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Evaluation of Hygienic Conditions of Small Butcheries in Herat City, Afghanistan

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ABSTRACT

Foodborne diseases are a significant health issue worldwide, particularly affecting low- and middle-income countries (LMICs) like Afghanistan. In Afghanistan, poor food handling practices put many people at risk. This study examined the hygienic conditions of butcheries in Herat City, including the personal hygiene of butchers, measures for ensuring meat safety, and the hygienic condition of butchery tools and equipment. The study was conducted from July to October 2024 and used a cross-sectional design involving 249 butcheries in Herat City. Out of these, a random sample of 182 (n=182) butcheries was selected by the Raosoft online calculator for this study. The data were collected through a structured questionnaire that gathered information about the butchers' backgrounds, their self-reported hygiene practices, and direct observations made during site inspections to assess the physical conditions of their shops. The findings revealed that 39.0% of butchers were between the age of 26 and 35. Furthermore, over 40.1% of butchers were illiterate, with only 3.8% holding a higher education degree, while 51.1% of butchers had five years of working experience. Although 72.0% lacked hygienic training, 83.0% possessed a butchery license. 39.6% worked with money while handling meat, and 42.3% worked while sick. Thankfully, 42.9% of the butcher shops were cleaned more than twice daily, and 54.9% had tiled walls and floors. In summary, this study highlights serious gaps in hygiene practices among meat handlers in Herat City's butcher shops. These inadequate practices may contribute to the spread of foodborne illnesses in the area. The results emphasize the urgent need for targeted food safety training for butchers. Such programs should focus on increasing awareness of food safety standards, encouraging adherence to hygiene practices, and ultimately reducing the risks of foodborne diseases, leading to better health outcomes for people in Herat City.

Keywords: Butchery, Condition, Evaluation, Herat City, Hygiene

INTRODUCTION

According to Shakhes et al. (2023), contaminated food products are the source of several foodborne illnesses globally. Foodborne diseases (FBDs) are a significant public health concern that significantly increases morbidity and death across all age groups. One of the best human protein sources is meat, which contains several vitamins, including A and B_{12}. Since meat consumption has increased recently, there is a significant public health issue over its safety. Meat's high nutritional content makes it a favorable substrate for bacterial development (Milford et al., 2019).

Meat safety and hygiene is directly impacted by worker hygiene, and improper hygiene has significant public health ramifications, as it may spread infections from humans, animals, and the environment to both

employees and customers (Banstola et al., 2022). Sustaining life, avoiding illness, and encouraging proper hygiene depend on access to wholesome food (Lee & Yoon, 2021). To ensure that meat is safe for human consumption, a series of procedures known as "meat hygiene" must be followed, including applying specific standards, codes of practice, and regulatory actions by the regulating authority (Bhandari et al., 2022). The systematic management of environmental conditions throughout food production, packing, transportation, storage, processing, preparation, sale, and serving is known as food hygiene, one of the key public health interventions (Di Novi et al., 2022).

According to the World Health Organization (2023), unsafe food containing pathogens such as bacteria, viruses, parasites, or chemicals can cause more than 200 illnesses, ranging from cancer to diarrhea. Any sickness caused by consuming tainted food with harmful bacteria, viruses, or parasites is a foodborne disease (Alemayehu et al., 2021). This leads to foodborne diseases and ultimately to meat deterioration (Soladoye et al., 2024). Nearly 600 million people are affected by foodborne illnesses annually, accounting for 40% of all foodborne deaths and affecting one in ten people each year due to consuming contaminated food (World Health Organization, 2023). These foodborne illnesses can result in chronic conditions such as renal failure, cancer, liver failure, and neurological and brain abnormalities, as well as short-term symptoms like nausea, vomiting, and diarrhea (World Health Organization, 2023). According to Miner et al. (2020), the most common bacteria causing foodborne infections are Salmonella, Campylobacter, and Escherichia coli O157:H7. The most hazardous foods for humans are those from animal sources, which are sometimes considered high-risk commodities due to their high levels of pathogens, natural poisons, and other contaminants. Meat processing and handling practices are partly responsible for this contamination (World Health Organization, 2023). The susceptibility of meat to contamination, especially during the processing and handling stages, makes meat products a quick source of foodborne infections. According to Zerabruk et al. (2019), several factors, including age, gender, education, and work experience, influence hygiene in the meat industry.

