DETERMINATION OF ANIMAL BASED PROTEIN PREFERENCES AND CONSUMPTIONS OF ELEMENTARY, MIDDLE AND HIGH SCHOOL STUDENTS IN TÜRKIYE

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Abstract. This study was conducted to determine the animal protein source preferences and consumption of primary, middle and high school students in Diyarbakır, one of the cities where families with large differences in income live together. It aims to contribute to the solution of the problems identified in the period when the physical and mental development and therefore the learning skills of school children receiving basic education at a young age develop and take shape. The survey data were evaluated with the Chi square test and the results were interpreted. There were statistically significant relations between the daily total protein intake and some items (grade of schools, gender, age, the number of siblings, parents' occupations, parents' regular income status and awareness of the nutritive values of animal source proteins). As a result of the study, it was determined that there were no major differences in terms of families' income (home and car ownership) and children's animal protein consumption, and that families used all their resources to ensure that their children had a healthy and balanced diet under all circumstances. It was determined that a significant portion of the students participating in the survey did not have sufficient knowledge about the nutritional levels of animal proteins. It would be beneficial to add the subject to existing program to educate students about the subject and to raise awareness levels of families.
Keywords: *animal source foods, body mass index, dietary behaviors, food preference, school children*

Introduction

In order for human beings to grow, develop and live healthy and productive lives, they should be able to take all the necessary nutrients in sufficient amounts within a specific period. It is known that when any of these elements are deficient or consumed in excess taken more than necessary, growth and development are inhibited and health is impaired. Adequate and balanced nutrition is of great importance for the body to grow and develop, to work efficiently, to be resistant to external factors and diseases. Since a very small amount of protein can be stored in the cells, the protein need should be calculated and consumed daily because the protein consumed in excess is converted into fat and glycogen and stored.

Proteins contain 20 amino acids identified that are needed for human growth and metabolism. Animal source proteins (ASP) like egg, milk, red meat, fish and poultry provide the highest quality rating of food sources. ASP can provide micronutrients in greater amounts and more bioavailable forms compared to plant source foods, but their intake is low in many poor populations due to their higher prices (Murphy and Allen, 2003; Gropper and Smith, 2013). Supplementation with small amounts of meat or milk reduced the high prevalence of Ca, riboflavin and vitamin B-12 deficiency of children (Neumann et al., 2002; Siekmann et al., 2003). ASP contain the most available Fe, Ca, P, I, collagen, omega - 3, conjugated linoleic acid, vitamins A, D and B12 for human. Eleven amino acids can be synthesized in children, but remainings called essential need

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to get by foods, especially with ASP (Hoffman and Falvo, 2004). In general, milk and its by products have been considered a basic part of human nutrition. They are healthy, beneficial, and fortifying for all age groups. Cow's milk is included in one of the seven basic food groups developed for providing high biological value proteins, calcium, phosphorus, immunoglobulins, conjugated linoleic acid, lactoferrin, etc.) with beneficial effects on human health. Concern of younger people on the subject of healthy nutrition starts from the early developing stages of children (Serban et al., 2022). Fermented milk called as yoghurt and cheese are rich in probiotics and prebiotics. The growth-stimulating effect of milk seems to take place also in well-nourished populations (Hoppe et al., 2004). Proteins are essential macronutrients, including essential amino acids. Finding the most appropriate protein source is quite challenging as it depends on consumers' preferences, industrial availability, geographical location and cultural factors (Sá et al., 2020). Although the demand for aquaculture products rich in protein, vitamins, minerals and omega 3 fatty acids is increasing day by day in order to meet the increasing nutritional needs of the world population, the amount of protein consumption in Turkey is quite low (Saygı, 2020).
Adolescence is the stage of life between childhood and adulthood between the ages of 10 to 19 years that effect wellness of next life of children (WHO, 2019). In order to know the eating habits of students, it becomes necessary to assess the nutritional status of students taking into account the different foods that themselves choose to eat (Alejandra et al., 2016). Optimal food intake is crucial for promoting the health and well-being of adolescent girls, with potential intergenerational benefits. Policy makers should focus on nutrition education and address the underlying causes of inequitable access to nutritious foods in order to interrupt the cycle of undernutrition in adolescent girls (Sosanya et al., 2024). Especially, the fact that people do not face any health problems when moving from adolescence to adulthood is very related to the healthy eating behaviors acquired during childhood (Charlton et al., 2021).

