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Awareness of Meat Safety and Quality among Red Meat Consumers in Kerala

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ABSTRACT

Culinary taste was observed to be important attribute towards consumption of red meat. Among these red meats carabeef and chevon were most accepted among consumers, carabeef being available at less than half of chevon price was widely consumed in Kerala state. With the aim of understanding meat consumers preferences along with their level of awareness on safety and quality of meat, the study was conducted. Socio-demography of consumers revealed that majority of respondents were middle aged group (46.66%), had graduate and above education (41.66%). Majority of carabeef consumers were employed in agriculture and animal husbandry (AH) and from salaried class with the income group of Rs. 1.8 lakh to 4.03 lakh whereas chevon consumers are from salaried class with the income group of 4.03 lakh to 6.26lakh. Fish was the most consumed meat followed by chicken, carabeef, beef and chevon with per capita consumption of 32.46 Kg, 16.5 Kg 7.26 Kg, 4.62 Kg and 3.66 Kg, respectively. Majority of (58.33%) consumers had a medium level of awareness, while studying domain-wise awareness of consumers, optimum storage conditions and consumption period for meat and awareness about hygiene at the meat shop were the domains where consumers have high (Mean score 52.83) and low level of awareness (MS 45.18). Adopting multiple linear regressions on understanding factors influencing consumer's awareness revealed that gender, education, family size, type of family and quantity of meat consumed were the factors prompting at 5 per cent level ($P < 0.05$), whereas total annual income influencing at 1 per cent level ($P < 0.01$).

Key Words: Awareness,Carabeef, Chevon, Per capita consumption, Quality meat, Red Meat.

INTRODUCTION

Red meat is an essential component of human diets, valued for its nutritional richness, including high-quality proteins, vitamins and minerals. However, the safety and quality of red meat have increasingly drawn public health and regulatory attention due to concerns about contamination, improper handling and adulteration (Gracy *et al*, 2009). Meat safety issues, such as microbial contamination, the presence of antibiotic residues and unhygienic slaughtering practices, pose significant risks to consumer health and highlight the need for effective quality control mechanisms (Viegas *et al*, 2021).

Kerala, with its unique dietary preferences and high per capita red meat consumption, presents an interesting case for studying meat safety and consumer awareness. The state's dependence on both organized retail and informal markets creates challenges in maintaining safety and quality standards. Consumer awareness is critical to mitigating health risks associated with unsafe meat practices. Studies have shown that informed consumers are more likely to demand safer, higher-quality products and adopt hygienic meat handling practices (Nagyová *et al*, 2022; Kiran *et al*, 2018). Consumer attitudes and perceptions toward meat safety and quality are shaped by a variety of factors, including cultural practices, education and socio-economic status. Research conducted in Southern India reveals

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Table 1. Distribution of red meat consumers as per their socio-demographic characteristics

n=60

Socio – demographic variable	Consumers		
	Carabeef	Chevon	Total
Age			
Young up to 35	3 (10.00)	4 (13.33)	7 (11.66)
middle aged 36-50	13 (43.33)	15 (50.00)	28 (46.66)
old aged above 50	14 (46.66)	11 (36.66)	25 (41.66)
Gender			
Male	22 (73.33)	25 (83.33)	47 (78.33)
Female	8 (26.66)	5 (16.66)	13 (21.66)
Education			
Illiterate	00	00	00
Primary and secondary	14 (46.66)	11(36.66)	25 (41.66)
Higher secondary	5 (16.66)	2 (6.66)	7 (11.66)
Graduate and above	11 (36.66)	17 (56.66)	28 (46.66)
Family size			
Small (up to 3)	5 (16.66)	2 (6.66)	7 (11.66)
Medium (3 to 6)	24 (80.0)	25 (83.33)	49 (81.66)
Large (Above 6)	1 (3.33)	3 (10.00)	4 (6.66)
Average Family size	4.5	5.23	
Type of Family			
Nuclear	15 (50.00)	13 (43.33)	28 (46.66)
Joint	15 (50.00)	17 (56.66)	32 (53.33)
Occupation			
Agriculture and Animal Husbandry (AH)	9 (30.00)	7 (23.33)	16 (26.66)
Wage employment	6 (20.00)	4 (13.33)	10 (16.66)
Salaried class	9 (30.00)	8 (26.66)	17 (28.33)
Business	3 (10.00)	7 (23.33)	10 (16.66)
Self employed	2 (6.66)	4 (13.33)	6 (10.00)
Others	1 (3.33)	0	1(1.66)
Annual income Rs in lakh			
Rs. 1.80-4.03	24 (80.00)	12 (40.00)	36 (60.00)
Rs. 4.03 - 6.26	2 (6.66)	13 (43.33)	15 (25.00)
Rs. 6.26 - 8.50	4 (13.33)	5 (16.66)	9 (15.00)

