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Research Article

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Effect of COVID-19 Pandemic on Animal-Source Food Consumption in Turkey

Abstract

In this study, before and during COVID-19 pandemic food consuming habits of people living is seven regions of Turkey were examined and it was investigated how this findings change depending on such demographic characteristics as people's gender, age, education level, marital status and average monthly income. Surveys were conducted on 800 people across Turkey via the internet, and the results were tested with non-parametric test methods in terms of whether there was any significance difference between dependent and independent groups. At the same time, the factors that will affect the consumers' consumption of these products in the future were analyzed by the method of regression trees. A significant difference was found between the consumption frequencies of meat-type foods before and during COVID-19 among consumers. It was found that daily consumption of yoghurt increased too much during the COVID-19 pandemic. According to the results of regression tree analisys average monthly income was found is the most affecting factor the consumers' preference of these products in the future. In the study, it was determined that at the zoonotic infection knowledge levels, most of the participants did not give up their food habits at the time of the COVID-19 pandemic. In addition, it was determined that they did not give up their consumption of animal-based food. Finally, it is recommended people to be conscious consumers and that necessary studies should be carried out to reduce their anxiety in any pandemic.

1. INTRODUCTION

Epidemics that spread and are effective in many countries around the world are called pandemics. According to the World Health Organization (WHO), it is sufficient for a disease to be declared a pandemic if it is a new virus or a mutated factor, and can be transmitted easily and quickly from person to person (TUBA, 2020). The coronavirus disease (COVID-19), which the WHO now regards as a pandemic, also poses an important public health threat in the world (Di Gennaro et al., 2020; Zavvar et al., 2021).

The COVID-19 pandemic caused by the SARS-CoV-2 virus occurred on December 31, 2019 in Wuhan, China's Hubei province. The pandemic has spread very quickly in the world, the first positive cases have been identified in Turkey on March 11, 2020. Thus, the pandemic process started in our country and it was observed that it continued increasingly. Market places selling live animals in Wuhan, China at the beginning of the pandemic of the first cases were later closed due to the potential source of the disease, and it was observed that the COVID-19 pandemic was linked with them. However, over time, it was found that COVID-19 disease spread among people (Uğraş Dikmen et al., 2020). The WHO stated that microbiological contamination from food is one of the main reasons for the increase in mortality and disease rates together with diarrhea (Freese et al., 1998). According to studies, it is observed that an average of 6.5 to 33 million people in the USA are affected by foodborne diseases every year (Altekruse et al., 1999). It is seen that such events can cause panic among the public. On the one hand, direct and indirect experiences with unsafe food products and food-borne diseases affect people's trust levels.

In this study, it was aimed to investigate the effect of the COVID-19 pandemic on the animal origin food consumption of consumers, which can be evaluated in the context of a situation factor affecting the whole world.

2. MATERIAL and METHODS

2.1. Material

Participants are grouped based on their native provinces data by the seven geographical regions of Turkey (Figure 1).

Figure 1. Geographical map of Turkey

2.2. Method

2.2.1. Data

The data obtained from an online survey of residents in Turkey in early May, 2020 was used in the study. Questionarie were prepared using online survey programs and has been announced by the social media. The sample covered 800 residents from 81 provinces and seven geographical regions of Turkey. In addition to demographic

questions in the surveys, the frequency of consumption of animal origin foods before and during the COVID pandemia were also asked.

2.2.2. Statistical analysis

In addition to the descriptive statistics of the data, the nonparametric Wilcoxon sign test for the analysis of the difference between the two dependent variables, the Mann Whitney U test to determine the difference between two independent groups, and the Kruskal Wallis H-test to compare more than two independent groups were used in the study (Cebeci, 2019). SPSS software for Windows Version 22 was used for the analysis.

