

Evaluation of Socio-Economic Factors Affecting Chicken Meat Consumption in Turkey

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ABSTRACT: In this research, socio-economic and demographic characteristics of consumers living in urban areas throughout Turkey were set forth and it was determined that how these characteristics influenced chicken meat consumption preferences. In this sense, a survey study was conducted involving 2690 consumers from 12 provincial centres to represent each region in SRUC (Statistical Regional Units Classification) Level 1 regions of Turkey. The data obtained through one by one interview method. Logistic Regression analysis was utilized in the study in order to reveal the factors affecting chicken meat consumption. In the analyse, chicken meat consumption behaviour was considered as a dependent variable (non-consumers and consumers) and age, gender, education of consumer, number of total individuals in the household and region of birthplace were also considered as independent variables. As conclusion of the research, it was found that consumer age decreases the chicken meat consumption possibility of consumer in the rate of 1%. Income variable was found statistically significant in regression model comparing the chicken meat consumers to non-consumers. While possibility of consumers with higher income (more than 5000 TL) on consuming chicken meat was 40% more than the consumers within middle income level (between 1200 and 2500 TL), it was determined that consumers with higher income, relatively had more likelihood of consumption in a rate that could be considered lower (5%) compared to consumers included in 2500 and 5000 TL group.

Keywords: Chicken meat, Consumption, Logistic regression, Socio-economic factor

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Türkiye’de Tavuk Eti Tüketiminde Etkili Olan Sosyo-Ekonomik Faktörlerin İncelenmesi

ÖZ: Bu araştırmada Türkiye genelinde kentsel alanda yaşayan tüketicilerin sosyo-ekonomik ve demografik, özellikleri ortaya konularak bu özelliklerin tavuk eti tüketim tercihlerine nasıl yansıdığı belirlenmiştir. Bu kapsamda her bir İBBS (İstatistiki Bölge Birimleri Sınıflaması) Düzey 1 bölgesini yansıtmak üzere, 12 il’de ve 2690 tüketici ile anket çalışması gerçekleştirilmiştir. Veriler birebir görüşme ile elde edilmiş anket verileridir. Çalışmada tavuk eti tüketimini etkileyen faktörlerin ortaya konulmasında regresyon analizlerinden yararlanılmıştır. Bu analizde, tavuk eti tüketim davranışı (tükenmeyenler ve tüketenler) bağımlı değişken, tüketicinin yaşı, eğitimi, cinsiyeti, doğum yeri, geliri, hanedeki birey sayısı ve doğum yeri bölgesi ise bağımsız değişkenler olarak ele alınmıştır. Araştırmada, tüketici yaşının bir yaş artmasının tavuk eti tüketme olasılığını %1 azalttığı sonucuna ulaşılmıştır. Gelir değişkeni, tavuk etini tüketenlerin tüketmeyenlere göre kıyaslandığı lojistik regresyon modelinde istatistiksel olarak anlamlı bulunmuştur. Yüksek gelirli tüketicilerin (5000 TL’den fazla) orta gelir grubunda yer alan (1200 - 2500 TL) tüketicilere göre tavuk eti tüketme ihtimalleri %40 daha fazla iken, 2500 - 5000 TL grubunda yer alan tüketicilere göre nispeten daha düşük sayılabilecek bir oranda (%5) tüketme olasılıkları daha fazla olduğu tespit edilmiştir.

Anahtar Kelimeler: Tavuk eti, Tüketim, Lojistik regresyon, Sosyo-ekonomik faktörler

INTRODUCTION

Livestock products are the stable products that are necessary for human health and nutrition (1). Chicken meat is one of the most important protein sources that need to be consumed for physical and mental development, for healthy and balanced diet (2). It is necessary to evaluate chicken consumption in order to ensure more consumption of chicken meat forming the most important group of livestock products, and to bring this consumption to an efficient level on the purpose of ensuring the balanced and adequate diet in Turkey where the population grows rapidly and economic development efforts are sustained intensively.

Problems experienced in production and supply chain of red meat have brought up meat import in the recent years and accordingly it has caused concerns on procurement source of meats to become widespread.

Chicken meat emerges as an important alternative for both coping with the decrease in real incomes of consumers and eliminating the problems encountered in production, supply and marketing chain of red meat and closing the gap livestock protein deficiency at a faster rate with a lower cost (3). The fact that poultry meat sector has been determined as one of the sub-sectors that could compete with EU within food sector. The sector forms a large employment and is considered as one of the most well-organized food sub-sectors in Turkey. Chicken meat per capita consumption is in an upward trend in Turkey (4). Because chicken meat has low fat, higher protein value, it is rich in terms of vitamins and minerals, the preparing chicken meat for consuming is easy, and it can be used in a variety of dishes and the price of it are much more reasonable compared to red meat.

