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DETERMINING EGG CONSUMPTION LEVEL AND PREFERENCES OF FAMILIES IN ISPARTA PROVINCE IN TURKEY

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Abstract

The purpose of this study was to determine families' consumption levels and preferences for egg in urban areas of Isparta province in Turkey. The main material of the study consisted of the data obtained from surveys, which were conducted by face-to-face interviews with 384 families in Isparta city center. As a result of the research, it was determined that the average population per family was 3.5 persons. It was found that the share of monthly food expenditures in income was 25.3% and the share of monthly egg expenditures was 4.6 % in food expenditures. It was determined that 98.4% of the families consumed eggs, 86.2% at breakfast and 65.1% consumed as boiled. It was found that 20.9% of the families consumed quail eggs in addition to chicken eggs. The annual egg consumption was calculated as 250 per person. It was found that 54% of the families preferred to consume medium size eggs and 60.1% of the families preferred dark colored egg yolk. Results showed that 48.7% of families paid attention on production date while purchasing eggs, 51.6 % of them purchased eggs from supermarkets, 65.9% of them bought it once a week and %50.3 of them preferred gelatin coated viol as packaging. It was also determined that 85.78 % of the interviewed families were aware of organic eggs and 86 % of them would pay higher price for organic eggs.

Key words**:** *egg, consumption level, consumer preference*

INTRODUCTION

People should consume sufficient amount of nutrients in a balanced manner necessary for growth, development and leading a long and healthy life. The energy, proteins, vitamins and minerals required for a sufficient and balanced diet is obtained from animal and vegetable sources (Baysal, 2007) [6]. Animal based foodstuff has importance among the fundamental nutrients. Decrease of animal based foodstuff below a certain limit causes insufficient nourishment in humans. Even though it varies among different age groups, it is suggested to take about 40 – 60 % minimum of the daily protein consumption from animal based nutrients (Anonymous, 2007) [2].

Egg as a product with the best protein quality among all animal based nutrients is a rich source of protein with high nutritional value that is consumed all around the world (Dede et.al. 2005) [9]. Egg preserves its worldwide importance as a valuable source of animal protein for human nourishment (Uluocak et.al., 1996; Hasipek and Aktas 1997)[21,14] and contains all the nutrients that the human body needs in the most proper amounts and ratios (Gogus, 1986)[12].

A large size egg has on average 6.3 g protein, 4.8 g fat and 0.4 g carbohydrate (Anonymous, 2014). In addition, it is also rich in A, D, E, K and B group vitaminsas well as minerals such as iron and phosphor (Stadelman *et.al*. 1988)[18].

Even though Turkey has a significant ranking among the countries of the world with regard to egg production and export, egg consumption per person is not at the desired level. According to 2015 data, Turkey is ranked number 10 in the world with a production of 17.2 billion eggs and 3rd in the world with an egg export of 404 million dollars. However, egg consumption per person in Turkey is 203 according to 2015 data. Egg consumption per person in some countries according to 2014 data are as follows: 352 in Mexico, 329 in Japan, 285 in Russia, 256 in Australia, 254 in China, 245 in Denmark and 231 in Germany (Anonymous, 2016)[3]. The main reasons why Turkey has not reached the desired level for egg

consumption despite having a significant ranking with regard to egg production are income level, eating habits (Gunes and Albayrak, 1997) [13] and increasing opinions among the public regarding high cholesterol levels of eggs (Celik and Sengul, 2001)[8]. The position and importance of eggs for a sufficient and balanced diet should be explained to the public in order to correct this and new products containing eggs should be produced which are suited for the fast pace of life in our day (Hasipek and Aktas, 1997)[14].
The main objective of the study was to determine the egg consumption levels and preferences of families living in urban areas of the city of Isparta. For this purpose, various attributes of families have been determined in the study such as their demographic characteristics, food expenses, share of egg expenditure in total food expenses, egg consumption amount, consumed meals, consumption style, purchasing places of eggs and purchasing frequency, the characteristics that families consider when purchasing eggs as well as packaging and size preferences. We hope that the study shall provide valuable information to egg producers, consumers as well as people and institutions working in this field.

