore implies that SMIA (1999) is not enforced. Once a food animal qualifies the requisites of AM inspection i.e. the animal is clinically healthy, it is passed for slaughter; and the subsequent examination of the internal organs of the butchered animals is carried out to rule out occurrence of any disease or the condition. PM refers to any procedure or test conducted by a competent person on all relevant parts of slaughtered animals for the purpose of judgment of safety, suitability and disposition (Zade & Khan, 2007) and this judgment declares that the carcass is either fit for human consumption or it is conditionally held or condemn is made.

In the study area, it was found that proper garbage collection and disposal were lacking, and 77.37% vendors disposed garbage in an open place. Hygiene problems are not limited to meat shops but also associated with incorrect processing and marketing practices. According to the results of this study, 96.84% of the meat shop workers handled money while serving meat. Since, money is full of microbes, it can contaminate the food. Handling of foods with bare hands may also result in cross contamination; hence introduce microbes on safe food.

This study showed that 60.53% of meat handlers practiced smoking, eating or drinking while handling meat. Furthermore, 84.21% of the meat handlers were found wearing jewellery during meat handling (Table 5). Jewellery is a potential source of micro-organisms, because the skin under the jewellery provides a favourable habitat for contaminating microorganisms to proliferate (Trickett, 1997). Meat handlers are probable sources of contamination for microorganisms, it is important that all possible measures should be taken to reduce or eliminate such contamination.

## **CONCLUSIONS**

Retail meat shops were found with a very poor hygiene level, lack of basic hygiene components such as waste disposal system, proper plant design and provision of facilities: like toilets, hand washing basins, which shows the high potential of cross contamination of meat. Under these conditions, the meat handlers as well as the consumers are equally at high risk of zoonotic diseases. Government and the concern authorities have to take initiative to the implementation of existing Slaughterhouse and Meat Inspection Act 1999 and training courses must be conducted for butchers and meat sellers to promote hygiene practices and animal welfare thereby improving the quality standard of meat shops and finally the quality of meat.

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