2.2.3. Regression tree analysis

Prediction trees use the tree diagram to represent the recursive partition. Each of the leaves, of the tree represents a cell of the partition, and has attached to it a simple model which applies in that cell only (Hastie and Tibshirani, 1990; Lahmann and Kottner, 2011; Loh, 2011). The space X is partitioned by a sequence of binary splits into terminal nodes (Figure 2).

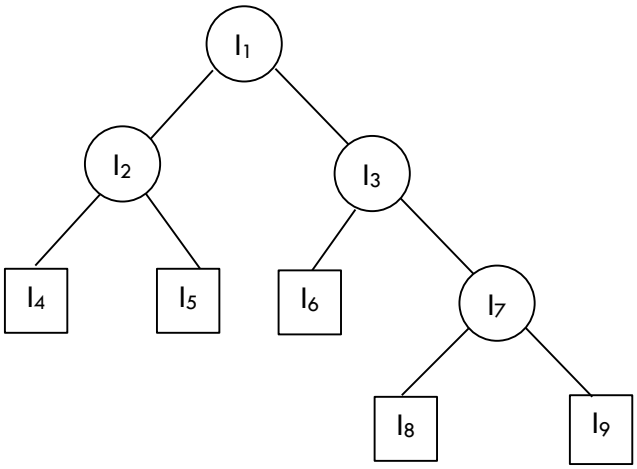

Figure 2. Scheme of regression trees

In each terminal node l, the predicted response value y(l) is constant.

Starting with a learning sample, three elements are necessary to determine a tree predictor:

1. A way to select a split at every intermediate node
2. A rule for determining when a node is terminal
3. A rule for assigning a value y(l) to every terminal node l

It turns out, as in classification, that the issue of the node assignment rule is easiest to resolve. We start with the resubstitution estimate for R*(d), that is,

$$R(d) = \frac{1}{N}\sum_n \left(y_n - d(x_n)\right)^2 \quad \text{(Eq. 1)}$$

The value of y(l) that minimizes R(d) is the average of y_n for all cases (x_n, y_n) falling into l; that is, the minimizing y(l) is

$$\bar{y}(l) = \frac{1}{N(l)}\sum_{x_n \in l} y_n, \quad \text{(Eq. 2)}$$

where, the sum is over all yn such that $x_n \in l$ and N(l) is the total number of cases in l. The proof is based on seeing that the number a, which minimizes $\sum(y_n - a)^2$ is n

$$a = \frac{1}{N}\sum_n y_n \quad \text{(Eq. 3)}$$

Similarly, for any subset y_n, the number which minimizes $\sum(y_n - a)^2$ is the average of the y_n.

From now on, the predicted value in any node t will be $\bar{y}(l)$. Then, using the notation R(L) instead of R(d),

$$R(L) = \frac{1}{N}\sum_{l\in\tilde{L}}\sum_{x_n\in l}(y_n - \bar{y}(l))^2 \quad \text{(Eq. 4)}$$

Set

$$R(l) = \frac{1}{N}\sum_{x_n\in l}(y_n - \bar{y}(l))^2 \quad \text{(Eq. 5)}$$

so (Eq. 4) can be written as

$$R(L) = \sum_{l\in\tilde{L}} R(l) \quad \text{(Eq. 6)}$$

These expressions have simple interpretations. For every node l, $\sum_{x_n\in l}(y_n - \bar{y}(l))^2$ is the within node sum of squares. That is, it is the total squared deviations of the y_n in l from their average. Summing over $l \in \tilde{L}$ gives the total within node sum of squares, and dividing by N gives the average. Given any set of splits S of a current terminal node l in $\tilde{L}$, the best split s* of l is that split in S which most decreases R(L).