Contamination from improper food handling procedures accounts for 10% to 20% of foodborne illness outbreaks (Chekol et al., 2019). Hygienic practices are more frequently used by food handlers with a solid understanding of food safety (Yenealem et al., 2020). Food handlers under supervision are more likely to follow proper food safety procedures (Azanaw et al., 2021). Meat safety and hygiene requires good personal practices, such as washing your hands before and after handling meat (Bafanda et al., 2017). Their education and personal habits greatly influence food handlers' knowledge and behaviors (Nyamakwere et al., 2017). Millions of people worldwide are at risk from foodborne infections, which are especially common in low- and middle-income nations like Afghanistan. These nations frequently pose public hygiene risks with inadequate living circumstances, education, and unsanitary food handling. Consequently, the current study shifted its focus to the practices of butchers, meat safety measures, and the general environment of these butcher shops to evaluate the hygienic conditions of butcher shops in the City of Herat, Afghanistan, paying particular attention to hygienic practices, meat safety, and shop hygienic conditions.

MATERIALS AND METHODS

Study Area

This cross-sectional study was conducted in Herat City, a town in western Afghanistan and the capital of Herat Province. The targeted population for this study included all butcher shops operating in Herat City during the study period from July to October 2024. According to the Butchers Union of

Afghanistan, there were 249 butcher shops in Herat City in 2024 (MAIL, 2024).

Samples Collection

Sample Size Determination: The RaoSoft Sample Size Calculator, available at http://www.raosoft.com/samplesize.html, was used to determine the study's sample size. We set the response distribution at 50%, the confidence level at 99%, and the margin error at 1%. The calculated sample size based on these parameters was a minimum of 182 (n = 182) butcher shops from the study area.

Sampling Procedure: A complete list of all 249 butcher shops was obtained from the Butchers Union of Herat City. From this list, 182 butcher shops were randomly selected using a simple random sampling technique to be included in the study. This ensured that each shop had an equal chance of selection, maximizing fairness and minimizing tendency in the sample.

Data Collection Tools and Procedures: Previously developed and evaluated structured questionnaire was used to collect data. The questionnaire inquired about the socio-demographic characteristics of butchers, personnel hygienic conditions of butchers, sanitary conditions of the butchery environment, and the hygienic condition of butchery tools and equipment. The questionnaires were distributed by a highly trained and educated individual who systematically visited each butchery to ensure the reliability and accuracy of the collected data, giving us confidence that the information gathered was accurate.

Measurement of Variables: Data was collected through face-to-face interviews with butchers using a structured quantitative questionnaire. There were 33 questions in the survey questionnaire. This questionnaire was designed based on previous research (Ashuro et al., 2023 & Gil et al., 2024) and translated into the local language to ensure clear communication and accurate responses. The questionnaire included four key sections: (1) socio-demographic characteristics of the butchers, (2) personal hygiene of the butchers, (3) hygienic condition of the butcheries, and (4) hygienic conditions of butchery tools and equipment. The questionnaire was a type of multiple choice test with the number of possible responses for each question derived from previous studies and the local context. Highly educated, professional personnel distributed the questionnaire and systematically visited different butcheries to verify the reliability and validity of data collection, ensuring accuracy in the collected information. Each interview lasted for about 10 to 15 minutes.

Statistical Analysis

The data collected were coded and analyzed using SPSS version 27. Descriptive statistics were applied to summarize the data, including using frequencies and percentages for the various response categories within each variable.

Ethical Considerations: This study received ethical approval from the Research, Authorship, and Translation Committee of the Faculty of Veterinary Sciences, Herat University (protocol number 11, date 2025/02/04). The study was conducted in collaboration with the Herat Provincial Department of Agriculture, Irrigation, and Livestock and the Herat University Administration.

RESULTS

The Socio-demographic Characteristics of Butchers: This study specifically focused on the hygienic conditions of butcheries in Herat City, Afghanistan, which are equally important from the perspective of public health and food safety. The data analysis showed that butchers aged 26 to 35 comprised over 39.0% of the total were married.

Educational Background: It can also be noted that based on academic criteria, over 40.1% of butchers were illiterate, with only 3.8% holding a higher education degree, while 51.1% of butchers had five years of working experience.

Health and Safety Measures: In contrast, concerning health and safety measures, more

than 83.0% possessed a health license; however, only 15.4% had some training in meat hygiene. Alarmingly, 42.3% continue to work while ill, which signifies a clear need for hygiene education.

The Personal Hygiene Practices of Butchers: Regarding personal hygiene, 62.6% wash their hands before and after handling meat, while 74.2% wash their hands after visiting the toilet. However, only 25.8% of butchers put on gloves. It has also been found that 39.6% handle money while handling meat.

