

Beef Consumers and their Relationship to Animal Welfare

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Abstract

The study's objective was to determine how beef consumers in the northern area of Quito (Ecuador) perceive animal welfare as important and how they behave in this regard. 407 face-to-face surveys were administered in 20 supermarkets and 13 municipal and popular markets in the city's northern sector. Respondents were stratified according to a place of purchase, gender, age and socioeconomic level. A high percentage of consumers were knowledgeable about animal welfare (72.7%). In addition, it was determined that more than 70% of consumers had a favorable perception, attitude and behavior toward animal welfare; however, those who bought in popular markets were the ones who showed less interest in animal welfare. Young people are more concerned about animal welfare, while older adults form the group with the least concern for the issue ($p < 0.05$). 78.1% of consumers, mainly from a high socioeconomic level, were willing to assume up to 20% additional price for meat that exhibits an animal welfare seal. It was concluded that a large percentage of consumers in the northern zone of Quito were concerned and willing to pay extra to consume products obtained under animal welfare standards, although with differences depending on their age, socioeconomic level and place of purchase.

Keywords: *five freedoms; consumption; beef; price; concern.*

1. Introduction

Beef is the third most consumed source of animal protein by the human population worldwide, behind only poultry and pork [1]. In this sense, the Latin American agricultural sector has evolved thanks to economic, social and political changes that have increased its productivity [2-4]. This has gone hand in hand

with an increased demand for meat produced in developing countries [3,5-8] [3,5-8]. According to the Panorama Agroalimentario de los Fideicomisos Instituidos en Relación con la Agricultura, world beef production grew at an average annual rate of 0.3% between 2007 and 2016, being able to reach in 2017 an all-time high of 61.3 million metric tons, representing an annual increase of 1.4% [9].

Meat fit for human consumption must have certain characteristics that constantly evolve according to market conditions [10]. Concerning animal welfare, in Europe, for example, the market approach is inclined towards the care of animals during the production, transport and slaughter stages. An example of this is the legislation in force in the European Union, which includes protocols, treaties and annexes, such as the Protocol on the Protection and Welfare of Animals annexed to the Treaty of Amsterdam, which amended the 1997 Treaty of the European Union [11]. [11]. Based on the aforementioned regulations, producers seek alternatives that improve animal welfare during production, transport and slaughter. Likewise, industrialists elaborate meat products under ecological, organic or similar standards, characterized by the use of production techniques that coexist with natural systems, avoiding environmental contamination, economizing the use of resources and ensuring the ethical treatment of animals [3,12-14]. All to meet the requirements of consumers who are increasingly concerned about animal welfare and who suggest that regulations should be more restrictive [15]. [15].

At the Latin American level, it was found that a growing group of meat consumers in Mexico, Chile and Brazil prefer products with added value, including animal welfare, and are willing to pay a higher price for it [16,17]. However, in Ecuador, the meat market has promoted technified production systems, leaving aside consumers' growing interest in environmentally friendly products and animal welfare [18-20].

Therefore, the present research sought to determine the degree of interest of beef

consumers in animal welfare through their perception, attitude and behavior. Differences were considered according to the place of purchase, gender, age and socioeconomic level in the hope that animal welfare could be appreciated as a concept that adds value to the commercialization of beef.

2. Materials and Methods

2.1. Study design

The study was descriptive and cross-sectional and was carried out through personal interviews in seven urban parishes (Carcelén, Cochapamba, Comité del Pueblo, Cotacollao, El Condado, Ponceano and La Concepción) and five rural parishes (Guayllabamba, Pomasqui, San Antonio, Calderón and Pacto) in the Metropolitan District of Quito, Ecuador. Within these parishes, 20 supermarkets and 13 municipal and popular markets were selected.

The population surveyed consisted of people between 18 and 83 years of age who reported consuming beef and buying meat products in the supermarkets and markets in the northern Quito region selected for the study. These participants were stratified according to their socioeconomic level, as described by the National Institute of Statistics and Census of Ecuador (INEC), which categorizes five groups (A, B, C+, C- and D). However, the study merged the first two strata (A and B) to define the high socioeconomic level, as well as the two intermediate categories (C+ and C-) to define the medium socioeconomic level and considered the low socioeconomic level (D) as a single group [21].

Consumers were classified according to gender (male, female) and age (youth: under 25 years of age; young adults: between 25 and 45 years of age; adults: between 46 and 65 years of age; older adults: over 65 years of age). The

population was also divided according to the place of purchase, i.e., whether consumers purchased meat in supermarkets (belonging to large commercial chains), medium and small supermarkets (belonging to smaller commercial chains), municipal markets with an established marketing structure (municipal operating permits, schedules and places assigned by product line) and informal popular markets, with no established structure.

