



Assessment of hygiene practices in the retail poultry meat shops in Bareilly city

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Received: 04 July 2025; Accepted: 26 September 2025

ABSTRACT

Chicken meat is the most preferred meat species, and it accounts for around 50% of overall meat production in our country. Hygiene is one of the key factors in retail poultry meat shops that influence the overall quality and acceptability of the meat. A survey was conducted to assess existing hygiene practices in retail chicken shops by conducting interviews of both consumers visiting the retail shops and the retailers. Results showed that 71.67% of retailers agreed about the existing unhygienic retail practices of the shops, whereas, 61.67, 11.66, 26.66, and 85% of consumers complained about dirty wooden meat-cutting logs, careless and dirty handling of meat and offal, presence of flies over meat surfaces, and wet, unclean, and dirty appearance of live birds. The entire consumer base (100%) agreed about the dirty wipe cloths used by the retailers during slaughtering and cleaning of the carcass, the dirty working surface, and the dirty hands. Poor ventilation facilities and absence of fly traps were noticed in 66.67% of retail shops. None of the butchers were found to be using hand gloves, headgear, etc. Intermittent handwashing was found to be practiced only by 44.44% of retailers, but none were found to use any kinds of hand sanitizer, surface sanitizer, or carcass decontaminant. Half of the retailers (50%) did not have dustbins to discard the waste and offal in their shops. The used knives and logs were found to be cleaned only once at the end of the day of work by 83.34% of retailers. The results showed a poor picture of the existing hygiene practices in the retail shops of Bareilly, which need to be intervened.

Keywords: Bareilly city, Chicken meat, Consumer, Retailers, Retail shop

Poultry meat has achieved wide consumer approval because of its characteristic flavor and taste and is expanding at a rate of 8-10% per year (APEDA, 2020-21). Total poultry meat production in the Indian subcontinent was 4.3 MT (APEDA, 2019-20). In India, the per capita consumption of broiler meat has been estimated at 3.35 kg/individual/year (DAHDF, 2021). Chicken meat accounts for around 50% of overall meat output in our country (FAO, 2021). In the current scenario, the demand for chicken meat has increased many folds due to various reasons (Asrani *et al.*, 2011; Bora *et al.*, 2024). In our country the major portion of poultry meat is come from the wet market operated by roadside poultry meat processors and retailers (Muthukumar *et al.*, 2021).

Despite high demand of chicken, absence of appropriate infrastructure facilities, cold chain facility and quality assurance systems, has emerged as a bottleneck in this rapidly growing industry. The existing practices in poultry meat handling and processing are not scientifically approved, therefore, resulting in the deterioration of hot-processed chicken meat quality. Pathogens spread through

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dirty handling and usage of unclean utensils and cutting instruments, viz., knives, choppers, saws, rails, gambrels, and the dirty log used for chopping the carcass. Personal hygiene practices and health status of the retailers also influence the quality of the finished products significantly. The microbe-friendly nutrient configuration and the unhygienic handling practices involved in the retailing of hot-processed chicken meat made latter much more prone to quality deterioration. For this purpose, a comprehensive investigation of existing practices in the retailing of chicken meat is very much necessary.

MATERIALS AND METHODS

An experimental design was prepared to meet our objectives of assessing the existing hygienic practices followed in the retail shops selling fresh poultry meat. The Bareilly city area was divided into 3 main zones on the basis of the clustering and availability of retail fresh poultry meat shops. The three zones were Zone I: the Rajendra Nagar region, including Delapeer and 100 Feeta Road; Zone II: the Sailani market region and the areas adjoining Stadium Road in Bareilly; and Zone III: the Bada Bazar area and Killa Market. From each zone, 6 fresh poultry meat retail shops were selected randomly. A structured interview proforma was prepared for retailers of the city who are engaged in