The Environmental Conditions of Butcheries: Environmental conditions seem relatively good; 54.9% of butcheries had tiled floors and walls, and 42.9% washed them more than twice a day. The remaining 52.7% of shops have ventilation, while 66.5% have separate shelves for storing meat.

Conclusion and Recommendations: The findings also revealed significant variation in hygiene practices among butchers; thus, continuous improvement of hygiene standards accompanied by training is needed to minimize meat-associated health risks.

Table 1. Socio-Demographic Characteristics of Butchers.

Variables	Category	Frequency (n)	Percentage (%)
Age	15-25	43	23.6%
	26-35	71	39.0%
	36-50	62	34.1%
	51-70	6	3.3%
Marital status	Single	49	26.9%
	Married	133	73.1%
Education level	Illiterate	73	40.1%
	Elementary	55	30.2%
	High school graduate	47	25.8%
	University graduate	7	3.8%
Work experiences	5 years	93	51.1%
	10 years	54	29.7%
	20 years	30	16.5%
	More than 20 years	5	2.7%

Table 1 shows a frequency distribution of the butchers' demographic characteristics. 39% of the butchers belong to the 26-35 age category, while 73.1% are married. Regarding their educational status and level, 40.1% are illiterate, and 30.2% have primary education, and an additional 3.8% have a university degree. Additionally, 51.1% of them have 5 years of work experience.

Table 2. Personal Hygienic Condition of Butchers.

Variables	Response	Frequency (n)	Percentage (%)
Received a hygienic certificate by Animal Health, Public Health, and Municipality	Yes	151	83.0%
	No	13	7from%
	Don’t know	18	9.9%
Butchery inspection or evaluation by Animal Health, Public Health, and Municipality	Yes	148	81.3%
	No	25	13.7%
	Yes, but very rarely	9	4.9%
Participation in the meat hygiene training	Yes	28	15.4%
	No	131	72.0%

	Yes, but very rarely	23	12.6%
Hands washing before and after handling raw meat	Yes	114	62.6%
	No	21	11.6%
	Yes, but very rarely	47	25.8%
Wearing of gloves while meat handling	Yes	21	11.5%
	No	134	73.6%
	Yes, but very rarely	27	14.8%
Wearing of clean apron, cap, and mask while working	Yes	80	44.0%
	No	35	19.2%
	Yes, but very rarely	67	36.8%
Handling/touching the money while meat processing	Yes	72	39.6%
	No	45	24.7%
	Yes, but very rarely	65	35.7%
Hands washing with soap and warm water after using the restroom at the butcher shop	Yes	135	74.2%
	No	19	10.4%
	Yes, but very rarely	28	15.4%
Removal of personal items like rings, necklaces, bracelets, watches, or mobile phones while working with meat	Yes	64	35.2%
	No	64	35.2%
	Yes, but very rarely	54	29.7%
Continuing the working in the butchery during self-illness	Yes	77	42.3%
	No	54	29.7%
	Yes, but very rarely	51	28.0%
Continuing of cutting or processing of meat while hands are cut, bruised, or injured	Yes	75	41.2%
	No	58	31.9%
	Yes, but very rarely	49	26.9%

Table 2 reveals the Personal Hygiene Condition of butchers. 83.0% of the butchers surveyed have health certificates, and 81.3% undergo evaluation by health institutions. However, only 15.4% of butchers have completed health training, while 62.6% clean their hands before and after touching raw meat. It's concerning that only 11.5% wear gloves when handling meat, and 44.0% of respondents use aprons, hats, and masks. About 39.6% of butchers handle money while processing meat, and 74.2% wash up with soap and water after using the toilet. Additionally, 35.2% take off their personal items when handling meat. 42.3% would keep working when ill, and 41.2% would continue to process meat with cut or injured hands. These findings indicate the need to improve hygienic practices and provide training for butchers to safeguard public health.

Table 3. Sanitary Conditions of the Butchery Environment.