In Turkey, it has been endeavoured to balance the livestock protein deficiency resulting from regression of the red meat production occurring due to cost problems and crisis with the increase of chicken and turkey meat production in Turkey. Chicken meat consumption which was 11.05 kg per person in 2000 in Turkey, took place respectively as follows; 14.53 kg in 2005, 19.43 kg in 2011 and 21.8 kg in 2015 (3,5). According to 2015 data of World Agricultural Outlook issues by OECD-FAO chicken meat is consumed annually per person as follows; 43.2 kg in USA, 18.1 kg in EU, 30.1 kg in Canada, 22.9 kg in Russia. Chicken meat consumption takes places above the EU average in Turkey (21.8 kg) (6).

There are numerous research studies conducted on the consumption of chicken meat in the World and Turkey. However, the majority of these studies were carried out on a regional or provincial basis and there was no study conducted on country level. Some research showed that some physiological and psychological variables as well as gender, race, ethnicity, place of residence and social class were among main factors influencing the food consumption (7). A study was done in Europe stated the main factors affecting consumption of poultry meat. According that, relatively low and competitive pricing of poultry compared to other meat, the absence of cultural or religious obstacles, and dietary and nutritional (protein) qualities are the main factors explaining its attractiveness (8). In some studies, while chicken meat was more widespread among youngsters (9,10) was stated, in another study, disabled and alcohol consumer individuals with lower education levels consumed more meat and meat products (11). The persons drinking alcohol once in a day and smoking cigarette preferred red meat more compared to chicken meat (11) and lamb and fish were preferred more by elderly people (10). In a study conducted in Korea, the author expressed that chicken meat was a livestock product consumed following fish, beef and pork meat (12). The main factors affecting the meat demand were found as increasing health concerns and changes occurring on meat prices (13). A research in Great Britain showed that, 28.3% of the consumers decreased their meat consumptions by the reason of their health concerns (14). Another study in USA stated that beef, lamb, chicken and turkey meat demands of households were lower than vegetable and fruit demands; and chicken meat was preferred more compared to red meat and fish (10). In a study conducted in Turkey, it was detected that the consumers' average chicken meat consumption would increase 82% by increase of their income by 100% (15).

Regional studies with the limited information may not reflect the consumers' behaviours completely for country-wide. Because of that the study is very important to understand of the consumers' preferences to chicken meat throughout the country level in Turkey and with respect to scope of the study, it gives macro level information. In the study, socio-economic and demographic characteristics of the consumers living in urban areas throughout Turkey were set forth and was determined that how these characteristics affect chicken meat consumption preferences of them. In this sense, consumer profile was reflected by means of this research which was conducted in 12 provinces centres of Turkey with 2690 consumers.

MATERIALS and METHODS

Survey data obtained through one by one interview and the survey was carried out with consumers in 12 provincial centres to represent each region in SRUC (Statistical Regional Units Classification) Level 1 regions of Turkey constituted the main material of the study. 2014 population data of Turkish Statistical Institute formed a basis for determining the provinces. The provinces that had the highest population involving the age of 15 and over for each SRUC Level 1 regions were included in the study. Proportional sample volume formula was utilized in determining the number of consumers to be interviewed (16).

$$n = \frac{Np(1-p)}{(N-1)\sigma_{\hat{p}_x}^2 + p(1-p)}$$

In the above formula n =sample volume; N = number of population in the provinces within the scope of research $\sigma_{\hat{p}_x}^2$ =variance; since it was desired to reach maximum sample volume in the research, $p=0.50$ value which ensures the magnitude to be as large as possible and will give the greatest value in multiplying with $p(1-p)$ was accepted.

Total population of Turkey aged 15 and over was 68 833.474 in 2014 (17). Total population of 12 provinces in the study zone aged 15 and over is 31 270 936 and it represents the 45% of total country population. Sample volume was found as 2690 for 99% confidence interval and 2.5 margin of error. The number of surveys conducted was proportionally distributed to provinces. Accordingly, following number of surveys were applied to consumers; 1065 in İstanbul, 376 in Ankara, 306 in İzmir, 203 in Bursa, 161 in Antalya, 125 in Gaziantep, 94 in Kayseri, 92 in Samsun, 90 in Balıkesir, 69 in Van, 56 in Trabzon and 53 in Erzurum. Survey study, conducted simultaneously in the provinces, were carried out in city centres in October-December 2015. Logistic Regression analysis was utilized in the study in order to reveal the factors influencing chicken meat consumption. First of all, function types such as linear, logarithmic, quadratic, exponential etc. were tested and it was observed that linear model was the most appropriate one. In this model, chicken meat consumption behaviour was considered as dependent variable (non-consumers and consumers) and age, gender, education of consumer, number of total individuals in the household and region of birthplace were considered as independent variables. It was tested that if there was a multiple connectivity problem among independent variables or not by means of variance inflation factor (VIF) and condition index (K) values during estimation process of the model.