Table 1. Details of poultry meat retailers

Category	Frequency				Percentage (%)			
	Zone I	Zone II	Zone III	General	Zone I	Zone II	Zone III	General
Age group								
20-30 years	3	2	1	6	50	33.33	16.66	33.33
30-40 years	2	3	3	8	33.33	50	50	44.44
40-50 years	-	1	-	1	-	16.66	-	5.55
>50 years	1	-	2	3	16.66	-	33.33	16.66
Sex								
Male	6	6	6		100	100	100	
Female	-	-	-		-	-	-	-

fresh poultry meat retailing. A set of questions was prepared that addressed the issues related to the hygienic status and the practices in the retailing of fresh poultry meat. A questionnaire was also prepared to evaluate the consumer response regarding the hygienic status of the different meat shops and the major problems faced by them. The interview was scheduled for every day (between 10:00 am and 12:00 noon and 5:00 and 8:00 pm) in a week, excluding Tuesday. From each zone, 20 meat consumers were also randomly selected and interviewed. The questionnaire consisted of queries related to the information of existing practices in the handling and retailing of fresh poultry meat, viz., sources of meat supply, quantity of meat sold per day, consumer preferences for meat purchase, compliance with basic public health regulations, sanitation and hygienic status of the shop as well as the meat handlers, source of water supply, type of packaging material used, etc. The questionnaire for consumers included the queries related to the meat consumption patterns, quantity of poultry meat consumption, preferred retail meat cuts, the place from where meat is usually purchased, price range of available poultry meat, overall hygienic status of the shops from which meat is purchased, etc. The questions were relevant to gaining insight into the overall quality and hygienic status prevalent in the poultry retail meat shops in the city of Bareilly.

RESULTS AND DISCUSSION

Information about the retailers: The details of the poultry meat retailers from the various zones are enumerated in Table 1. The age group of the butchers was observed during the interview. It was found that in Zone I, the majority (50%) of the retailers were in the 20-30 years age group, whereas in Zone II & III, most of the retailers (50%) belonged to the 30-40 years age group. Overall, when comparing all three zones, 44.44% of the retailers were found to be in the 30-40 years age group.

The prevalence of social stratification might be the reason for the engagement of the middle-aged people in the fresh meat retailing business. A similar observation was also noted by Mishra *et al.* (2020) in the Bareilly city while assessing the retailing pattern of processed meat products.

A study by Chatterjee (2015) showed that the maximum proportion of the food vendors in the Chinese street of Kolkata were males and middle-aged people. In the present study, it was observed that only the male members were involved in the retailing of fresh poultry meat. The male domination may be due to the existing societal norms where women are generally not involved in butchering practices. Mishra *et al.* (2020) also observed 100% male dominance in the meat retailing sector. A similar observation was also made by Bafanda *et al.* (2017) in Jammu district of J&K.

Procurement and processing of live birds: The details of source of bird, daily retail meat sell pattern, the cost of meat and the health status of birds are presented in Table 2.

It was observed that all of the retailers (100%) procure their live birds from the local wholesale live bird market/mandi at the wholesale rates. In most of the cases (55.55%), the selling rate of fresh meat was found to be around 50-70 kg/week. The maximum sale of meat occurred on Sundays, Wednesdays, and Fridays which might be due to the religious beliefs attached to the avoidance of meat consumption on certain days. It has been observed that the maximum slaughter (44.44%) of live birds was done within 6 to 9 hours after the arrival of live birds from the wholesale market to the retail shop. According to Talukder *et al.* (2020), 46.67% of the retailers in North Indian cities sell 40-60 kg of meat/week. In 94.44% of the shops, the average price of the fresh meat varied between Rs. 200-250/kg, and it was solely dependent on the market price of live birds. According to the retailers, the preference of the consumer was for hot meat, slaughtered in front of their eyes. The overall appearance of the birds was healthy and birds with clean bodies and aesthetic looks were seen in 77.77% of the shops. In 22.23% of the shops, the birds were unhealthy in appearance; most of the birds were sitting on haunches, with ruffled feathers, showing abnormal droppings and closed eyes. Other than these, there was overcrowding of live birds and hence unclean body surfaces. Feeders and waterers were available in every shop. However, the surroundings of the birdcages were filthy, and houseflies were in abundance. Stray animals like dogs were present around every meat shop. Rajesh (2006) observed that 50% of the retail meat shops in Patna City had rodents and stray