In addition to basic education, sociocultural structure also has a significant effect on healthy and balanced nutrition of children. In a study conducted in rural Uganda, it was determined that children of families with livestock consumed more animal protein and it was stated that increasing animal protein consumption could provide many positive benefits in terms of nutrition (Azzarri et al., 2014). The relationship was found between maternal education and protein adequacy in the children. The results showed that 85% of the children had insufficient protein intake. Mothers with low education had 1.2 times higher risk of protein deficiency in their children compared to those with high education (Rahmawaty et al., 2023). Healthy and balanced nutrition of school-age children in accordance with their age provides physical development (Uauy et al., 2015) and is also effective in ensuring motor skills (Sudfeld et al., 2015), school success and prevention of chronic diseases in the following years (Garipağaoğlu and Özgüneş, 2008). It has been reported that children who go to school without breakfast do not understand the lessons sufficiently, their perception is low, their attention span is short, they have difficulty in learning, and some of them have problems such as dizziness and pain (Baysal, 1999). In China, it was found that ten-year-old girls increased their height rapidly and their bone density increased compared to those who did not drink milk after consuming milk regularly for two years (Qin et al., 2004).

In Turkey, it has been stated that while the energy level required to be taken daily in the nutrition of individuals is sufficient, unbalanced nutrition is in question. In general,

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there is a problem of access to animal products in quantity and quality to ensure adequate and balanced nutrition, especially in red meat (Gürer and Ören, 2013). Adequate and balanced nutrition is defined as the most economical intake and utilization of the types of nutrients required for growth and development, maintenance of existence and the best performance of activities in the most economical way without losing nutritional value and without impairing health (Açıkgöz, 2006). In order to have healthy, productive and skillful human potential, which is the most important factor in the economic and social development of a country, it is necessary to provide adequate and balanced nutrition to the individuals constituting the society, especially children who are in a continuous and rapid growth and development process (Baykan, 1999). As a matter of fact, nutrition is important in every period of human life from the womb to old age (Pekşen-Akça, 2010).

It has been scientifically demonstrated that growth and development are inhibited and health is impaired when any of the food groups are taken more or less than necessary (Baysal, 2004). The aim of nutrition is to provide sufficient amounts of each of the energy and nutrients needed by the individual according to his/her age, gender, working and special condition (Kılıç and Şanlıer, 2007). Since family, friends, advertisements and school canteens have the greatest effect on the formation of nutritional habits of school-age children, the necessity of education and supervision is obvious (Karaca et al., 2007).

The education and status of the mother is very important in healthy and balanced nutrition of children. Since school-age children are in a rapid growth and development process, they need the highest level of nutrients in this period and the nutritional habits to be acquired in this period can be maintained for a lifetime (Törüner and Büyükgönenç, 2012). Since food preferences and habits of families affect children's eating habits and food choices, it is of great importance to inform families about healthy and balanced nutrition (Bilgen-Sivri and Özpulat, 2015). This study aimed to determine the nutritional status of elementary, secondary and high school students living in 4 districts in the center of Diyarbakır province.

Materials and methods

The research material consisted of the data obtained from the questionnaires conducted with 799 elementary, middle and high school students studying in four districts (Bağlar, Kayapınar, Sur, Yenişehir) of Diyarbakır. The schools in the district were determined by considering the income status of the families and population density. The study was conducted with 4 (elementary + middle) school and 4 high school students from each district. After obtaining the necessary permissions for the questionnaire from the school administration in advance, the questionnaire form prepared and printed by the researchers was distributed to each student individually by informing the students about the subject under the supervision of the teachers at the end of the lesson and completed within a break period of approximately 15 min. In the questionnaire, it was tried to obtain information about the gender, age, district of residence, number of siblings, educational status of the family and financial status of the parents, nutritional preferences, consumption of meat and meat products, milk and milk products, fish and eggs.