In logistic model dependent variable average is calculated as a possibility in the following manner;

When the possibility belonging to desired case is P , the possibility of undesired case in $1-P$

β_0 : Constant coefficient belonging to equation (intercept), β_1 , β_2 . and β_p : regression coefficients belonging to independent variables (slopes).

X_i : Value belonging to i . independent variables (for instance; discrete independent variable could take the value of $X_{i=1}$ for $i=1$ or $X_{i=0}$) and

p : Number of variables ($i=1,2,3,\dots,p$)

When the possibility of desired case ($Y=1$) is;

$$P(Y = 1|X_1, X_2 \dots X_p) = \frac{e^{\beta_0 + \beta_1 X_1 + \dots + \beta_p X_p}}{1 + e^{\beta_0 + \beta_1 X_1 + \dots + \beta_p X_p}}$$

or

$$P(Y = 1|X_1, X_2 \dots X_p) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \dots + \beta_p X_p)}}$$

the possibility of undesired case is ($Y=0$)

$$P(Y = 0|X_1, X_2 \dots X_p) = 1 - P(Y = 1|X_1, X_2 \dots X_p) =$$

$$1 - \frac{e^{\beta_0 + \beta_1 X_1 + \dots + \beta_p X_p}}{1 + e^{\beta_0 + \beta_1 X_1 + \dots + \beta_p X_p}} = \frac{1}{1 + e^{\beta_0 + \beta_1 X_1 + \dots + \beta_p X_p}}$$

They are equal and the ratio between these two possibilities is called as "odds ratio".

Odds ($Y=1|X_1, X_2, \dots, X_p$) ratio could be written as:

$$\frac{P}{1-P} = e^{\beta_0 + \beta_1 X_1 + \dots + \beta_p X_p}$$

or

$$\frac{P}{1-P} = e^{\beta_0} e^{\beta_1 X_1} \dots e^{\beta_p X_p}$$

When the natural logarithm of both sides of equation is taken (Ln); logistic regression equation in which the relation between dependent variable and independent variables turns into a linear case is written as (18,19).

$$\text{Logit}(P) = \log\left[\frac{P}{1-P}\right] = \beta_0 + \beta_1 X_1 + \dots + \beta_p X_p$$

RESULTS

The study was carried out encompassing a total of 2690 consumers living in 12 city centres, based on the data obtained through surveys. While 87.4% of consumers (2353 people) consume chicken meat, the rates of those who do not consume chicken were noted as 12.6% (337 people).

Some descriptive results about the consumers were presented in Table 1. According to Table 1, 53.9% of the consumers were men and 46.1% was women. Considering the impact of education level on directing consumption of chicken meat, education levels of the consumers were also surveyed. Among consumers surveyed, university graduates are highest in number with a rate of 33.7%, while high school graduates are 23.5% followed by secondary school graduates having a share of 19.8%. It was determined that among those who participated in the survey, primary school graduates have a share of 6.9%. A large portion of the consumers (16.1%) are well educated and holds either a master's of science (MSc, 13%) or Philosophy of Doctorate (PhD-3.1%). Among those who participated in the survey, average age of consumers was determined as 40.2 while the youngest was 15 and the oldest was noted as 87 age. Average household size of consumers was determined as 4.2 persons. Average monthly household income of consumers was determined as 3.888 TL. Consumers having an average household income between 2501 and 4.000 TL have the highest share with a rate of 32% while those with an income between 1.301 and 2.500 TL make up for 28.6%. About one third of the consumers have a monthly income of 2.500 TL or below. On the other hand, 20% of consumers were noted as having an income of 4.000 TL or more.