Table 2. Information about the source of bird, daily retail meat sell pattern, the cost of meat and the health status of birds

Information	Category	Frequency				Percentage (%)			
		Zone I	Zone II	Zone III	Overall	Zone I	Zone II	Zone III	Overall
Source of birds	Commercial Farm	-	-	-	-	-	-	-	-
	Wholesale live bird Market/ Mandis	6	6	6	18	100	100	100	100
	Own farm	-	-	-	-	-	-	-	-
	Other	-	-	-	-	-	-	-	-
Quantity of meat sell/day (kg)	<50	1	1	-	2	16.67	16.67	-	11.11
	50-70	3	3	4	10	50	50	66.66	55.55
	70-90	1	2	1	4	16.67	33.33	16.67	22.22
	>100	1	-	1	2	16.67	-	16.67	11.11
Gap between arrival of birds and slaughter (h)	<3 h.	-	1	2	3	-	16.67	33.33	16.67
	3-6 h	2	3	1	6	33.33	50	16.67	33.33
	6-9 h	3	2	3	8	50	33.33	50	44.44
	>9 h	1	-	-	1	16.67	-	-	5.55
Average price of meat (Rs/ kg)	<150	-	-	-	-	-	-	-	-
	150-200	-	-	1	1	-	-	16.67	5.55
	200-250	6	6	5	17	100	100	83.33	94.44
	>250	-	-	-	-	-	-	-	-
Heath status of birds	Healthy looking & clean	5	5	4	14	83.33	83.33	66.67	77.77
	Unhealthy looking & Unclean	1	1	2	4	16.67	16.67	33.33	22.23

animals in and around them and were in an unhygienic state.

Sanitation and hygienic practices in the retail meat shops: The interviewees were questioned about various hygienic practices being followed during the post slaughter handling till the final selling of meat and the information is presented in Table 3.

The retail meat shops lacked proper facilities for slaughtering and dressing birds. Since the shops were mostly present in crowded market areas, there is less chance of proper waste disposal. The study showed that only 44.44% of the retail shops complied with the basic public health regulations (maintaining structural and environmental hygiene, personal hygiene, following up on sanitation and appropriate consumer protection and display, etc.) and registered with the local body (registered with FSSAI). None of the shops (100%) had facilities for the supply of hot water for washing wooden meat-cutting logs and equipment like knives and utensils. The ventilation and lighting were not proper in majority (72.22%) of the shops. There was no provision for fly shields in any of the retail shops (100%). In earlier studies by Rajesh (2006) and Upadhaya and Ghimire (2018), it was seen that only 50% of shops used measures to control flies and rodents. It was interesting to note that 50% of the retailers had no dustbin to discard the slaughter waste materials and inedible offal. It was found that the used knives and meat-cutting wooden

logs were cleaned only once at the end of the day in 83.34% of the shops. There was no provision for the use of surface sanitizer or any carcass decontaminant in any of the shops (100%). To wipe off excess blood from the surface, all the butchers were found to use very dirty cloth. Since the meat is sold as hot meat in all the shops, the availability of deep freezers was nil, and only 11.11% had refrigeration facilities for temporary storage of meat during hot weather. It was found that the blood, visceral organs, feathers, and other wastes were scattered around the shops, creating a nuisance and attracting stray animals, with a foul smell and unpleasant sight in almost all the retail shops. The findings in this study were in agreement with the findings by Tuneer and Madhavi (2015). Upadhaya and Ghimire (2018) showed that 77.37% of the waste generated during the slaughtering of live poultry birds was disposed off in the nearby free space, but only about 22.11% of retailers disposed of the waste in municipal sewers. In the present study, it was observed that the adoption of hygiene practices by the retailers was not very good. The use of gloves and aprons during slaughtering and post-slaughter handling was not observed in any of the shops (100%). Only 44.44% of the retailers had the provision for washing hands. According to the study of Junaidu *et al.* (2015) and Sneed *et al.* (2004), it was observed that proper handwashing facilities were available only with 40% of retailers in Patna city. Scarce good personal hygiene practices during the slaughtering of