2.2. Sample

Before the data collection instrument application, all consumers were presented with an informed consent document, interviewing only those who accepted the intervention and signed the document.

A non-probabilistic purposive sampling was carried out using the formula for infinite populations (greater than 100,000). The result determined that 385 surveys should be carried out, although, finally, an additional 10% of surveys were executed to reduce errors, obtaining a total of 424 surveys. However, the surveys that did not present complete information were discarded, ending with 407 valid surveys for data analysis.

2.3. The survey

Two previous studies were considered in the survey design, one carried out in Chile [22] and another conducted by Welfare Quality® in seven European countries (Hungary, Italy, France, United Kingdom, Netherlands, Norway, and Sweden) [23]. The survey was validated with 15 people, conducting seven surveys in popular markets and eight surveys in supermarkets.

To determine whether the beef consumers surveyed were aware of animal welfare, the question “Have you ever heard of animal welfare?” was asked. Then, to confirm their

response, they were asked if they had heard of any of the five freedoms presented in the form of statements.

To determine the perception of animal welfare, three survey questions were asked: “Do you believe that the level of welfare and protection given to animals for consumption in Ecuador is adequate? Do you believe that adequate animal welfare during the animal’s life will improve the meat’s flavor? And Do you believe that products of animal origin that display a seal indicating that the product has been produced under animal welfare standards are healthier?”

To determine the attitude, understood as the action of purchasing beef depending on whether or not they consider the welfare of the animals from which the beef originates to be important, three questions were used: do you consider it wrong to consume food of animal origin from animals that have suffered throughout their lives; do you consider it important to apply animal welfare protocols in animals destined for consumption; and would you like to find products of animal origin that display an animal welfare seal?

To determine behavior, understood as a habitual procedure related to the attitude of consumers towards the purchase of meat that comes from animals that were raised under animal welfare standards, two questions were used: would you be willing to pay a higher price for food of animal origin if it exhibited a seal indicating that the animals were treated under animal welfare protocols, and how much more would you be willing to pay per pound of meat that exhibits an animal welfare seal? In Ecuador, beef is marketed to the final consumer by the pound; the average price per pound of beef at the time of the surveys was \$2.5 (two dollars and fifty cents). For the second question, respondents had four response

options, 10% additional (25 cents), 20% additional (50 cents), 40% additional (one dollar) or another value (open response). These values were defined considering the criteria of beef traders, who based themselves on the estimated price fluctuation of the year before the year of the study (unpublished data).

The questions posed were dichotomous responses (yes or no). Only in the question about paying extra for each pound of meat with an animal welfare seal were more than two alternatives (categorical type).

Statistical analysis

The data obtained from the survey were tabulated in the IBM SPSS 20® program. The Chi-square test was performed, considering a significance value of $p < 0.05$, to determine possible significant differences according to gender, age, socioeconomic level and place of purchase.

3. Results and Discussion

59.5% of the surveys were conducted in urban parishes and 40.5% in rural parishes. Of the two geographic groups of surveys, 18.7% were conducted in supermarkets, 36.6% in medium/small supermarkets, 4.2% in municipal markets with a defined marketing structure, and 40.5% in popularly oriented markets without a defined marketing structure.

In addition, 49.8% of the respondents were male, and 50.2% were female. Likewise, 24.3% belonged to the youth group, 44.1% to young adults, 23.5% to adults and 7.8% to older adults. According to socioeconomic level, 20.1% of the respondents corresponded to the low socioeconomic level, 67.8% to the medium level and 12.1% to the high level.

There were differences in beef consumers' perception, attitude and behavior according to

the place of purchase. Those who bought in popularly oriented markets showed less interest in animal welfare. Similarly, older adults showed the least concern for the welfare of the animals that provide the meat they consume; in contrast, young people showed the greatest concern for animal welfare. According to socioeconomic level, it was found that consumers in the highest stratum showed greater knowledge of animal welfare and were willing to assume an additional cost for meat obtained under these precepts (Tables I and II).

3.1. Consumer Knowledge

72% of those surveyed stated that they knew about animal welfare because they had read or heard about it and the five animal freedoms. Likely, the high percentage of Quiteño consumers who mentioned knowing about animal welfare is a consequence of a popular consultation carried out in Ecuador, in which informative campaigns on animal welfare in the bovine species were carried out, giving rise to the prohibition of bullfighting in the city of Quito, which eventually evolved into the creation of Municipal Ordinance 019 that regulates animal welfare for all animals in the Metropolitan District of Quito [24].