significant gaps in consumer knowledge and practices concerning meat safety, highlighting the urgent need for awareness campaigns and policy interventions (Kiran *et al*, 2018). Furthermore, perceptions of quality, hygiene and risks associated with meat often influence consumer behaviour more than actual scientific evidence (Viegas *et al*, 2021).

This study aimed to assess the awareness levels of red meat consumers in Kerala regarding safety and quality issues. By exploring consumer perceptions and attitudes, this research seeks to provide insights into the challenges faced by the state's meat supply chain and offer recommendations for improving public health and food safety.

MATERIALS AND METHODS

A study was conducted among six districts of Kerala; stratified multistage sampling was resorted for selection of the districts, the 14 districts of the state will be considered as three strata *viz.,* southern Kerala, central Kerala and northern Kerala. In the first stage of sampling, the district with the highest buffalo/goat populations as per the twentieth livestock census (DAHD,

Table 2. Distribution of red meat consumer as per their purchasing and consumption behaviour. n=60

Purchasing behaviour	Consumers		
	Carabeef	Chevon	Total
Purchasing source			
Backyard slaughtering	1 (3.33)	5 (16.66)	6 (10.00)
Retail shop	10 (33.33)	12 (40.00)	22 (36.66)
Super market	1 (3.33)	00	1 (1.66)
Hotel and retail shop	16 (53.33)	10 (33.33)	26 (43.33)
Back yard and Retail shop	2 (6.66)	3 (10.00)	5 (8.33)
Offal consumption			
Grey offal	8 (26.66)	13 (43.33)	21 (35.00)
Red offal	4 (13.33)	4 (13.33)	8 (13.33)
Dark offal	00	12 (40.00)	12 (20.00)
Non consumers	20 (66.66)	10 (33.33)	30 (50.00)
Factors considered while purchasing			
Quality	6 (20.00)	5 (16.66)	11 (18.33)
Price	1 (3.33)	1 (3.33)	2 (3.33)
Both	23 (76.66)	24 (80.0)	47 (78.33)

2021) from each stratum would be selected for the study. Thus in the case of carabeef value chains, Malappuram, Thrissur and Kollam districts will be selected, whereas in the case of chevon value chains, Malappuram, Palakkad and Thiruvanathapuram districts will be selected respectively from the northern, central and southern Kerala. In the second stage of sampling from the selected districts of each stratum 10 consumers will be randomly selected (Verma, 2019) with respect to chevon and carabeef so that the study would cover a total of 30 chevon consumers and 30 carabeef consumers. Hence, 60 respondents were interviewed with pretested interview schedule, which was subjected to pilot study at Kannur and Wayanad district. Consumers Awareness on safety and quality of meat was analysed using the adopted scale (Aswathy, 2023). The multiple linear regression analysis was used to find out factors influencing the awareness of consumers about safety and quality of meat and meat products. The collected data was analysed by SPSS version 24.0.