More precisely, for any split s of l into l_L and l_R, let

$$\Delta R(s,l) = R(l) - R(l_L) - R(l_R) \quad \text{(Eq. 7)}$$

Take the best split s* to be a split such that

$$\Delta R(s^*,l) = \max_{s\in S}\Delta R(s,l) \quad \text{(Eq. 8)}$$

Thus, a regression tree is formed by iteratively splitting nodes so as to maximize the decrease in R(L). In classification trees, choosing the best splits to be the ones that minimized the resubstitution misclassification rate had undesirable properties. The best split at a node is that split on the x variables which most successfully separates the high response values from the low ones. At each intermediate node l, one of $\bar{y}(l_L), \bar{y}(l_R)$ is considerably lower than $\bar{y}(l)$ and the other higher (Breiman et al., 2017).

3. RESULTS and DISCUSSION

3.1. Descriptive statistics and anxiety level analysis

The demographic information of the participants in the study is included in Table 1.

Table 1. Frequency table of some demographic characteristics of the participants

Demographic Characteristics		**n**	**%**
Gender	Female	450	56.2
	Male	350	43.8
Education	Secondary school and less	35	4.4
	High school	115	14.4
	University	650	81.3
Age	Under 20	41	5.1
	21-30	271	33.9
	31-40	330	41.2
	41-50	123	15.4
	Over 51	35	4.4
Hometown (as Regions)	Mediterranean	98	12.3
	Eastern Anatolia	64	8.0
	Aegean	46	5.8
	Southeastern Anatolia	362	45.3
	Central Anatolia	113	14.1
	Black Sea	62	7.8
	Marmara	55	6.9
Marital status	Married	486	60.8
	Single	314	39.2
Average monthly income	Less than 2500 TL	183	22.9
	2501-5000 TL	312	39.0
	More than 5001 TL	305	38.1
Average monthly food expenditure	Less than 600 TL	110	13.8
	601-1000 TL	206	25.8
	1001-1500 TL	200	25.0
	More than 1501 TL	284	35.5

As seen in Table 1, 56.2% of the participants are women and 43.8% are men. 60.8% of them are married and 39.2% are single. More than 80% of the participants had education at university level. Considering the age of the participants, more than 90% are 21-50 years old. The distribution of the respondents according to regions is as follows: Mediterranean Region 12.3%, Eastern Anatolia Region 8%, Aegean Region 5.8%, Southeastern Anatolia Region 45.3%, Central Anatolia Region 14.1%, Black Sea Region 7.8% and Marmara Region 6.9%. It has been determined that 22.9% of the participants' monthly income is less than 2500 TL, 39.0% is between 2501-5000 TL and 38.1% is more than 5001 TL. It is seen that 13.8% of participants' average monthly food expenditure is less than 600 TL, 25.8% is between 601-1000 TL, 25.0% is between 1001-1500 TL and 35.5% is more than 1501 TL.

The COVID-19 virus, which continues to have an effect on the whole world, is thought to be a zoonotic infection that is, transmitted from animals to humans. In our study, the rate of participants who think that the COVID-19 virus can be transmitted from foods of animal origin is 30.9% (Table 2). 59.8% of the participants stated that the general food consumption did not change during the pandemic.

Table 2. Frequency and percentages about the knowledge and awareness level of the participants' concerning Zoonotic infection

N	Questions	Yes		No		No idea	
		n	%	n	%	n	%
1.	Do you think that the source of infectious diseases is transmitted from animals?	465	58.1	335	41.9	0	0.0
2.	Do you think the COVID-19 virus can be transmitted from foods of animal origin?	247	30.9	313	39.1	240	30.0
3.	Has there been any change in your life in terms of food consumption in general during the COVID-19 pandemic?	322	40.2	478	59.8	0	0.0
4.	Do you think that the consumption of animal origin foods will decrease during the COVID-19 pandemic?	93	11.6	515	64.4	192	24.0
5.	Even if the COVID-19 pandemic is literally over, will you continue to consume food of animal origin?	692	86.4	26	3.3	82	10.3

It is known that there are zoonotic infections such as brucellosis, toxoplasmosis and bird flu, which are transmitted from animals to humans throughout history. Scientists also do not think that the COVID-19 virus is transmitted from bats, and considering that bats are not sold in the market where the virus appeared, it is still suggested that a type of intermediate animal is a carrier in the transmission of the virus to humans (TUBA, 2020).