Table 1. Independent variables used for logistic regression analysis models and characteristics based on categories

Variables	Groups	Categories	Number	%
Gender	Gender (1)	Female	1240	46.1
	Gender (2)	Male	1450	53.9
Age	Consistent data	-	-	-
Education	Education (1)	Literate/Primary School	438	16.3
	Education (2)	Secondary school/High school	912	33.9
	Education (3)	University	906	33.7
	Education (4)	MBA	434	16.1
Income	Income (1)	1200 TL or less	236	8.8
	Income (2)	Between 1201 and 2500 TL	802	29.8
	Income (3)	Between 2501 and 5000 TL	1164	43.3
	Income (4)	5000 TL or more*	488	18.1
Region	Region (1)	Central Anatolia	566	21
	Region (2)	Marmara	774	28.8
	Region (3)	Blacksea	289	10.7
	Region (4)	Mediterranean	291	10.8
	Region (5)	Aegean	216	8
	Region (6)	Eastern Anatolia	341	12.7
	Region (7)	Southeast Anatolia	206	7.7
	Region (8)	Abroad	7	0.3
Number of people per household	Person (1)	1-2 persons	927	34.5
	Person (2)	3-5 persons	1573	58.4
	Person (3)	More than 5 persons*	190	7.1
Birthplace	Birthplace (1)	Province	1511	56.2
	Birthplace (2)	Town	669	24.8
	Birthplace (3)	Village*	510	19

*For logistic regression, category was interpreted as the reference.

Table 2. Results of the likelihood ratio test for socio-economic and demographic characteristics of consumers

Step	Characteristic	df	P
Step 1	Fixed	0	0.00
	Age	1	0.001**
	Education	3	0.167
	Gender	1	0.001**
	Region	2	0.074***
	Income	3	0.040*
	Number of people per household	2	0.021*
	Birthplace	7	0.001**
Step 2	Model	19	0.001**
	Fixed	0	0.00
	Age	1	0.001**
	Gender	1	0.001**
	Region	2	0.090***
	Income	3	0.010**
	Number of people per household	2	0.014*
	Birthplace	7	0.001**
	Model	16	0.001**

df: Degree of freedom, * P < 0.05, ** P < 0.01, *** P < 0.1

Table 3. Logistic regression model analysis results for the assessment of the impact of socio-economic and demographic characteristics on chicken meat consumption tendencies of consumer.

Independent variables	β ¹	SE ²	Wald ³	df ⁴	Likelihood ratios
Age	-0.019	0.005	14.868**	1	0.981
Region (1)	0.000 ⁵	-	-	0	-
Region (2)	-0.353	0.150	5.499*	1	0.703
Region (3)	0.529	0.225	5.505*	1	1.697
Region (4)	0.380	0.211	3.237**	1	1.462
Region (5)	0.177	0.218	0.660	1	1.194
Region (6)	-0.004	0.190	0.001	1	0.996
Region (7)	-0.059	0.217	0.074	1	0.943
Region (8)	-1.075	0.742	0.030	1	0.341
Gender (1)	-0.210	0.060	12.356**	1	0.811
Gender (2)	0.000 ⁵	-	-	0	-
Birthplace (1)	-0.023	0.095	0.057	1	0.978
Birthplace (2)	-0.146	0.097	2.258***	1	0.865
Birthplace (3)	0.000	-	-	0	-
Person (1)	-0.237	0.113	4.382*	1	0.789
Person (2)	0.152	0.099	2.366***	1	1.164
Person (3)	0.000 ⁵	-	-	0	-
Income (1)	-0.047	0.158	0.089	1	0.954
Income (2)	0.338	0.111	9.280**	1	1.402
Income (3)	-0.050	0.094	0.283	1	0.951
Income (4)	0.000 ⁵	-	-	0	-

¹ Parameter estimation, ² Standard error, ³ Levels of significance in accordance with Wald statistics, ⁴ Degree of freedom,

⁵ This parameter is set to zero because it is interpreted as the reference group, *P < 0.05, **P < 0.01, ***P < 0.1

Results were achieved through a comparison of independent variables including those who consume chicken and those who do not. As a dependent variable of the relevant data set, 'Chicken meat consumption preference' was analysed through an interpretation of the variables on Table 1 as independent variable. Likelihood ratios of variables were given in Table 2.

In order to determine the significance of an independent variable included in the logistic regression model, likelihood ratio test is used. When the variables in Table 2 is analysed, it is anticipated that all independent variables are statistically significant. Following the assessment of general statistics obtained in the model, (degree of freedom of mod is 16, χ^2 and is 77.512 (P<0.001) and classifier verification ratio is 87.5%) parameter estimation (β), standard error, levels of

significance in accordance with Wald statistics, degree of freedom and likelihood ratios are given in Table 3.

As it is evident on Table 3, gender is identified as a variable affecting the consumption preference of consumers. It is evident from this study that the likelihood of chicken meat consumption is about 1.23 times less for women compared to men.