In the comparative analysis, age and socioeconomic level were relevant factors (Table 1). Eighty percent of young people mentioned knowing about animal welfare, while only 50% of older adults mentioned knowing something about this topic. On the other hand, 93.3% of people from the high socioeconomic stratum expressed knowledge about animal welfare, in contrast to 63.4% of respondents from the low socioeconomic stratum. These results agreed with those obtained in an Italian study with populations of different ages and economic strata, finding that young millennials and those with a high

socioeconomic level, represented by professionals and university students, had greater knowledge about animal welfare [25]. Likely, the results of the present study and the Italian research are because, in recent decades,

there have been many social changes accompanied by changes in the educational system, which have oriented teaching with an emphasis on the care of the environment and the beings that inhabit it [26].

Table 1. Statistical significance according to a place of purchase, gender, age and socioeconomic level for each question made up the evaluation of beef consumers' knowledge, perception, attitude and behavior in the northern zone of Quito ($p < 0.05$).

Variable	Question	Place of purchase	Genre	Age	Socioeconomic level
Knowledge	1	n.s.	n.s.	0.003	0.001
Perception	2	0.031	n.s.	<0.001	n.s.
	3	n.s.	n.s.	n.s.	0.010
	4	n.s.	0.051	n.s.	n.s.
Attitude	5	0.011	n.s.	0.025	n.s.
	6	n.s.	n.s.	n.s.	n.s.
	7	n.s.	n.s.	n.s.	n.s.
Behavior	8	0.010	n.s.	<0.001	0.004

n=407

1 Have you ever heard of animal welfare?

2 Is the level of welfare and protection given to food animals in Ecuador adequate?

3 Will proper animal welfare during the animal's life improve the meat's flavor?

4 Are animal products that display a seal indicating that the product has been produced in compliance with animal welfare standards healthier?

5 Is it wrong to consume animal foods from animals that have suffered throughout their lives?

6 Is it important to apply animal welfare protocols in food animals?

7 Would you like to find animal products that display an animal welfare seal?

8 Would you pay a higher price for animal-derived foods if they displayed a seal indicating that the animals were treated under animal welfare protocols?

3.2. Consumer Perceptions

The responses of 85% of respondents suggest that animals in Ecuador do not receive protection and that their welfare is not adequate. Comparing the results according to the age of the respondents, it was found that

there is a higher percentage of older adults (40.6%) who believe that animal welfare and protection conditions in the country are adequate, compared to the percentage of young people (10.1%) (Table 1, $p < 0.001$). A similar situation was described in Chile, as it was found

that young adults (under 35 years of age) are more aware of the animal welfare issue than older adults [27]. In this regard, it is mentioned that some consumers currently belong to the first generation of digital natives, who have lived in cities since birth and have had little or no contact with rural areas; therefore, they are unfamiliar with the processes of meat production and industry and may perceive any animal handling process as inadequate [28]. [28].

When the results were broken down by place of purchase, more than 80% of respondents considered animal welfare conditions in Ecuador deficient. Even so, small and medium-sized supermarkets showed the highest percentage (89%) of respondents with this perception (Table I, $p=0.031$). However, according to a study conducted in markets and supermarkets in Guayaquil and Santo Domingo de los Tsáchilas, meat consumers do not have animal welfare among their main concerns when making purchases. [18].

On the other hand, 80% of consumers considered that meat flavor would be improved by applying animal welfare protocols. In this sense, it is known that the stress suffered by animals before slaughter can affect some organoleptic characteristics of the meat obtained from them, especially its tenderness and juiciness, which in turn affect the flavor perception of the product. [29]. It should be noted that, in the present study, only two response options were offered to the respondents (Yes/No); however, by increasing the number of response options, it is estimated that the result may differ as the participants will select different alternatives decreasing the number of responses per option [30]. In all purchasing locations, more than 75% of the respondents considered that applying animal welfare protocols would improve the flavor of

the meat, with no significant difference by purchasing location.

78.4% of respondents assumed that meat produced under animal welfare standards is healthier without finding significant differences in the study variables. It was similar to what was described in a study carried out with a group of Mexican consumers who mentioned that they would select meat produced under animal welfare concepts because they considered it healthier [31].

3.3. Consumer Attitude

93.1% of consumers thought it was wrong to consume food from animals that suffered during their lives, this percentage being lower in popular markets (88.5%). Likewise, a greater concern was noted in the age group of youth and young adults compared to adults and older adults, as observed in a similar European study [32].