Significant differences were found between the anxiety levels of the participants by region, age, gender, education level and marital status (Table 3). We see that age and education level are very effective in these differences. As a result of the analysis, it was determined that the participants who thought that infectious diseases were transmitted from foods of animal origin and stated that they would be more meticulous in food shopping during this process showed a statistically significant difference ($p<0.05$) according to the educational level and genders.

Table 3. Kruskal Wallis and Mann-Whitney U test results to determine the difference between the anxiety levels of the participants by regions, age, education level, gender and marital status

N	Question	Regions	Age	Educational level	Gender	Marital status
		χ^2 value			Z value	
1.	Do you think that the source of infectious diseases is transmitted from animals?	10.451	17.027**	7.558*	-0.208	-0.952
2.	Do you think the COVID-19 virus can be transmitted from foods of animal origin?	13.334*	18.654**	9.777**	-2.514*	-1.824
3.	Has there been any change in your life in terms of food consumption in general during the COVID-19 pandemic?	8.791	9.550*	2.660	-1.289	-1.566
4.	Do you think that the consumption of animal origin foods will decrease during the COVID-19 pandemic?	3.643	20.660**	21.692**	-2.345*	-2.375*
5.	Even if the COVID-19 pandemic is literally over, will you continue to consume foods of animal origin?	5.456	9.272	16.351**	-2.953**	-1.198

*:p<0.05; **:p<0.01

3.2. Analysis of consumption of foods of animal origin

As the consumption habits of foodstuffs may differ from country to country, from region to region, it can differ as well as between provinces and even locally. In this context, when Table 4 is examined, a significant difference was found at $p<0.01$ level in minced meat, beef, fish and turkey meat, and $p<0.05$ in mutton, chicken, goose

and quail meat between the consumption frequencies of meat-type foods before and during COVID-19 among consumers who think that animal products are infectious. No significant difference was found between the consumption frequencies of the participants who did not believe in zoonotic infection in meat groups other than beef, turkey and fish. When the consumption frequencies of meat-type foods before and during COVID-19 were evaluated statistically, it was observed that the number of people who would never consume products such as minced meat, beef, mutton, fish, chicken, turkey and goose during the COVID-19 pandemic increased (Table 4).

Table 4. Consumption frequencies of meat-type foods and products of animal origin before and during COVID-19

	Minced meat		**Beef**		**Mutton**		**Fish**	
	Before	**During**	**Before**	**During**	**Before**	**During**	**Before**	**During**
Z value	-3.005**		-3.704**		-2.350*		-7.204**	
Never	8	21	53	79	110	146	20	102
Once a year	14	15	83	70	149	114	126	125
Once a month	171	176	236	242	225	223	411	340
Once a week	530	502	369	348	271	272	240	223
Daily	77	86	59	61	45	45	3	10
Total	800	800	800	800	800	800	800	800
	Chicken		**Turkey**		**Goose**		**Quail**	
	Before	**During**	**Before**	**During**	**Before**	**During**	**Before**	**During**
Z value	-2.247*		-6.175**		-2.252*		-2.013*	
Never	10	23	274	355	537	562	601	612
Once a year	20	20	355	287	191	166	123	118
Once a month	151	154	126	118	55	57	60	57
Once a week	548	523	40	38	15	12	13	12
Daily	71	80	5	2	2	3	3	1
Total	800	800	800	800	800	800	800	800
	Milk		**Egg**		**Cheese**		**Yoghurt**	
	Before	**During**	**Before**	**During**	**Before**	**During**	**Before**	**During**
Z value	-2.090*		-0.338		-1.437		-2.194*	
Never	22	27	10	11	15	15	10	11
Once a year	23	18	1	2	1	1	0	2
Once a month	94	84	8	6	5	3	6	94
Once a week	291	283	137	133	42	56	98	100
Daily	370	388	644	648	737	725	686	678
Total	800	800	800	800	800	800	800	800