Variables	Response	Frequency (n)	Percentage (%)
Type of butchery	Traditional	63	34.6%
	Modern	97	53.3%
Type of walls and floors of the butchery	Combination	22	12.1%
	Concrete	62	34.1%

	Tiles	100	54.9%
	Mud	20	11.0%
Condition of walls and floors of the butchery	Clean and without cracks	127	69.8%
	Both cracked and dirty	17	9.3%
	Clean but cracked	38	20.9%
Disinfecting of walls and floors of the butchery	Yes	105	57.7%
	No	32	17.6%
	Yes, but very rarely	45	24.7%
proper ventilation in the butchery	Yes	96	52.7%
	No	36	19.8%
	Yes, but very rarely	50	27.5%
Appropriate detergents and disinfectants use in the butchery	Yes	103	56.6%
	No	34	18.7%
	Yes, but very rarely	45	24.7%
Presence of insects and pests in the butchery	Yes	50	27.5%
	No	89	48.9%
	Yes, but very rarely	43	23.6%
Measures for effective control of pests and insects in the butchery	Maintaining cleanliness butchery	64	35.2%
	Installing mesh windows	98	53.8%
	Using insecticides	20	11.0%
Presence of separate storage racks for beef, lamb, goat, and chicken meat in the butchery	Yes	121	66.5%
	No	34	18.7%
	Yes, but very rarely	27	14.8%
Washing and disinfecting of the butchery/day	Once	51	28.0%
	Twice	53	29.1%
	Three times	78	42.9%

Table 3 explains the sanitation conditions and practices observed in the butchery environment. Data indicate that 53.3% of the respondents work in modern butcheries. Modern butcheries are becoming more fashionable than traditional ones. Additionally, 69.8% of the respondents said the walls and floors were clean and not cracked. Concurrently, 57.7% stated that these surfaces could be washed and disinfected. Regarding ventilation, 52.7% were aware of proper ventilation, and 56.6% acknowledged using appropriate detergents and disinfectants. Regarding pest presence, 48.9% said there were no pests in the butchery. Another 66.5% emphasized having special storage racks for each type of meat.

Table 4. Hygienic Condition of Butchery Tools and Equipment.

Variables	Response	Frequency (n)	Percentage (%)
Mesh doors availabilities to avoid the entry of flies and insects	Yes	135	74.2%
	No	37	20.3%
	Don't know	10	5.5%
Washing of butchery equipment before starting work	Yes	128	70.3%
	No	20	11.0%
	Yes, but very rarely	34	18.7%
Hygienic condition of equipment such as meat grinders, cutting boards, and knives	Yes	136	74.7%
	No	15	8.2%
	Yes, but very rarely	31	17.0%
Selling of meat with slaughterhouse approval stamp	Yes	169	92.9%
	No	4	2.2%

	Yes, but very rarely	9	4.9%
Water supply source of butchery	Regular well water	37	20.3%
	Municipal water	99	54.4%
	Deep well water	46	25.3%
First aid kit availability in the butchery	Yes	71	39.0%
	No	70	38.5%
	Don't know	41	22.5%
Safety equipment for personal hygiene	Cap	12	6.6%
	Mask	29	15.9%
	Gloves and apron	141	77.5%
Materials used to disinfect butchery equipment	Bleach	17	9.3%
	Detergent powder	111	61.0%
	Hot and clean water	54	29.7%
Disposal of blood contaminants and other butchery waste	Discharge into a drain	73	40.1%
	Discharge into municipal sewage	98	53.8%
	Discharge into a water channel	11	6.0%

Table 4 displays information on the hygiene of tools and equipment inside the butcher shops. Notably, 92.9% of respondents confirmed that the meat sold has a stamp of approval from a slaughterhouse doctor, indicating strong compliance with health regulations. Additionally, 74.7% reported that equipment such as meat grinders and cutting boards are maintained in hygienic conditions, while 74.2% indicated the presence of mesh doors to prevent the entry of flies and insects. Furthermore, 70.3% stated they wash butchery equipment before starting work, and 77.5% use safety equipment like gloves and aprons for personal hygiene. The majority, 54.4%, rely on municipal water as their water source, and 39.0% confirmed having a first aid kit available.

DISCUSSION

The findings show that over 39.0% of the butchers were in the age group between 26 and 35, with 26.9% single and 73.1% married. The findings agree with a study conducted by Sarma et al. (2022) in Dhaka, Bangladesh, where 38.25% of the butchers were in the 26-35 age category, 22% single, and 78% married. These similarities in demographic features may suggest that there are other socio-economic factors behind the butcher workforce in these different geographical areas. However, in contrast, only 3.8% of butchers hold a higher-level degree, and more than 40.1% are illiterate; only 51.1% have experience of over five years. This was also indicated in southwest Ethiopia by Gil et al. (2024), whereby only 1.2% were educated, and 44.1% were illiterate. In addition, the data from Ashuro et al. (2023) showed that 50.2% of butchers had more than five years of experience, consistent with this study's findings. This evidence suggests a similar trend concerning the level of education and work experience among butchers across regions.