Table 3. Information related to maintenance of hygiene in retail shop

Attribute		Frequency				Percentage (%)			
		Zone I	Zone II	Zone III	Overall	Zone I	Zone II	Zone III	Overall
Compliance to basic public health Regulations and standards	Yes	4	4	2	10	66.67	66.67	33.33	55.55
	No	2	2	4	8	33.33	33.33	66.67	44.44
Use of hand gloves	Yes	-	-	-	-	-	-	-	-
	No	6	6	6	18	100	100	100	100
Sterilization of knife by using hot water	Yes	-	-	-	-	-	-	-	-
	No	6	6	6	18	100	100	100	100
Provision of dustbin	Yes	4	2	3	9	66.67	33.33	50	50
	No	2	4	3	9	33.33	66.67	50	50
Well ventilation and fitted with air conditioner	Yes	2	2	1	5	33.33	33.33	16.67	27.77
	No	4	4	5	13	66.67	66.67	83.33	72.22
Availability of fly shield or fly trap or measures of rodent control	Yes	-	-	-	-	-	-	-	-
	No	6	6	6	18	100	100	100	100
Cleanliness of wipe cloth	Clean	-	-	-	-	-	-	-	-
	Dirty	6	6	6	18	100	100	100	100
Use of surface sanitizer	Yes	-	-	-	-	-	-	-	-
	No	6	6	6	18	100	100	100	100
Use of hand sanitizer	Yes	-	-	-	-	-	-	-	-
	No	6	6	6	18	100	100	100	100
Use of carcass decontaminants	Yes	-	-	-	-	-	-	-	-
	No	6	6	6	18	100	100	100	100

poultry birds were also observed by Rajesh (2006).

The water used in the meat shops during the various processes plays a crucial role in determining the microbial load of the carcasses. In the present study, provision of good-quality potable water was found in 83.33% of the shops, and all of them were found to use stored water only. In most of the shops, municipal water was stored in overhead tanks for routine use, whereas, two shops lacked storage provisions and depends entirely on the direct municipal supply. In Zone I, 100%; in Zone II, 83.33%; and in Zone III, 66.67% had provision of municipal water supply. In Zones II & III, 16.67% and 33.33% of retailers relied on hand pumps and submersible pumps for water supply. The survey conducted earlier by Upadhyay and Ghimire (2018) had revealed that 83.68% of shops used the municipality water supply channel as the source of water for the various activities in the shop, and 16.32% rely on tube wells as the source of water. The meat was packed in black polythene bags while selling to the consumers. There is a ban on the use of polythene bags in India, but currently there is no proper alternative available, and since these are cheaper, the retailers preferred to use them. Biodegradable packaging materials at a good cost can be explored further to use as packing materials for perishable products.

Demographic information of the poultry meat consumers: The consumers were randomly selected from the retail

shops itself during visiting the shops and questions were asked to gather required information, data presented in the Table 4.

It was observed that meat is purchased mostly by the male members of the family (80%). In Zone I, Zone II, and Zone III, the percentages of male members purchasing meat were 75%, 80%, and 85%, respectively. Waghmare *et al.* (2021) also reported that 89.12% of customers concerned with the purchasing of meat were male. In India, cooking and associated handling of meat are considered a woman's work, while men are assigned to buy meat from the shops. The frequency of purchase was also studied; it was found that 5% purchase meat once a week, 70% purchase twice a week, and 25% purchase thrice a week in Zone I. In Zone II, 80% purchased twice in a week, and 20% did so thrice in a week. In Zone III, 35% purchase twice in a week, 50% purchase thrice in a week, and 15% of consumers purchase more than four times in a week. Overall, most people (61.67%) purchased meat twice a week. Similar findings were noted by Waghmare *et al.* (2021), where most people preferred to have non-vegetarian diets only once or twice a week. The average quantity of meat purchased at a time was found to be 1-2 kg by 85% and 3-4 kg by 15% of consumers in Zone I. In Zone II, 1-2 kg is consumed by 65% and 3-4 kg by 30% of consumers. In Zone-III, 1-2kg by 75% and 3-4kg by 25% consumer. Overall, 75% of