**:p<0.01(Wilcoxon Signed Ranks test results)

Considering the table of consumption frequencies of products of animal origin before and during COVID-19, it was found that daily consumption of yoghurt increased too much during the COVID-19 pandemic (Table 4). In the study conducted by (Şimşek et al, 2005) in Istanbul, annual drinking milk consumption per person was found to be 34 liters. The other consumption of milk and dairy products in the research area is 4.86 kg cheese, 10.6 kg yoghurt and 0.59 kg butter. Therefore, it has been reported that the most important reason for the low amount of drinking milk consumed in the research area is that families consume yoghurt in addition to drinking milk.

Ethnocentric tendency plays a big role in consumer behavior in food shopping. The eating habits of individuals may vary from region to region, as well as family, economic status, religious beliefs, and basically psychological status. Over time, eating habits can also change as a result of some experiences. One of the factors affecting the consumption habits in the family is the harmony between culture and

gender. The different needs of men and women and if gender roles are important in families with a traditional structure, this also differentiates family consumption habits (Özsungur and Güven, 2017). In our study, when the consumption frequencies of some foods of animal origin according to the regions were examined as before and during COVID-19, there was a statistically significant difference ($p<0.05$) in the consumption of cheese and yoghurt in the Mediterranean Region and a statistically significant difference ($p<0.01$) in the consumption of only yoghurt in the Southeastern Anatolia Region (Table 5).

Table 5. Wilcoxon Signed Ranks test results for the differences between the consumption frequencies of some foods of animal origin before and during COVID-19 according to demographic characteristics

Demographic characteristics		Milk	Egg	Cheese	Yoghurt	Goose	Quail
		Z value					
Gender	Male	-1.742	-0.998	-1.578	-3.017**	-1.56	-1.27
	Female	-0.657	-1.163	-0.870	-1.057	-2.11*	-.83
Region	Mediterranean	-.714	-1.164	-2.047*	-2.360*	-1.64	-2.16*
	Eastern Anatolia	-1.604	-.905	-1.633	-.302	-1.90	-.21
	Aegean	-.447	.000	-1.414	-.577	-.69	-.96
	Southeastern Anatolia	-1.822	-1.265	-.206	-2.618**	-1.92	-.86
	Central Anatolia	-1.000	-1.604	-.816	-.378	-1.67	-1.99*
	Black Sea	-.577	-.791	-1.342	-1.134	.00	-1.41
	Marmara	-1.342	-.378	-1.000	-1.000	-1.34	-1.13
Demographic characteristics		**Minced meat**	**Beef**	**Mutton**	**Chicken**	**Turkey**	**Fish**
		Z value					
Gender	Male	-2.89**	-3.04**	·.01	-1.76	-4.09**	-5.66**
	Female	-1.81	-2.49*	·3.68**	-2.10*	-5.21**	-5.96**
Region	Mediterranean	-1.57	-2.82**	·1.37	-1.02	-1.64	-2.89**
	Eastern Anatolia	-1.10	-.26	·.74	-1.79	-2.42*	-2.36*
	Aegean	-.33	-2.33*	·.23	-.19	-.50	-.14
	Southeastern Anatolia	-2.83**	-1.46	·2.19*	-.85	-4.54**	-4.49**
	Central Anatolia	-.28	-1.71	·1.67	-.65	-2.83**	-5.09**
	The Black Sea	-.54	-.68	·1.61	-1.59	-2.24*	-2.98**
	Marmara	-1.57	-1.43	·.29	-1.88	-1.81	-2.26*