Regardless of the place of purchase, 98.3% of respondents considered it important that cattle are handled according to animal welfare standards, which, surprisingly, contrasts with results obtained in the European Union, where lower values were found than in the present study [23]. However, it is important to consider that the interviewees try to answer the questions in a way that is under what is expected by society; in this case, a bias could be generated in which the respondents could change their answers according to what they considered appropriate to gain the sympathy of the interviewer [33]. Similarly, it is noted that the variations in the result may be a consequence of the number of response options received by the respondents in this study, being too few (only two) to obtain more accurate appreciations [34].

99.5% mentioned that they would like to find meat that displays an animal welfare seal. In this regard, several studies around the world, including Latin American countries, have shown that consumers interested in acquiring products from animals raised, transported and slaughtered in accordance with their welfare require that these be identified with an appropriate label. [17,25,31,35].

3.4. Consumer Behavior

78.1% of the respondents were willing to assume an additional cost per pound of beef as long as a seal indicating that the product was produced in compliance with animal welfare protocols was displayed (Table II). [17,25,31,35].

It was observed that supermarkets had the highest percentages of consumers willing to assume an additional cost for meat with an animal welfare seal (85.5%) and the lowest percentages (72.1%) in popular markets without a defined marketing structure.

Some 32.9% of respondents would be willing to assume an extra 10% over the purchase price of each pound of beef, 33.4% could assume up to an additional 20% and only 11.8% up to an additional 40%. These results differ from those observed in a study done on surveyed Mexican consumers, where only one in ten would be willing to pay more than 10% of the base market value for each unit of meat, but 90% of the respondents would not pay more than 10% extra for animal welfare certified beef [31]. In contrast, another study mentions that Spanish consumers would be willing to pay up to 16% extra on the value of each kilo of meat certified for animal welfare [36].

About the age of consumers, 85.1% of young people would be willing to pay additional value for meat produced with animal welfare, compared to 34.4% of older adults. This is similar to the response of young Spaniards because they form an age group willing to pay more for food as long as the product complies with the animal welfare-friendly standard [36].

Table 2. Percentage relationship between consumers interviewed in the northern zone of Quito (n=407), according to a place of purchase, gender, age and socioeconomic level, and the values they would be willing to assume, or not (in US dollars), for the purchase of beef, obtained considering the welfare of the animals during raising, transport and slaughter.

Variable		Extra \$0	Extra \$0.25	Extra \$0.50	Extra \$1.0	p<0.05
Location	Large supermarket	14.50	28.90	35.50	21.10	0.47
	Medium/small supermarket	18.80	34.90	35.60	10.70	
	Municipal market	23.50	11.80	47.10	17.60	
	Popular market	27.90	35.20	29.10	7.90	
Genre	Male	20.20	39.40	29.60	10.80	0.50
	Female	23.50	26.50	37.30	12.70	
Age	Young	14.10	30.30	40.40	15.20	<0.001
	Young adult	13.90	37.80	35.00	13.30	
	Adult	30.20	31.30	30.20	8.30	
	Older adult	65.60	18.80	12.50	3.10	

Socio-economic level	Low	34.10	39.00	19.50	7.30	<0.001
	Medium	19.90	34.80	38.40	6.90	
	High	12.20	12.20	28.60	46.90	
Total		21.90	32.90	33.40	11.80	

It was also determined that a higher percentage of consumers from the high (87.7%) and middle (80.8%) socioeconomic levels would be willing to assume an additional value for meat with animal welfare certification, while those from the low socioeconomic level (65.9%) would be less willing to assume an additional value (Table I, $p=0.004$). This is similar to what was observed in a Spanish study in which consumers with better education and income seek animal welfare-friendly products [26]. Also similar to what was described in Chile, where the population with a medium socioeconomic level was willing to pay more for environmentally friendly products to comply with conditions that ensure animal welfare [28]. In general, the willingness to pay more for a product that complies with animal welfare standards depends on the socioeconomic level of the consumers, with those in the middle and high levels being the most willing to assume the cost of animal welfare [26,32,36,37].

Finally, no significant differences were found between genders in most of the aspects considered in this study; the only difference was in the perception of the female gender that meat obtained under animal welfare protocols is healthier. In addition, contrary to what was observed in other studies, women were more willing to look for and purchase products identified with labels or seals that guarantee that they were obtained taking care of the animals' welfare [38,39].

4. Conclusions

There are differences in beef consumers' perceptions, attitudes and behavior in northern Quito about animal welfare according to their age, socioeconomic level and place of purchase. Respondents with higher purchasing power and younger age are the most willing to consume beef obtained under animal welfare conditions and identified as such with a distinctive seal. More than 60% of the beef consumers who participated in this study would be willing to assume an additional value of 10 to 20% for each pound of beef obtained under animal welfare standards.

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