RESULTS AND DISCUSSION

The findings of this study (Table 1) indicated that majority of the respondents were old-aged (43.33%), whereas among chevon consumers majority are from middle aged group (50.00%). Education profile of respondents revealed that majority of carabeef consumers (46.66%) were possess primary and secondary education, whereas majority of chevon consumers (56.66%) had graduate and above education, with respect to family size both carabeef and chevon consumers (80.0% and 83.33%) majorly belongs to medium family size. Studying occupation and annual income of red meat consumers, majority of carabeef consumers employed in agriculture and AH sector and works as salaried employee (30.00% each) and belongs to the income group of Rs. 1.8lakh to 4.03 lakh (80.00%), whereas majority of chevon consumers were belongs to salaried class (26.66%) and falls to the income group of Rs. 4.03 lakh to 6.26 lakh (43.33%). The above results were in consistent with findings of Kiran *et al* (2018) and Chandran *et al* (2024) with respect to studied age group.

Table 3. Per capita meat consumption (Kg.)

n = 60

Meat type	Carabeef Consumers	Chevon Consumers	Average
Fish	32.4	32.52	32.46
Chicken	15.24	17.76	16.5
Carabeef	8.04	6.48	7.26
Beef	4.56	4.68	4.62
Chevon	3.24	4.08	3.66
Others	3.24	0.24	1.74
Total	66.72	65.76	66.24

Table 4. Distribution of consumers based on overall awareness about safety and quality of meat and meat products. n=60

Sr. No.	Scores	Carabeef f (%)	Chevon f (%)	Total f (%)
1	Low (80-89)	8 (23.66)	2 (6.66)	10 (16.66%)
2	Medium (90-98)	19 (63.33)	16 (53.33)	35 (58.33%)
3	High (99-108)	3 (10.00)	12 (40.00)	15 (25.00%)
4	Total	30 (100.00)	30 (100.00)	60 (100.00)

It could be inferred from the study (Table 2) that hotel and retail shop was the most preferred source for carabeef purchase (53.33%), which was followed by retail shop source (33.33%). Among the chevon consumers, retail shop was the most depended source (40.00%) which was followed by hotel and retail shop source (33.33%). Studying the preference for offals revealed that little more than quarter of studied carabeef consumers (26.66%) preferred grey offal whereas only 13.33 per cent of carabeef consumers preferred red offal. With respect to chevon consumers nearly half of the respondents (43.33%) preferred grey offal, followed by this little less consumers (40.00%) preferred dark offal, whereas preference for red offal was meagre (13.33%). Two third (66.66%) of carabeef consumers, don't prefer any kind of offals, whereas it was accounted to be one third (33.33%) among chevon consumers. In contrary study conducted by Ayman *et al* (2020) on offal consumption and documented that dark offals were the least preferred type of offal meat, while grey offals were consumed by only about half of the population. Among the factors quality and price, majority of consumers (78.33%) considered both while purchasing red meat.

The most preferred meat was fish (32.46 Kg) followed by chicken (16.5 Kg), carabeef (7.26 Kg), beef (4.62 Kg) and chevon (3.66 Kg). apart from quantity of consumption there was no significant difference in order of preference among carabeef and chevon consumers towards various meat types. It was observed from the other studies (Kiran *et al,* 2018; Jayanthi *et al,* 2024 and Sivaprasad *et al,* 2024) that chicken was the most preferred among other meats, whereas they haven't considered fish among those meat categories.

From data in Table 4 it can be inferred that with respect to the extent of awareness of consumers about the safety and quality of meat and meat products, 58.33 per cent of consumers had a medium level of awareness while 25.00 per cent of consumers had a high level of awareness only 16.66 per cent consumers had a low level of awareness. Similar study was conducted by Aswathy (2023) and reported that majority of studied consumers had medium level of awareness, followed by low and high level of awareness.

Table 5. Domain-wise awareness of consumers about safety and quality of meat and meat products. n=60

Sr. No.	Domain-wise awareness of consumers	Carabeef		Chevon		Red meat	
		Mean score	Rank	Mean score	Rank	Mean score	Rank
1	Optimum storage conditions and consumption period for meat	52.66	1	53	2	52.83	1
2	Meat quality	52	2	53.45	1	52.73	2
3	Packed meat and meat products	51	3	51	5	51	3
4	Hygiene of the meat handler	50.28	4	50.57	6	50.43	4
5	Hygiene cooking practice	47.33	7	51.66	3	49.49	5
6	Post-buying hygienic meat handling practices for consumers	45	5	51.2	4	48.1	6
7	Meat storage practice for consumer	45	6	48.75	7	46.88	7
8	Awareness about hygiene at the meat shop	44.54	8	45.81	8	45.18	8
	Total	48.43		50.27		49.58	