MATERIALS AND METHODS

The main material of the study was comprised of data acquired by way of face-to-face surveys carried out with 384 families selected from the Isparta city center using the sampling method. In addition, results of various studies on this subject along with reports and current statistical data were also used. The survey work for the study was completed during March 2017.
The study was carried out in the city centre of Isparta in the Western Mediterranean Region in Turkey. Isparta province is the centre of the Lake District and its area is 8,933 km^2. The total population is 421,766 and the central population is 235,456 inhabitants. Isparta province is 120 km away from Turkey's tourism city, Antalya (TUIK, 2016) [20].
The method "Non-clustered single stage simple random probability sampling based on the population" specified in Equation 1 has been used in determining the number of families to be surveyed (Collins, 1986)[7].

$$N = t^2(p*q) / e^2 \quad (1)$$

In Equation 1, t: t-table value corresponding to a significance level of 95% (1.96), p: probability of the event to take place (0.50) (in this study, the ratio of families that consume eggs), q: the probability of the event not to take place (0.50) and e: margin for error for the sampling (5%). The number of samples was calculated as 384 using Equation 1. After determining the number of samples in the study, the quarters in the Isparta city center were classified according to their socio-economic status into three groups as low, moderate and high income and survey studies were carried out in 15 quarters that may represent the study area. Whereas the number of surveys to be conducted at each quarter was distributed proportional to the populations and the families were selected randomly. Data acquired from the consumers were analyzed via MS Excel and SPSS software after which tables were formed which were then interpreted using absolute and relative distributions and interpreted using the weighted averages method.

RESULTS AND DISCUSSIONS

The average population per family was determined as 3.5 people according to the study results. It was determined as a result of examining the population distribution with regard to gender that the male and female population ratios were similar. Female and male population ratios were as 50.2% and 49.8% respectively (Table 1).

Table 1. The average population per family

Sex	The average population per family	%
Female	1.76	50.2
Male	1.74	49.8
Total	3.50	100.0

Source: Data from Field Survey, 2017.

Erturk *et.al*. (2015) [11] carried out another study in the study region during which the

female and male population ratios were determined as 50.45% and 49.6% respectively.

Highest population ratio in the study was observed in the 41-64 age group (30.6%) followed respectively by 26-40 (22.8%) and 18-25 age groups (14.3%) (Table 2).

Table 2. Distribution of population by age groups

Age groups	The average population per family	%
0-6	0.30	8.6
7-14	0.43	12.3
15-17	0.28	8.0
18-25	0.50	14.3
26-40	0.80	22.8
41-64	1.07	30.6
65+	0.12	3.4
Total	3.50	100.0

Source: Data from Field Survey, 2017.

When the education levels of mothers in the families were examined, it was determined that the ratio of primary school graduate mothers was higher by a margin of 35.4%. The ratio of high school graduate mothers was determined as 32.7% and the ratio of university graduate mothers was determined as 17.4%. It was determined upon an examination of the education status distribution of the fathers that high school graduate fathers were ranked first (31%), followed by primary school graduates in the second position (29.6%) and university graduates in the third (23.6%) (Table 3).

Table 3. Educational status of mothers and fathers

Educational status	Mother		Father	
	n	%	n	%
Illiterate	7	1.9	1	0.3
Literate	6	1.6	3	0.8
Primary school	132	35.4	108	29.6
Middle school	41	11.0	54	14,8
High school	122	32.7	113	31.0
University	65	17.4	86	23.6
Total	373	100.0	365	100.0

Source: Data from Field Survey, 2017.

The distribution of families according to their income levels has been given in Table 4.

It was determined that majority of the families were in the 1,501-3,000 TL monthly income group. The ratio of families in the monthly income groups of 0-1,500 TL, 1,501-3,000 TL, 3,001-4,500 TL and 4,501+ TL were calculated respectively as 18.2%, 47.7%, 13.8%and 20.3%.

Table 4. Distribution of families by income groups

Income groups (TL/month)	n	%
0 – 1,500	70	18.2
1,501 – 3,000	183	47.7
3,001 – 4,500	53	13.8
4,501 +	78	20.3
Total	384	100.0

Source: Data from Field Survey, 2017.