Table 4. Demographic information of the poultry meat consumers

Category		Frequency			Percentage (%)		
		Zone I	Zone II	Zone III	Zone I	Zone II	Zone III
Sex	Male	15	16	17	75	80	85
	Female	5	4	3	25	20	15
Frequency of meat purchase/week	1	1	-	-	5	-	-
	2	14	16	7	70	80	35
	3	5	4	10	25	20	50
	>4	-	-	3	-	-	15
Quantity of meat purchase (kg)	1-2kg	17	13	15	85	65	75
	3-4kg	3	6	5	15	30	25
	4-5kg	-	1	-	-	5	-
	>5kg	-	-	-	-	-	-
Time of purchase	Early morning	10	9	11	50	45	55
	Late morning	2	2	2	10	10	10
	Afternoon	6	8	5	30	40	25
	Night	2	1	3	10	5	15
Preferred poultry cuts	Leg	8	7	4	40	35	20
	Breast	2	3	1	10	15	5
	Wing	-	2	-	-	10	-
	Curry cuts	11	8	15	55	40	75
Important character of purchased meat	Color	8	7	8	40	35	40
	Texture	2	3	1	10	15	5
	Juicy look	4	5	4	20	25	20
	All of the above	6	5	7	30	25	35

people preferred to buy 1-2 kg of meat on a daily basis.

In Zone I, 50%, 10%, 30%, and 10%, in zone II, 45%, 10%, 40%, and 5%, while in zone III, 55%, 10%, 25%, and 15% of consumers preferred to purchase meat in the early morning, late morning, afternoon, and nighttime, respectively. It was observed that most people (50%) preferred to buy meat in the early morning, followed by late afternoon hours (31.67%) in all the zones. The study by Ojha *et al.* (2019), also observed that 55.2% and 37.6% of the buyers preferred to buy meat in the morning and evening hours, respectively. It was observed that 56.67% of the consumers preferred to buy all body parts together rather than any selected poultry cut. However, the most preferred cut-up part was leg meat (31.67%), followed by breast meat (8.3%), while the remaining consumers opted for wholesale curry cuts. According to Waghmare *et al.* (2021), all body parts of the carcass were preferred by most of the consumers (56.19%), while 43.81% preferred specific cut-up poultry parts. Among the selection of characteristic features of meat prioritized by the consumer during purchase was color of meat, which was preferred by 40, 35, and 40% of the consumers in Zones I, II, and III, respectively. The visual perception of meat texture and juiciness was preferred by 10 and 20% of the consumers in

Zone I, 15 & 25% of the consumers in Zone II, and 5 and 20% of the consumers in Zone III, respectively. Overall 30% of consumers preferred the overall appearance of the meat in all three zones as the first criterion during meat purchase. Most consumers preferred to buy meat from local roadside shops, constituting 60, 65, and 65% in Zones I, II, and III. While 20% and 10% of the consumers in Zone II and Zone III, respectively, preferred to buy packed, ready-to-cook (RTC) poultry meat from departmental stores. Whereas 20% of the consumers preferred wholesale market areas to buy meat from. The majority of the people prefer to buy hot meat that has been slaughtered and dressed in front of them. The study undertaken by Kiran *et al.* (2018) in Bangalore showed that 46.5% of meat consumers prefer to buy fresh meat from local roadside shops, and only 4.7% of people purchase meat from departmental stores. The average cost of poultry meat, according to the consumers, was Rs. 240/kg, and the majority of people (90%) purchased meat at a price ranging between Rs. 200 and 250/kg.