Daily protein consumption was determined based on the portions of animal foods consumed daily or weekly. Then, daily protein intake was calculated by multiplying the protein ratios contained in animal protein sources by the amounts of protein sources

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consumed. Comparisons were made between students' body mass index, number of siblings, educational status and occupation of fathers and mothers, etc. in terms of daily animal protein amounts.

Statistical analysis

The research data were analyzed using IBM SPSS v21 package program (SPSS Inc., 2021), statistical analyses were evaluated according to Chi square method and Duncan (Duncan, 1955). multiple comparison test was used to determine the difference between groups. Pearson/Spearman correlation analysis was conducted to examine the relationship between the variables.

Results and discussion

This survey consists of total 799 students with 413 (51.69%) female and 386 (48.31%) male (*Table 1*). The average weight of male students (49.02 kg) were higher than the females (44.60 kg). It was determined that the most of the families (66.58%) lived in their own homes, but, the highest percent of families (64.58%) did not have a car. While there were only 3 (0.38%) students did not have any siblings, it was found that the number of siblings range between 1-3 as 306 (38.30%), with 4-6 siblings 370 (46.31%), with 7-9 siblings 100 (12.52%) and more than 10 just 20 (2.50%).

Positive relations were determined between the ASP intake and mental development of children in developing countries (Neumann et al., 2003; Whaley et al., 2003). It was reported that food preferences were mostly depend on the age and gender of students, however, effect of living place, economic levels of family and the level of education were found less effective in Poland (Wądołowska et al., 2008). Also, its stated that children of nutritionally conscious parents tend to fed more healthily and show a high nutritional awareness (Gutkowska et al., 2023). Insufficient protein intake of students can cause some health problems (Sosanya et al., 2024); Rahmawaty et al., 2023). It was stated that calcium, phosphorous and magnesium which takes place important role in development of children are abundant in milk, cheese and meat (Seidler et al., 2013). In another study (Workicho et al., 2016) stated that in order to increase local production and consumption of animal-based proteins need to empowered economic and educational activities of families. In our study, quite balanced protein intake of the students was determined with the higher education levels of their families (*Table 2*). In order to get good development of the students well nutrition have an important role (Perveen et al., 2017). ASP have a large share of nutrition requirements of peoples, even in Covid 19 pandemic, serious increases were determined (Aydin and Demir, 2022). In animal source proteins, the most preferred protein source are milk and milk by products (Grasso et al., 2019). In contrast, some adult people do not drink milk in some countries of the world (Merlino et al., 2021). Additionally, the pressure of similar age group can be effective on food preferences, nutritional habits and the nutritional situations of students (Ange et al., 2024). Adequate nutrition literacy is crucial for the health of adolescent girls, and it influences the trajectory of maternal and future family nutrition and health (Canavan and Fawzi, 2019). Nutritional habits are established in early stages of lifespan and can have an important influence on the health of individuals in the long-term (Papadaki et al., 2007). Moreover, the environment where the food is provided influences the food-preference of the students (de Oliveira et al., 2015).

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Table 1. *Protein source preferences of students in accordance with the daily protein intake and various parameters of students ($p < 0.05$)*