*:p<0.05; **:p<0.01

Consumer behavior, which is a human behavior, cannot be considered separate from culture and psychology. Therefore, consumer behavior is closely related to psychological, social, situational and demographic variables. In their study, Petroman et al. (2015) conducted to show the effect of education on the behavior of the consumer of food products of animal origin, it was found that 98% of the participants' choice of meat was influenced by family, customs and traditions in the region. Among the participants, those who did not eat meat stated that the reason was due to health, religion or other conditions. It was also observed in the study that the preference of chicken meat is a significant factor in their ability to grow them in their own homes. In the study, significant differences were determined in the consumption frequencies of meat-type foods in men and women before and during COVID-19 (Table 5). In addition, we see that there are significant differences in consumption frequencies by regions. When we examine the table, we see that there are statistically significant differences in consumption of fish and turkey meat, according to demographic characteristics. In addition, statistically significant

differences were detected in different meat types according to all characteristics.

3.3. Regression tree analysis

The factors affecting the contunied consumption of foods of animal origin was investigated by means of regression analysis. The independent variables were average monthly income (AMI), age (A), education level (EL), regions (R), gender (G), average monthly food expenditure (AMFE) and marital status (MS) of participants. The response variable (RV) was the question 'Even if the COVID-19 pandemic is literally over, will you continue to consume foods of animal origin?' with answers 'yes', 'no' and 'no idea'. The regression tree diagram of the analysis is depicted in Figure 3.