Handling of meat by consumers: The hygienic conditions of meat should be maintained till it is consumed to maintain the optimum quality. The manner in which consumers handle the meat can also influence the quality of the meat; the related data are presented in Table 5.

Table 5. Meat handling practices by the consumers

Attributes	Frequency				Percentage (%)			
	Zone I	Zone II	Zone III	Overall	Zone I	Zone II	Zone III	Overall
Time intervals between purchase and processing of meat								
1-2 h	13	11	16	40	65	55	80	66.67
3-4 h.	3	5	2	10	15	25	10	16.67
4-6 h	2	1	1	4	10	5	5	6.67
>6 h	2	3	1	6	5	15	5	8.33
Storage conditions of meat								
Room temp.	12	14	17	43	60	70	85	71.67
Refrigeration	6	2	2	10	30	10	10	16.67
Deep-freezer	2	4	1	7	10	20	5	11.67
Cooking method applied to process meat								
Dry cooking	4	1	5	10	20	10	25	16.67
Moist cooking	11	13	15	39	55	65	75	65
Braising	5	6	-	11	25	30	-	18.34

It was observed that most of the consumers (66.67%) used to cook meat after 1-2 hours of purchase. In Zones I, II, & III, 65, 55, & 80% of the consumers, respectively, preferred to cook 1-2 hours after the purchase, while 15, 25, & 10% of the consumers, respectively, preferred to cook after 3-4 hours of purchase. Only 10% of overall consumers preferred to cook after more than 6 hours of purchase. Poultry meat develops rigor mortis within 1-2 hours post-slaughter. Hence it can be concluded from our study that the maximum number of the consumers cook the meat at the rigor stage only. Similar findings were noted by Ojha *et al.* (2019) in their study to assess the prevailing market practices for pork; they found 74.4% of consumers cook the pork meat within 1-2 hours of its procurement. It has been observed that most of the consumers preferred to store the meat at room temperature till cooking. In Zones I, II, & III, 60, 70, and 85% of the consumers, respectively, purchased meat at room temperature. Whereas, only 16.67% and 11.67% of the consumers of the city use refrigeration

and deep freezers, respectively, for meat-storing purposes. Our data is consistent with the findings of Ojha *et al.* (2019) who reported 63.2% and 33.6% of consumers store the purchased meat storage at room temperature and under refrigeration, respectively. The cooking method followed was moist cooking by 65% of the consumers, while 16.67% and 18.34% of consumers used dry cooking and braising, respectively. In Indian conditions, gravy types of meat products are more popular. Similar findings were observed by Kiran *et al.* (2018). The findings of Menon *et al.* (2009) showed that majority of consumers prefer whole broiler meat at curry and fried items.

Perception about the hygiene in retail poultry meat shop by the consumer: The consumers' perception about the existing hygienic practices in the retail meat shops was enquired. The related data are presented in Table 6.

It was found that 71.67% of consumers agree about the overall dirty appearance of the retail shops. While, 61.67% of consumers stated that the meat-cutting wooden log was

Table 6. Meat hygiene perception by the consumers

Attribute		Frequency				Percentage (%)			
		Zone I	Zone II	Zone III	Overall	Zone I	Zone II	Zone III	Overall
Overall cleanliness status in meat shop	Clean	7	5	5	17	35	25	25	28.33
	Dirty	13	15	15	43	65	75	75	71.67
Specific problem/s observed in meat shop	Dirty cutting log	11	13	13	37	55	65	65	61.67
	Spots/dirt on meat	2	3	2	7	10	15	10	11.66
Butcher using gloves	Dirty utensils	7	4	5	16	35	20	25	26.66
	Yes	-	-	-	-	-	-	-	-
Butcher sterilizing /dipping knife in hot water	No	20	20	20	60	100	100	100	100
	Yes	-	-	-	-	-	-	-	-
Provision of dustbin in shop	No	20	20	20	60	100	100	100	100
	Yes	14	11	12	37	70	55	60	61.67
	No	6	9	8	23	30	45	40	38.33