When the number of people per household is investigated; a family of 1 or two is 27% less likely to consume chicken meat if compared to a family of 5 or more people and a family of 3 to 5 people is 16% less likely to consume chicken meat compared to a family of 5 or more. Investigating the status of region, people who were born in Marmara, Blacksea or Mediterranean were more likely to consume chicken meat than the people were born in the other regions.

Since age was identified as a continuous variable of the analysis, as the consumer age gets one year older the likelihood chicken meat consumption decreases at a rate of 1%. Meanwhile, when comparing those who consume chicken meat and those who do not; income variable has been identified as meaningful in the logistic regression model. Consumers within the high income (more than 5.000 TL) group are 40% more likely to consume chicken meat compared to moderate income group (1.200 – 2.500 TL) while moderate income group is (5%) less likely to consume chicken meat compared to consumers within 2.500 – 5.000 TL income group.

It is noteworthy to know that; although birthplace is interpreted as a significant factor for defining chicken meat consumption tendencies, it has less impact compared to other variables when comparing groups. As it is also evident from the analysis, while those who were born in villages were expected to have greater significance compared to those who were born in cities, the fact that consumers who were born in villages are 2% more likely to consume chicken meat compared to city born consumers is an indicator of other parameters' being more potent on this variable.

DISCUSSION

Food consumption is a fundamental necessity of humankind. The adequacy of food available and the right amount of consumption is also extremely important. According to results of the study, average chicken meat consumption of a household is 68.64 kg/year (except for consumed in restaurants and industry). The reasons for consuming or not consuming chicken meat have been evaluated each separately. For consumers, chicken meat prices (80%) ranks top in terms of setting a consumption preference. Among the reasons for not consuming chicken meat; not liking the taste of chicken meat at all (31.1%) or for health reasons (31.2%) can be listed.

Some of the major factors affecting the consumption of chicken meat can be listed as income, price, taste, health and environmental factors. Also, factors like price and income tends to lose its significance while health and quality become more important in determining chicken meat consumption tendencies (20). In this study, among the reasons for not consuming chicken meat, price is considered as the most important factor while other factors like habit, health or the preference of household follow this. According to a study on "Consumption of red meat, white meat and processed meat in Irish adults in relation to dietary quality" by Cosgrove et al. (21), 612 men and 717 women were randomly selected and surveyed online. In this study, average daily consumption amounts per person were determined as 26 grams, 33 grams, 51 grams for processed meat, chicken meat and red meat respectively and also, men consumed significantly more than women for all meat types. In this study, male consumers were determined as having significantly more intake in terms of chicken meat consumption compared to women.

According to a study by Stefanikova et al. (22), consumption of poultry products varies depending on the regions in Turkey as a result of different local eating habits and varying culinary cultures. As it is stated by Nunes (23), halal food concept is getting more important day by day and meeting consumer expectations on halal slaughter is likely to increase consumption of poultry

products. In a study by Mizrak et al. (24), it was determined that the chicken meat consumption tendencies in Turkey are linked to income and consumption preference. Also in this same study, it was revealed that the chicken meat consumption varies depending on the city or region especially considering cities which chicken meat consumption amount was lower such as Gaziantep where mutton and goat meat consumption is rather high and Trabzon where fish consumption is at higher levels. In accordance with the study carried out by Mizrak et al. (24), income has been identified as an important factor affecting the preference of chicken meat consumption.

As age factor has statistically significant impact on chicken meat consumption tendencies of consumers, especially targeting those who are 40 years old or younger; efforts should be in place aiming to increase chicken meat consumption. Men are less likely to consume mutton compared to women. Especially targeting these gender group efforts should be in place to ease such strictness related to health subjects, in order to increase the number of women consumers who are also known for being stricter about not consuming chicken meat compared to men. The factor of region is statistically significant in terms of identifying chicken meat consumption tendencies. It can be indicated from the study that especially those consumers who were born in Marmara, Blacksea or Mediterranean regions are more likely to consume chicken meat. For the rest of the consumers living in other regions, efforts are needed in place to convince the consumers on chicken meat's not being dangerous for human health and that it is also a part of our culinary culture through health programmes or food shows that will be broadcast on national or local TV channels. Especially for those groups with low-income, chicken meat should be made available at reasonable prices.

As a result, although it is evident from the surveys that the chicken meat consumption is rather low, it is promising to say that consumption is likely to increase with the progress made in health and food security related subjects. In order to increase the consumption of chicken meat, it is important to emphasize significance of it for dietary nutrition and work should be carried out to raise awareness in this respect. As chicken meat is known as an important source of animal protein, supply on the market should be carried out in accordance with the rules of modern science and innovative technologies by the companies producing for this sector and new products should be made available appealing to the taste of young people in order to increase consumption in this regard.

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