The monthly incomes of families along with their food and egg expenses have been given in Table 5.

Table 5. Families' food and egg expenditure

Income groups (TL/month)	Monthly income (TL) (a)	Monthly food expenditure (TL) (b)	Monthly egg expenditure (TL) (c)	(b/a) * 100	(c/b) * 100
0-1,500	1,359.2	486.9	32.0	35.8	6.6
1,501-3,000	2,474.6	859.5	39.1	34.8	4.6
3,001-4,500	3,840.6	1,100.0	44.0	28.6	4.0
4,501+	6,609.7	1,554.1	49.3	23.5	3.2
Average	3,299.8	833.6	38.3	25.3	4.6

Source: Data from Field Survey, 2017.

It was determined that the average monthly income of the examined families was 3,299.8 TL, average monthly food expense was 833.6 TL and average monthly egg expense was 38.3 TL.

The share of monthly food expenses in the monthly income was determined as 25.3% whereas the share of monthly egg expenses in the monthly income was determined as 4.6%. It was determined that the average income levels and the food expenses of the

interviewed families increased with increasing average income levels and that the share of food and egg expenses in the monthly income decreased.

Table 6 shows the egg consumption status of families and the meals during which egg is consumed. It was determined that the majority of the interviewed families (98.4%) consume eggs and that only a small portion does not (1.6%). Those who do not consume eggs stated the reasons mostly as health and that they do not like eggs. Those who consume eggs indicated that they mostly consume eggs in the mornings (86.2%) and some stated that the meals they consume eggs do not change (9.5%). It was determined that egg consumption was very low during lunch and dinners. Mizrak *et.al*., (2012) [17] carried out a study in which the ratio of consumers who consume eggs during breakfast was reported as 85.52%; while Iskender and Kanbay (2014)[15] put forth that 91.2% of the consumers consume eggs during breakfast. When the consumption styles were examined, it was determined that families consume eggs mostly as boiled (65.1%) followed by omelets in the second place (22.2%). Lower egg consumptions were determined at meals and in pastry. The ratio of consumers who consume eggs as boiled was determined by Durmus *et.al.*, (2007)[10]as 69.18% and by Mizrak *et.al.*, (2012)[17]as 70.28 %.

Table 6. Egg consumption status, consumed meals and consumption style

Egg consumption status	n	%
Yes	378	98.4
No	6	1.6
Total	384	100.0
Consumed meals		
Breakfast	326	86.2
Lunch	9	2.4
Dinner	7	1.9
Varies	36	9.5
Total	378	100.0
Consumption style of egg		
Boiled	246	65.1
Omelet	84	22.2
At meals	11	2.9
In pastry	18	4.8
Other	19	5.0
Total	378	100.0

Source: Data from Field Survey, 2017.

When the families who participated in the survey were asked who consumes the most eggs in the family, the ratio of those who responded as everyone was determined as 57.7%. The ratio of families who responded as children consume more was determined as 24.6% (Table 7).

Table 7. People who consume the most eggs in the family

Family members	n	%
Everyone	218	57.7
Children	93	24.6
Elders	34	9.0
Young	32	8.4
Patients	1	0.3
Total	378	100.0

Source: Data from Field Survey, 2017.

It was determined that majority of the examined families consume 0-15 eggs per week (58.25%). The ratio of families that consume 16-30 eggs per week was calculated as 37% (Table 8).

Table 8. Weekly egg consumption of families

Weekly egg consumption (Units)	n	%
0-15	220	58.2
16-30	140	37.0
31+	18	4.8
Total	378	100.0

Source: Data from Field Survey, 2017.

Weekly egg consumption per family was determined as 16.8 eggs and as 4.8 eggs per person. Annual egg consumption per person was determined as 250. According to 2015 date, egg consumption per person in Turkey was determined as 203 (Anonymous, 2016) [3].

These results put forth that annual egg consumption per person is higher in the study region when compared with the Turkey average.