Feature		N	%	Live weight $\bar{X} \pm SD$	Min.	Max.	Egg	Milk	Yoghurt	Cheese	Fish	Chicken	Red meat	Daily protein intake, g $\bar{X} \pm SD$
							%							
Gender of the student	Male	386	48.31	49.02 ± 15.44^{a}	25	91	8.55	6.71	4.03	22.72	19.31	20.34	18.35	35.28 ± 8.34^{a}
	Female	413	51.69	44.60 ± 10.06^{b}	25	78	8.11	6.51	3.97	22.82	19.36	20.59	18.65	34.05 ± 8.59^{b}
School	Elementary school	91	11.39	32.12 ± 4.14^{c}	25	42	8.17	12.05^{a}	3.51^{c}	22.85^{b}	18.68	20.01	14.74^{b}	37.16 ± 9.92^{a}
	Middle school	387	48.44	40.04 ± 6.48^{b}	26	62	8.09	7.73^{b}	3.91^{b}	24.98^{a}	19.32	20.75	15.23^{b}	33.84 ± 8.75^{b}
	High school	321	40.18	58.95 ± 10.45^{a}	39	91	8.64	3.71^{c}	4.24^{a}	20.08^{c}	19.55	20.25	23.52^{a}	34.91 ± 7.55^{b}
Age	9	5	0.63	36.00 ± 4.42^{de}	30	42	7.25	10.54^{ab}	3.56^{b}	27.54^{a}	17.74	18.29^{c}	15.07^{c}	33.14 ± 14.94^{ab}
	10	69	8.64	32.17 ± 4.13^{e}	25	42	8.06	11.93^{a}	3.43^{b}	23.04^{abc}	18.99	19.56^{c}	14.99^{c}	37.55 ± 9.43^{a}
	11	60	7.51	36.30 ± 6.74^{de}	25	50	8.00	10.32^{ab}	3.50^{b}	24.26^{abc}	18.84	19.51^{c}	15.56^{c}	35.54 ± 9.48^{a}
	12	156	19.52	39.82 ± 6.65^{cd}	28	62	7.88	8.25^{bc}	3.93^{ab}	25.18^{ab}	19.32	20.55^{bc}	14.88^{c}	34.48 ± 8.88^{ab}
	13	168	21.03	40.34 ± 6.34^{cd}	28	62	8.16	7.19^{cd}	3.94^{ab}	25.41^{ab}	19.19	20.90^{bc}	15.21^{c}	33.43 ± 8.56^{ab}
	14	19	2.38	42.47 ± 5.88^{c}	32	53	10.35	5.05^{de}	4.67^{a}	18.49^{c}	19.78	26.02^{a}	15.64^{c}	28.89 ± 7.09^{b}
	15	15	1.88	58.53 ± 12.19^{ab}	40	84	7.96	3.75^{e}	3.50^{b}	20.37^{bc}	20.57	22.48^{abc}	21.36^{ab}	36.16 ± 8.68^{a}
	16	100	12.52	56.52 ± 9.71^{b}	39	87	8.94	3.84^{e}	4.35^{ab}	19.68^{bc}	20.07	19.89^{c}	23.22^{ab}	34.79 ± 6.74^{a}
	17	159	19.90	59.55 ± 10.34^{ab}	40	91	8.61	3.53^{e}	4.32^{ab}	19.93^{bc}	19.85	19.93^{c}	23.84^{ab}	34.48 ± 8.01^{ab}
	18	40	5.01	61.85 ± 10.87^{ab}	41	89	8.08	4.14^{e}	3.88^{ab}	20.85^{bc}	17.63	20.82^{bc}	24.60^{a}	36.15 ± 7.29^{a}
	19	8	1.00	62.13 ± 12.16^{a}	46	80	8.94	3.21^{e}	4.41^{ab}	23.03^{abc}	16.36	24.96^{ab}	19.10^{bc}	37.59 ± 7.37^{a}
Number of siblings	0	3	0.38	31.67 ± 5.13^{c}	26	36	8.59	13.21^{a}	3.54	19.27	26.70^{a}	17.99	10.69^{b}	34.56 ± 8.43^{a}
	1-3	306	38.30	45.21 ± 13.57^{b}	25	91	7.96	7.89^{b}	3.79	22.27	19.21^{b}	20.71	18.17^{a}	35.85 ± 9.35^{a}
	4-6	370	46.31	47.49 ± 12.63^{ab}	25	90	8.52	5.82^{b}	4.07	23.46	19.54^{b}	19.99	18.60^{a}	33.99 ± 7.35^{b}
	7-9	100	12.52	47.13 ± 12.40^{ab}	27	80	8.68	5.66^{b}	4.37	21.86	18.70^{b}	21.92	18.79^{a}	33.07 ± 8.90^{b}
	≥10	20	2.50	56.45 ± 13.73^{a}	30	84	8.17	5.17^{b}	4.00	22.73	19.74^{b}	18.58	21.61^{a}	36.31 ± 10.25^{a}
BMI	Healthy weight (20.95 kg/m^2)	412	51.56	54.90 ± 12.10^{a}	30	91	8.42	7.64^{a}	3.84^{b}	23.81^{a}	19.52	20.77	16.20^{b}	34.98 ± 7.82
	Underweight (16.5 kg/m^2)	387	48.44	38.05 ± 7.30^{b}	25	65	8.21	5.64^{b}	4.14^{a}	21.79^{b}	19.16	20.18	20.67^{a}	34.30 ± 9.14
General		799		46.74 ± 13.12	25	91	8.32	6.61	4.00	22.77	19.34	20.47	8.68	34.65 ± 8.49