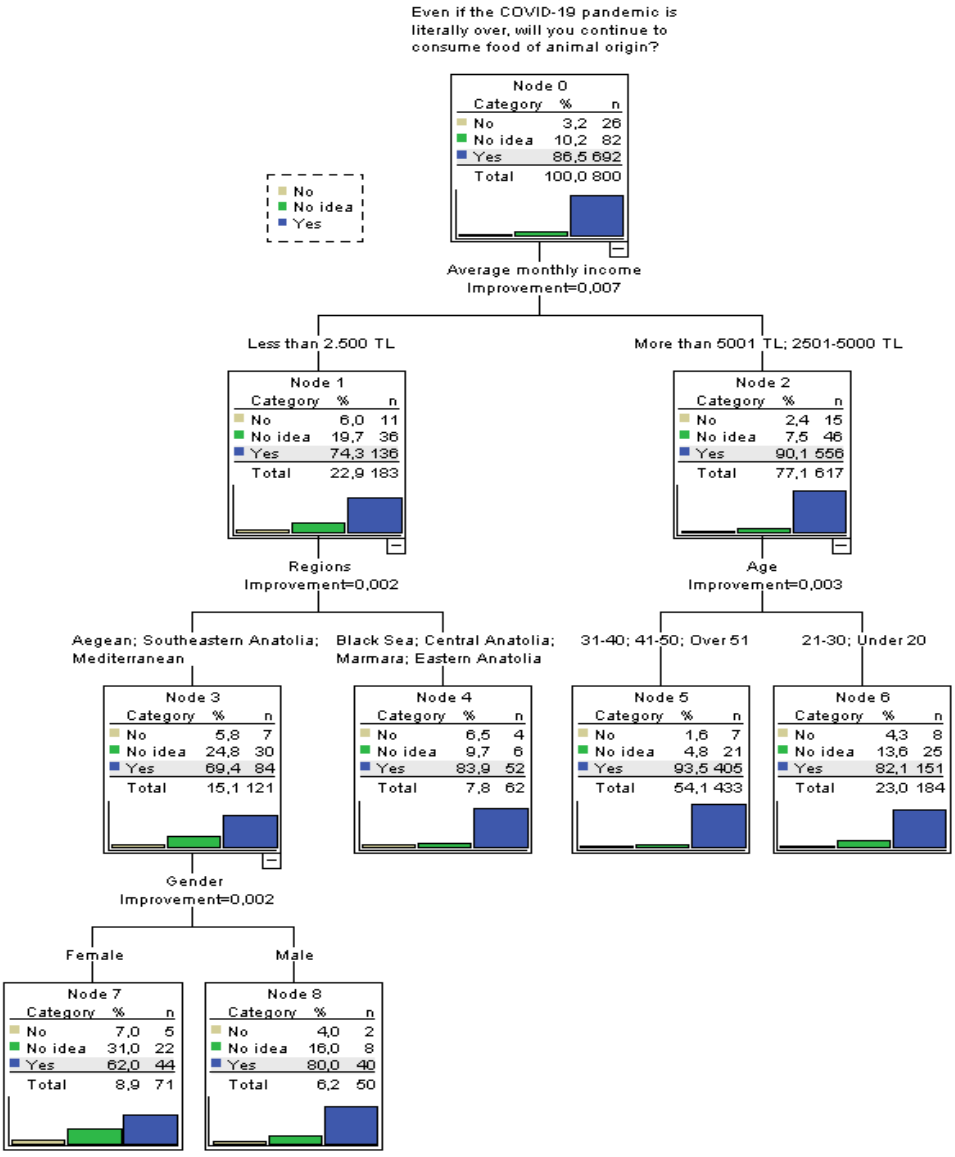

Figure 3. Regression tree diagram

In the regression tree diagram, Node 0, which gave general descriptive statistics of RV, was divided into new two child nodes, with respect to AMI factor. The RV

distribution of the participants with AMI less than 2500 TL on (Node 1) was calculated as %6-No, 19.7%-No idea and 74.3%-Yes and the RV distribution of the participants with AMI more than 2501 TL on (Node 2) was calculated as %2.4-No, 7.5%-No idea and 90.1%-Yes. Numbers (proportions) of suveys were 183 (22.9%) for Node 1 and 617 (77.1%) for Node 2. Afterwards Node 1 was divided into Nodes 3 and Node 4, depending on R factor. Classification measures for these two nodes were Aegean, Southeastern and Meditteranian Regions for Node 3 and Black Sea, Central Anatolia, Marmara and Eastern Anatolia for Node 4. Number of records were established as 121 (15.1%) and 62 (7.8%), respectively. The RV distribution of the participants from Aegean, Southeastern and Meditteranian Regions on (Node 3) was calculated as %5.8-No, 24.8%-No idea and 69.4%-Yes, while the RV distribution of the participants from Black Sea, Central Anatolia, Marmara and Eastern Anatolia Regions on (Node 4) was calculated as %6.5-No, 9.7%-No idea and 83.9%-Yes. On the other hand, Node 3 is divided into two new chid nodes according to Gender factor. While the RV distribution of the 71 female participants on (Node 7) was calculated as %7.0-No, 31.0%-No idea and 62.0%-Yes, the RV distribution of the 50 male participants on (Node 8) was calculated as %4.0-No, 16.0%-No idea and 80.0%-Yes. Nodes 4, 5, 6, 7 and 8 are terminal nodes, and they did not need any separation for providing homogeneity. Table 6 shows importance degree of the predictive variables. According to the table, AMI was significantly identified as the most important factor influencing RV. Similar results was found in (Wong et al, 2018).

Table 6. Importance level of independent variables affecting RV

Independent Variable	Importance	Normalized Importance (%)
Average monthly income (AMI)	.007	100.0
Age (A)	.006	80.1
Education level (EL)	.004	58.2
Regions (R)	.002	30.9
Gender (G)	.002	28.2
Average monthly food expenditure (AMFE)	.001	15.6
Marital status (MS)	.001	13.3

In current tree AMI was found most important factor affecting RV followed by Age (80.1%).

4. CONCLUSION

There was a difference between the anxiety levels of the participants and regions, age, education level, gender and marital status. In addition, it was determined that the participants who thought that infectious diseases were transmitted to humans through animals and stated that they would be more careful in food shopping during this process had a statistically significant ($p<0.05$) difference according to the regions. When the consumption frequency of meat-type foods before and during COVID-19 was evaluated statistically, it was seen that the number of people who would never consume products such as minced meat, beef, mutton, fish, chicken, turkey and goose during the COVID-19 pandemic increased. At the same time, during the COVID-19 pandemic, it was found that daily consumption of yoghurt increased too much. When the consumption frequencies of some foods of animal origin according to the regions were examined before and during COVID-19, it was found that there was a significant difference in the consumption of cheese and yoghurt in the Mediterranean Region and a significant difference in the consumption of only yoghurt in the Southeastern Anatolia Region. In the study, significant differences were identified in the consumption frequencies of meat-type foods in men and

women before and during COVID-19. In addition to this, as a result of the analysis it has been revealed that there are significant differences in consumption frequencies by regions, as well as significant differences in consumption of fish and turkey meat according to demographic characteristics.