too dirty specifically, 11.66% felt that the meat surface had dirt because of careless handling of the meat coming in contact with a dirty surface. Dirty utensils with flies sitting on them were observed by 26.66% of the consumers. The people complained that the shops and their surroundings were too dirty, and a bad smell was there in that area. It may be due to the improper disposal of wastes like offal, blood, and used water. Waghmare *et al.* (2021) showed 47.42% of people agreed about the poor hygiene and filthy status of the retail poultry meat shops. Overall, 42.78% of consumers were not satisfied with the hygienic conditions at the retail poultry meat outlets. According to 90% (Zone I), 85% (Zone II), and 80% (Zone III) of consumers, the live birds available in the cage at the retail poultry meat shops appeared healthy. Although the birds had a healthy appearance, the cleanliness status of the birds was very poor and was not acceptable to 80% in Zone I, 70% in Zone II, and 90% of consumers in Zone III. Unclean birds are found to be a nuisance and pose threats for cross-contamination of carcasses during post-slaughter handling of carcasses (Bisaillon *et al.* 1988). A very few number of consumers agreed that the cutting knife was made clean intermittently by the retailers during its use for butchering and meat-slicing purposes.

None of the butchers were found using gloves or any kind of protective body part covering. The butchers were seen chewing tobacco and spitting in between the work here and there. According to consumers (100%), the cloth used for wiping the working surface was very dirty and used to wipe hands, utensils, and multiple surfaces altogether. Use of a dirty wipe cloth could contaminate the meat since such wipe cloths showed a high load of organisms like *E. coli* and *C. perfringens*, as per a study conducted by Tebbut (1986) and Rajesh (2006). Handwashing was practiced by 44.44% of the butchers only during slaughtering and meat handling. But none of the retailers were found to use any sort of hand sanitizer, surface sanitizer, or carcass decontaminating agents. Some of the retailers found to use commercially available soap and water to wash their hands, but the time interval between washing of hands was too long. Assessment of the hygienic practices among butchers was studied by Rajesh (2006); he found that 64% of the butchers wash their hands during the work. He further noticed that in medium enterprises and licensed shops, handwashing was more prevalent than in local unlicensed butcher shops.

The aesthetic appeal of the retail shops is very important to create a good impact on the consumers' behavior. The cleanliness of the shops and adjoining area, hygiene practices of the butchers, etc., have a great impact on the purchasing decision of consumers. In Bareilly city, chicken meat was found to be the most preferred, with more sales of meat from the street-side meat retail shops. In the survey, it was observed that the hygienic practices among the meat handlers in the retail shops were highly conducive to the growth of microbes, thereby causing contamination of the meat. A poor ventilation facility and the absence of fly traps

were noticed in 66.67% of retail shops. None of the butchers were observed using protective gear such as hand gloves or headgear during bird slaughter. Only 44.44% of retailers were found to wash their hands during the slaughtering of birds, and no retailers were found to decontaminate the slaughter instruments. Half of the retailers (50%) did not have proper disposal of waste and offal in their shops. Approximately, 83.34% of retailers were found to clean their knives and wooden logs only at the end of the working day. The consumers noticed the dirty wooden meat-cutting logs (61.67%), careless and dirty handling of meat and offal (11.66%), the presence of flies over the meat surfaces (26.66%), and the wet, unclean, and dirty appearance of live birds (85%) at retail chicken shops. In addition, all the consumers (100%) agreed about the use of dirty wipe cloths by the retailers during the processing of meat. The results showed a poor picture of the existing hygiene practices in the retail shops of Bareilly, which need to be intervened.

ACKNOWLEDGEMENTS

The authors sincerely acknowledge the Director, ICAR-Indian Veterinary Research Institute, Izatnagar, for providing laboratory facilities and funding and supporting the research work.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no conflicts of interest, whether financial or otherwise

FUNDING

This study was funded by institutional research support from ICAR-Indian Veterinary Research Institute, Izatnagar.

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