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Table 2. *Protein source preferences of students in accordance with the educational status, occupation and economic status of their parents ($p < 0.05$)*

Feature		N	%	Live weight, kg $\bar{X} \pm SD$	Min.	Max.	Egg	Milk	Yogurt	Cheese	Fish	Chicken	Red meat	Daily protein intake, g $\bar{X} \pm SD$
							%							
Father's education level	Illiterate	21	2.64	33.05 ± 4.51^{b}	27	43	8.67	9.85^{b}	4.11^{a}	21.07^{b}	19.65	23.59^{a}	13.06^{b}	34.63 ± 11.15
	Literate	35	4.40	34.69 ± 6.19^{b}	25	52	8.09	11.93^{a}	3.43^{b}	25.00^{a}	18.66	18.78^{b}	14.12^{b}	35.48 ± 9.55
	Elementary school	187	23.52	49.50 ± 13.03^{a}	25	90	8.52	5.58^{c}	4.24^{a}	21.97^{ab}	20.273	20.26^{b}	19.21^{a}	33.93 ± 7.92
	Middle school	206	25.91	48.08 ± 12.62^{a}	26	90	8.73	5.45^{c}	4.05^{a}	22.89^{ab}	19.20	20.80^{b}	18.87^{a}	34.11 ± 8.52
	High school	170	21.38	45.12 ± 11.96^{a}	27	84	8.14	6.79^{c}	3.91^{ab}	23.00^{ab}	18.87	20.78^{b}	18.51^{a}	34.76 ± 8.36
	University	176	22.14	47.73 ± 14.20^{a}	25	91	7.86	7.37^{c}	3.86^{ab}	22.87^{ab}	19.16	20.09^{b}	18.79^{a}	35.70 ± 8.64
Father's occupation	Farmer	19	2.40	54.47 ± 14.35^{a}	25	77	8.68	6.23^{ab}	3.87	22.32	20.16	21.59	17.16^{b}	35.55 ± 7.01^{ab}
	Officer	236	29.76	48.76 ± 13.93^{b}	25	91	7.90	7.00^{a}	3.94	22.26	18.80	20.46	19.64^{ab}	35.86 ± 9.03^{a}
	Worker	345	43.51	42.05 ± 11.47^{c}	25	89	8.51	7.26^{a}	4.02	23.22	19.58	20.61	16.79^{b}	33.76 ± 8.25^{b}
	Self-employment	193	24.34	52.10 ± 11.67^{ab}	30	90	8.43	4.98^{b}	4.08	22.55	19.44	20.17	20.35^{a}	34.80 ± 8.27^{ab}
Mother's education level	Illiterate	136	17.15	37.64 ± 8.14^{d}	25	77	8.69^{a}	9.56^{a}	3.88^{ab}	22.84^{abc}	19.14^{abc}	20.74	15.15^{cd}	33.22 ± 9.26
	Literate	52	6.56	39.48 ± 6.23^{d}	28	58	7.84^{ab}	6.31^{b}	3.81^{ab}	25.73^{a}	21.25^{a}	20.43	14.63^{d}	34.80 ± 8.13
	Elementary school	353	44.51	52.94 ± 13.48^{a}	26	91	8.60^{a}	4.76^{b}	4.23^{a}	21.74^{c}	19.44^{abc}	20.48	20.74^{a}	34.50 ± 7.80