REFERENCES

Altekruse, S., Yang, F., Samantha, T., Babagaleh, B., Angulo, F.J. 1999. A multi-state survey of consumer food-handling and food-consumption practices. American Journal of Preventive Medicine, 16(3): 216-221.

Breiman, L., Friedman, J.H., Olshen, R.A., Stone, C.J. 2017. Classification and regression trees.

Cebeci, Z. 2019. R ile parametrik olmayan istatistik analiz. Abaküs Kitap Yayın Evi, İstanbul.

Di Gennaro, F., Pizzol, D., Marotta, C., Antunes, M., Racalbuto, V., Veronese, N. 2020. The state of food security and nutrition in the World 2017e building resilience for peace and food security. Int J Environ Res Publ Health, 17(8): 2690.

Freese, E., Romero-Abal, M.E., Solomons, N.W., Gross, R. 1998. The microbiological safety of typical Guatemalan foods from streetvendors, low income homes and hotels. International Journal of Food Sciences and Nutrition, 49(1): 27-38.

Hastie, T.J., Tibshirani, R.J. 1990. Generalized Additive Models. Chapman & Hall /CRC. London.

Lahmann, N.A., Kottner, J. 2011. Relation between pressure, friction and pressureulcer categories: a secondary data analysis of hospital patients using CHAID methods. Int. J. Nurs. Stud., 48(12): 1487-1494.

Loh, W.Y. 2011. Classification and regression trees. Data Mining and Knowledge Discovery, 1(1): 14-23.

Özsungur, F., Güven, S. 2017. Social factors affecting consumer behaviors and family. International Journal of Eurasian Education and Culture, 3: 127-142.

Petroman, C., Bidireac, I.C., Petroman, I., Sucan, M., Marin, D. 2015. The impact of education on the behaviour of the consumer of animal origin food products. Procedia – Social and Behavioral Sciences, 190: 429-443.

Şimşek, O., Çetin, C., Bilgin, B. 2005. A researh on determination of the drinking milk consuming habits and the factors affecting these habits in Istanbul Province. Journal of Tekirdag Agricultural, 2(1): 23-35.

TUBA, 2020. Pandemic Evaluation Report [Internet]. Available from: http://www.tuba.gov.tr/files/images/2020/kovidraporu/COVID-19%20Raporu-Final+.pdf [accessed 19.11.2020]

Uğraş Dĭkmen, A., Kına, M., Özkan, S., İlhan, M. 2020. Epidemiology of COVID-19: What We Learn From Pandemic. Journal of Biotechnology and Strategic Health Research, 1(Special issue): 29-36.

Wong, J.T., Bagnol, B., Grieve, H., Jong, J., Li, M., Alders, R.G. 2018. Factors influencing animal-source food consumption in Timor-Leste. Food Secur, 10:740–62.

Zavvar, M., Emadi Kochak, H., Abdolmohammadi, K., Rashidi, N., Mokhtari, M., Noorbakhsh, F., Azadmanesh, K., Shamsi Gooshki, E., Fatahi, Y., Mokhtari Azad, T., Jahangirifard, A., Mousavi, M.J., Masoumi, E., Mirzaei, H.R., Gouya, M.M., Rezaei, F., Nicknam, M.H. 2021. SARS-Cov-2 and COVID-19, Basic and Clinical Aspects of the Human Pandemic: A Review. Iran J Public Health. 50(4):665-675.