It was determined that 20.9% of the examined families consume quail eggs. Putting up alternative protein sources for sale is important for meeting the animal protein deficit. One of these resources is quail eggs. Recently quail eggs have been put up for sale in various markets with increasing rates of

consumption. The ratio of families which do not consume any other eggs than chicken eggs was determined as 77.8 % (Table 9).

Table 9. Egg types consumed outside of chicken eggs

Egg types	n	%
Duck	3	0.8
Turkey	2	0.5
Quail	79	20.9
None	294	77.8
Total	378	100.0

Source: Data from Field Survey, 2017.

Durmus *et.al*., (2007)[10] carried out a study in which a quail egg consumption ratio of 13.4% was determined besides chicken eggs. The reason why the ratios of consumption of eggs other than chicken eggs are low may be due to the fact that consumers do not have a habit of consuming these types of eggs.
Whereas supermarkets are ranked first among purchasing places for eggs with a ratio of 51.6%, they are followed by neighborhood bazaars (20.4%), producers (12.9%), grocery stores (9.8%) and own production (5.3%). Majority of the families stated that they would prefer village eggs (75.7%) when asked which egg type they would prefer between village and commercial types (Table 10).

Table 10. Families' purchasing places of eggs and village and commercial egg preferences

purchasing places of egg	n	%
Grocery store	37	9.8
Supermarket	195	51.6
Neighborhood bazaar	77	20.4
Producer	49	12.9
own production	20	5.3
Total	378	100.0
Village and commercial egg preference		
Village	286	75.7
Commercial	92	24.3
Total	378	100.0

Source: Data from Field Survey, 2017.

Iskender and Kanbay (2014)[15] carried out a study in which it was set forth that village eggs would be preferred more if the sales place had both village and commercial eggs.
It was observed that majority of the families purchase eggs once a week (65.9%). The ratio of families which purchase eggs twice a week was calculated as 20.1% (Table 11).

Table 11. Families' egg purchasing frequency

Egg purchasing frequency	n	%
More than once a week	33	8.7
Once a week	249	65.9
Once two weeks	76	20.1
Once a month	20	5.3
Total	378	100.0

Source: Data from Field Survey, 2017.

Akdemir (1989)[1] carried out a study in which it was reported that majority of the consumers (80.4%) have an egg purchasing frequency of once a week.
It was determined that families mostly consider the date of production (48.7%) followed respectively by brand (14.3%), size (11.1%), price (8.7%) and color (5.3%) factors (Table 12).

Table 12. The characteristics that the families consider when purchasing egg

Features	n	%
Brand	54	14.3
Color	20	5.3
Size	42	11.1
Date of production	184	48.7
Price	33	8.7
Other	45	11.9
Total	378	100.0

Source: Data from Field Survey, 2017.

The weight of eggs is a parameter that determines economic gain and is one of the most important criteria that consumers consider when purchasing eggs (Sahin and Gul, 1998)[19]. In addition, eggs are also priced according to size at sales places. It was indicated in the study that 54% of the families prefer middle sized eggs. The ratio of families that prefer large eggs was determined as 35.7% (Table 13).

Table 13. Families' preference of egg by size

Egg size	n	%
Large	135	35.7
Medium	204	54.0
Small	9	2.4
It does not matter	30	7.9
Total	378	100.0

Source: Data from Field Survey, 2017.

Karakaya *et.al.,* (2014)[16]carried out a study in which it was determined that consumer generally prefer purchasing large eggs (49.0%). It was reported in the study carried

out by Celik and Sengul (2001) [8] that even though there were no statistically significant differences between the income groups with regard to considering egg size (P>0.05), it was observed that consumers generally prefer purchasing large eggs. It was also determined in studies carried out by Mizrak *et.al*., (2012) [17]; Iskender and Kanbay (2014) [15] that medium size eggs are preferred more.

Another important factor with impacts on the egg preferences of consumers is the yolk color. The yolk color preferences of families and their reasons have been given in Table 14.

Table 14. Families' preference egg yolk and reasons

Families' preference	n	%
Dark colored	227	60.1
Light colored	53	14.0
It does not matter	98	25.9
Total	378	100.0
Preference reasons of dark colored egg yolk		
I like it visually	24	10.6
Taste is more delicious	74	32.6
I use it for cakes and pastries	8	3.5
Nutritional value is higher	104	45.8
Other	17	7.5
Total	227	100.0

Source: Data from Field Survey, 2017.