	middle school	132	16.65	46.61 ± 12.38^{b}	25	89	8.01^{ab}	6.30^{b}	3.90^{ab}	22.82^{abc}	18.73^{bc}	20.93	19.32^{ab}	34.93 ± 8.45
	High school	60	7.57	41.02 ± 9.07^{cd}	28	75	8.23^{ab}	9.40^{a}	3.53^{b}	25.38^{ab}	17.76^{c}	19.30	16.40^{cd}	35.12 ± 9.08
	University	60	7.57	43.98 ± 10.89^{bc}	30	80	7.20^{b}	8.53^{a}	3.79^{ab}	22.41^{bc}	20.61^{ab}	20.03	17.43^{bc}	37.08 ± 9.32
Mother's occupation	Housewife	719	89.99	46.84 ± 13.31	25	91	8.39	6.36^{b}	4.03	22.76	19.29	20.60	18.57	34.31 ± 8.33^{b}
	Officer	43	5.38	47.88 ± 12.34	30	80	7.51	8.34^{a}	3.72	22.61	19.72	19.17	18.94	38.02 ± 8.97^{a}
	Worker	37	4.63	43.49 ± 9.70	30	76	7.82	9.42^{a}	3.62	23.19	19.80	19.41	16.74	37.36 ± 9.77^{ab}
Does her father earn a regular income?	Yes	627	78.47	46.84 ± 13.15	25	91	8.27	6.74	3.94^{b}	22.67	19.19	20.41	18.79	35.19 ± 8.39^{a}
	No	172	21.53	46.38 ± 13.05	26	90	8.52	6.12	4.20^{a}	23.14	19.89	20.66	17.47	32.65 ± 8.58^{b}
Does his mum earn regular money?	Yes	80	10.01	44.82 ± 11.83	27	80	7.56^{b}	8.81^{a}	3.72	22.81	19.53	19.25	18.32	37.40 ± 9.42^{a}
	No	719	89.99	46.95 ± 13.25	25	91	8.40^{a}	6.36^{b}	4.03	22.76	19.32	20.60	18.53	34.34 ± 8.33^{b}
Is your house rented?	Yes	267	33.42	46.46 ± 13.65	25	90	8.41	6.24	4.04	21.85^{b}	19.37	20.67	19.42^{a}	34.31 ± 8.15
	No	532	66.58	46.88 ± 12.86	25	91	8.28	6.79	3.98	23.23^{a}	19.32	20.36	18.05^{b}	34.82 ± 8.66
Do you have a car?	Yes	283	35.42	44.62 ± 11.91^{b}	25	83	7.94^{b}	7.78^{a}	3.79^{b}	23.05	18.97	20.61	17.87	35.31 ± 8.68
	No	516	64.58	47.90 ± 13.61^{a}	25	91	8.53^{a}	5.96^{b}	4.11^{a}	22.61	19.54	20.38	18.86	34.28 ± 8.37
Do you know the nutritional value of animal foods?	Yes	269	33.67	43.93 ± 12.80^{b}	25	90	8.21	7.69^{a}	3.95	23.31	19.52	20.09	17.23^{b}	35.84 ± 8.63^{a}
	No	195	24.41	48.85 ± 13.98^{a}	25	89	8.47	6.45^{b}	3.95	22.67	19.12	20.83	18.51^{ab}	34.04 ± 8.93^{b}
	Partially	335	41.93	47.76 ± 12.50^{a}	25	91	8.32	5.83^{b}	4.06	22.39	19.32	20.55	19.53^{a}	34.05 ± 8.02^{b}