About safety and cleanliness training, 15.4% of butchers received formal training, while 83.0% were licensed.-The work of butchers was monitored in 81.3% of cases. Hygiene levels were observed to be higher than those reported in a survey conducted by Islam et al. (2022) in Assam, India. In Assam, 70.0% had permits, while 43.1% had training. In contrast, these findings depart from those of Banstola et al. (2022), who reported monitoring of only 68.8% of butchers in metropolitan Pokhara, Nepal. These variations reveal the regional differences in hygiene levels and monitoring in the butchering sector. About 44.0% of the butchers wear safety gear, and 62.6% wash their hands before and after they handle meat. The concerning part of the finding is that 39.6% of

the butchers also handle cash. In comparison, Mbonabucha et al. (2019) noted that 75.4% of butchers in Rungwe, Tanzania, washed their hands before and after handling meat. Of the total sampled butchers, 70.5% used safety gear (i.e., aprons, hats, and masks) and 41.2% handled money. This contrast emphasizes the pressing need for hygiene education for butchers since it serves to mitigate the health risks associated with unhygienic practices.

The present study showed that over 74.2% of the butchers practiced handwashing after using the restroom. Additionally, 35.2% of the butchers abstained from wearing personal items such as watches, rings, bracelets, necklaces, and mobile phones while working. However, a disturbing finding was that 42.3% of butchers continued with their work while ill. These results correlate with those reported by Ashuro et al. (2023) in southern Ethiopia, where 95.0% of butchers practiced handwashing after using the restroom. In their work, 35.5% did not wear personal items, while 51.5% reported having worked while ill. Such a comparison emphasizes the importance of targeted health education interventions for the butchers, given that ignoring hygiene principles and working while sick exposes other people to underlying health risks.

According to the current study, 54.9% of the butcher shops have tiled floors and walls. Moreover, 69.8% of the butcher shops had clean and intact floors and walls. The floors and walls of 57.7% of the butcher shops were readily washable. This finding is different from that of Gil et al. (2024) in southwestern Ethiopia, where only 13% of the floors and walls of butcher shops were tiled, showing non-adherence to hygiene standards in some areas. In that study, 45.1% of the butcher shops had clean and intact surfaces, while 49.6% had washable surfaces. The current comparison indicates that the butcher shops in this study have higher hygienic standards than those reported by Gil et al. It is, therefore, essential to observe hygiene standards and to continually train butchers on food hygiene and safety. In the present study, 52.7% of the studied butcheries have ventilation, 66.5% use dedicated shelf meat, and 42.9% of butchers access the butchery more than twice a day. These findings contrast those of Gil et al. (2024) in the Southwest, where 67.5% of the butcheries had ventilation, and 82.1% were accessed more than twice a day. Siluma et al. (2023) also reported that a higher percentage of butcheries use dedicated shelving in Limpopo, Africa, at 83.0%, compared to this study. The difference thus indicates regional differences in adhering to health and safety standards.

Furthermore, the present study found that over 74.2% of butchers use screened windows for insect control, and 61.0% utilize appropriate detergents and disinfectants. However, 53.8% of butchers dispose of butchery waste in municipal sewage systems. These results differ from those reported by Islam et al. (2022) in Assam, India, where 30.0% of butchers used screened windows, 33.33% used appropriate detergents and disinfectants, and 35.0% discharged waste into municipal sewage. This comparison highlights significantly improved hygiene practices in the butcheries of the present study compared to those in the survey by Islam et al.

CONCLUSION

Assessment of hygienic conditions in Herat City butcheries revealed some critical areas that required intervention, particularly concerning environmental hygiene and personal hygiene practices. While a large number of butchers have hygiene certificates, there is an apparent lack of specific training for meat hygiene. It is concerning to note that butchers often work while sick, and handling cash while preparing meat increases the risk of cross-contamination. Although some butcheries keep their premises relatively clean, with tiled floors and separate meat storage units, there are still some unhygienic practices and poor pest control measures in place. These challenges highlight the need to implement continuous education and

training programs on modern meat hygiene best practices among butchers. Additionally, regulatory agencies need to be strengthened to ensure compliance with hygiene requirements. To drive this initiative for sustainable improvements in public health, the commitment of local government agencies, educational institutions, and butcheries is essential. These efforts will help reduce the risk of food-related illnesses due to meat consumption, safeguard public health, and enhance the quality and safety of meat products available to consumers.

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