Table 6. Demographic variables associated factors influencing the awareness of red meat consumers about safety and quality of meat and meat products

X_i	Variables	Carabeef		Chevon	
		Standardized Co-efficients β_i	t-statistic	Standardized Co-efficients β_i	t-statistic
X_1	Age	-.198	-1.244	-.216	-1.298
X_2	Gender	.266*	2.767	.294	1.985
X_3	Education	.405*	2.148	.415*	2.851
X_4	Social category	-.133	-.697	-.035	-.212
X_5	Occupation	.160	.895	.144	1.060
X_6	Total annual income	.397*	2.137	.172**	6.381
X_7	Members of group or association	-.278	-1.525	.315	1.700
X_8	Quantity of meat consumed / month (kg)	.435	1.040	-.479*	-2.653
X_9	Offal consumption	.374*	3.027	.157	1.018
X_{10}	Family size	-.183	-.742	-.217*	-7.832
X_{11}	Type of family	-.050	-.224	.546*	2.819
X_{12}	Locality	.153	.916	-.063	-.489
X_{13}	Frequency of consumption	-.268	-.734	.235	1.187
	a. Dependent Variable: Awareness Score				
		N = 30		N =30	
		F-Value = 12.843*		F-Value = 17.990**	
		R^2 = 0.956, Adjusted R^2 = 0.903		R^2 = 0.971, Adjusted R^2 =0 .908	
		* - P < 0.05 ; ** - P < 0.01		* - P < 0.05 ; ** - P < 0.01	

Results with respect to the domain-wise awareness of about safety and quality of meat and meat products (Table 5), it could be inferred that optimum storage conditions and consumption period for meat was the domain where consumers have more awareness (Mean score 52.83), followed by this domains like meat quality (MS 52.73), packed meat and meat products (MS 51), hygiene of the meat handler (MS 50.43), hygiene cooking practice (MS 49.49), post-buying hygienic meat handling practices for consumers (MS 48.1) were in the rank order. Meat storage practice for consumer (MS 46.88) and awareness about hygiene at the meat shop (MS 45.18) were the domains where consumers have lack of awareness.

Among the 13 independent variables used in the regression analysis, the variable gender, education, total annual income and offal consumption was found to influence positively on the extent of awareness of carabeef consumers about safety and quality of meat and meat products at 5 per cent level ($P < 0.05$). Studying among chevon consumers the variables education and type of family were found to influence positively the extent of awareness of chevon consumers about safety and quality of meat and meat products at 5 per cent level ($P < 0.05$), whereas the variables quantity of meat consumed per month and family size were found to influence negatively at 5 per cent level ($P < 0.05$), it was also observed that total annual income was found to influence positively at 1 per cent level ($P < 0.01$) among chevon consumers.

CONCLUSION

It can be concluded from the present study that the red meats were majorly purchased from retail shop and hotels, whereas found that specifically chevon had additional supply chain from backyard slaughtering. Consumers willing less preferred for carabeef offals in compare with chevon. Majority of consumers considering both quality and price attributes while purchasing red meats. Fish was the most consumed meat among study group followed by chicken, carabeef, beef and chevon, except quantity of consumption there is no much difference in preferred rank order of above mentioned meat. Majority of consumers possess medium level of awareness on quality and safety of meat and meat products. Optimum storage conditions and consumption period for meat and awareness about hygiene at the meat shop were the domains where consumers have difference in awareness level with highest and lowest scores respectively. Total annual income was the factors which contribute majorly to the awareness level of consumers towards hygiene and safety of meat and meat products. The results of present study may provide insights into future strategies that extension educationist and meat scientists can adopt to better recognise consumer needs and address food safety challenges in India. Also it assists in understanding consumer preferences and the factors influencing them are crucial for effectively utilizing marketing tools and developing new strategies.

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