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Relationship between daily protein intake and class, gender of students

There were statistically significant differences between gender and daily protein intake, body weight of students ($P < 0.05$). The average daily protein consumption of male students (384) was found higher (35.28 g) than the females (413) as 34.05 g (*Table 1*). The average body weight of male students was 49.02 kg, higher than that of females (44.60 kg. When we consider the body weights of both genders, it is possible to say that students did not consume enough amounts of daily protein. In a healthy and balanced diet, daily protein consumption should be at least 0.8-1 g/kg $^{-1}$ body weight (WHO, 2024). Considering the body weights of the students, it is possible to say that both genders, especially male students receive insufficient amount of daily protein (71.97, 76.3 g/kg $^{-1}$ body weight for male and female students, respectively). Adequate daily protein intake is very important for the physical and mental development of school-age children, especially during the stage of growth period. It was determined that the largest share in the daily ASP consumption of the students participating in the research was cheese ant chicken, followed by fish and red meat, respectively. It was determined that the largest share in the total protein consumed by students was cheese with 22.77%, followed by chicken with 20.47%, fish with 19.34% and red meat with 18.50%. These results were consistent with the studies of Kutlu and Çivi (2009). who reported that the daily consumption of ASP of students aged 7-14 was largely met by milk and its by products, however, our results were not found to be compatible with meat preferences and amounts of daily consumptions. Additionally, our findings are in line with the study (Kubberød et al., 2002). in which reported that students preferred chicken meat over red meat.

Relationships between the daily protein consumption and grade of students

According to the survey results, while there was no statistically significant difference for the total protein intake of students between middle and high school students ($P > 0.05$), however significant differences were found with elementary school students ($P < 0.05$), (*Table 1*). Average body weights of elementary, middle and high school students were 32.12, 40.04 and 58.95 kg, respectively. The highest daily total protein intake score was obtained from elementary school students as 37.16 g, followed by high school (34.91 g) and middle school (33.84 g) (*Fig. 1*). A significant difference was found between the school grades of students and some items (body weight, intake of daily protein, milk, yoghurt, cheese and red meat), ($P < 0.01$).

Positive relationship between body weight and daily protein requirements of children is well known. However, in our study, total protein intake decreased with the weight/grade/age of students. The potential reason of this situation is decreasing parental pressure on food preferences and consumption of children as students grew older. It has been determined that students' protein source preferences vary significantly according to school grade. The protein needs of elementary school students are mainly met by cheese (22.85 g), chicken (20.01 g), fish (19.32 g), red meat (15.23 g) and milk (12.05 g); however, middle school students mostly preferred cheese (24.98 g), chicken (20.75 g), fish (15.23 g) and red meat (14.74 g). It was determined that high school students preferred red meat (23.52 g), chicken (20.25 g), cheese (20.08 g) and fish (19.55 g), (*Table 1*). Daily total protein intake rates were calculated as 1.16 g/kg^{-1}, 0.85 g/kg^{-1} and 0.59 g/kg^{-1} for elementary, middle and high school students, respectively. Considering World Health Organization data (WHO, 2019), it is possible to say that elementary and

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middle school students consume sufficient amounts of protein. However, it seems that high school students consumed lower amount of protein, considering their body weights. Parents, teachers and nutrition educators have certain duties, especially in terms of the nutritional habits of elementary school children, in order to develop nutritional habits that will affect adult lifestyles (Alejandra et al., 2016). Especially elementary school students are often influenced by their families regarding healthy and good balanced nutrition (Gutkowska et al., 2023).