Majority of the families (60.1%) indicated in the study carried out that they prefer dark colored egg yolks. The families stated that factors such as higher nutrient values of dark colored egg yolks (45.8%) and better taste (32.6%) were more effective. Mizrak *et.al*., (2012)[17] carried out a study in which the ratio of families that prefer dark colored yolk was determined as 81.20% while Iskender and Kanbay (2014) [15] reported in another study that the ratio of students who prefer dark colored yolk was 58.3%.

Egg consumption may vary among consumers according to seasons. Of the participating families, 55.8% indicated that their egg consumption does not vary with the seasons, while 44.2% indicated that their egg consumption varies with the seasons. Consumers who stated that their egg consumptions vary with the seasons stated that they consume more eggs in winter. Indeed, 83.8% of the families which indicated that their egg consumption varies with the seasons also stated that they consume more eggs in winter (Table 15).

Table 15. Egg consumption by season

Does the consumption of egg change by season?	n	%
Yes	167	44.2
No	211	55.8
Total	378	100.0
The most consumed season		
Spring	4	2.4
Summer	22	13.2
Autumn	1	0.6
Winter	140	83.8
Total	167	100.0

Source: Data from Field Survey, 2017.

Packaging is an important marketing service that has significant impact on consumer preference. It was determined in the study carried out that majority of the families preferred gelatin coated viol (50.3%) followed by closed cardboard viol (30.2%). It was determined that families mostly prefer 15-egg packages (48.4%) and 30-egg packages (41.8%) (Table 16).

Table 16. Families' packaging preferences

Type of packaging	n	%
Open viol	29	7.7
Gelatin coated viol	190	50.3
Closed cardboard viol	114	30.2
Transparent viol	20	5.3
Foam viol	11	2.9
Other	14	3.7
Total	378	100.0
Size of packaging		
6 eggs	10	2.6
10 eggs	11	2.9
15 eggs	183	48.4
30 eggs	158	41.8
Other	16	4.2
Total	378	100.0

Source: Data from Field Survey, 2017.

It was reported in the study by Iskender and Kanbay (2014)[15] that students prefer 15-egg closed cardboard viols and gelatin coated viols.

It was determined in the study that majority of the families (85.7%) indicated that they know organic eggs. Of the families who know organic eggs, 84% stated that they would pay more for organic eggs, while 16% stated that they do not want to pay more. The ratios of

families which indicated that they would pay 10%, 30% and 50% more were determined respectively as 23.8%, 15.7% and 27.2% (Table 17).

Armagan and Ozdogan (2005) [5] carried out a study in which it was determined that consumers would pay 30.4% more for ecologic chicken meat and 30.6% more for ecologic eggs.

Table 17. Families' knowledge status and payment preference for organic egg

Do you know organic egg?	n	%
Yes	324	85.7
No	54	14.3
Total	378	100.0
Payment preferences for organic eggs		
I pay %10 more	77	23.8
I pay %20 more	38	11.7
I pay %30 more	51	15.7
I pay %40 more	18	5.6
I pay %50 more	88	27.2
I don't want to pay more	52	16.0
Total	324	100.0

Source: Data from Field Survey, 2017.

CONCLUSIONS

In conclusion, it was determined that 98.4% of the families which participated in the surveys consume eggs, that their egg consumption is higher in winter, that eggs are consumed mostly in the morning more as boiled and omelets. It was also determined that families consume quail eggs other than chicken eggs. It was determined that majority of the interviewed families purchase eggs from the supermarkets once a week and that they consider mostly the date of production while mostly preferring medium sized eggs. It was determined in the study that families prefer darker colored egg yolks since it has higher nutritional value and is tastier. It was determined that majority of the interviewed families prefer gelatin coated viols with 15-egg packages as the preferred packaging size. Annual egg consumption per person was calculated as 250 in the study which was above Turkish average. Informational activities which emphasize the importance of eggs for human health should be given more importance in order to increase the rate of egg consumption both in the study region and in Turkey.

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