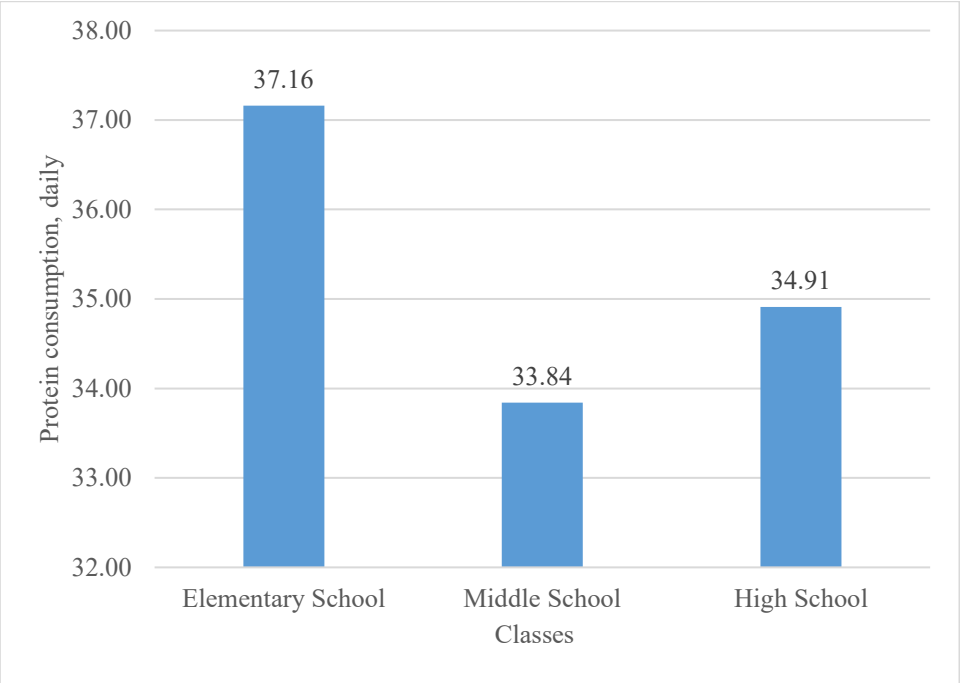

Figure 1. *Daily protein intakes considering school grades (g)*

Relationships between the daily protein consumption and age groups

A statistically significant difference was detected between the age groups and the consumption of some items (daily total protein, milk, cheese, yoghurt and red meat) ($P < 0.01$), and chicken meat ($P < 0.05$). The age-related daily protein consumption of students was found highest in 19-year-old children group (37.59 g), and this was followed by 10-year-old group (37.55 g), but the lowest protein consumption was observed in 14-year-old group (28.89 g). It has been determined that protein consumption decreases as age increases, except for the youngest age group (9-year-old) and the eldest group (19-year-old aged). It has been determined that as the age of the student increases, milk consumption dramatically decreases, while red meat consumption increases (*Table 1*). The highest food consumptions were for egg (10.35%), milk (11.93%), yoghurt (4.67%), cheese (27.54%), fish (20.57%), chicken (24.96%) and red meat (24.60%) were found considering age groups as follows; 14, 10, 14, 9, 15, 19 and 18-year-old respectively. Especially milk intake was decreased with the increasing age of the students. It can be said that the potential reason of this is the influence of decreasing parent pressure while students get elder. Timely, decreasing the effects of parents caused the change of nutrition habits of the students. Considering the relationship between the weight of the students and the total amount of daily protein intake, it is possible to say that there is no need to

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worry about the nutrition of children since the protein consumption required for a healthy and balanced diet. In other words, it can be said that students in elementary and middle school students, except high school group, participating in the survey consumed enough amount of ASP in their diets. These findings are consistent with the results of Kutlu and Çivi (2009), who reported that the majority of students (62.5%) consumed daily milk, yogurt and cheese.

Relationships between the daily protein intake and number of siblings

Southeastern Anatolia region is generally known as with crowded families who have highest birth rates in Türkiye. Statistically significant differences were determined between the number of siblings and some items (body weight, milk, fish, red meat, daily protein intake), ($P < 0.05$). The lowest average body weight (31.67 kg) were obtained with the students who have no siblings. It is possible to explain this result with the low number of students (only 3) who have no siblings. According to the survey results, it was determined that 309 students have less than 4 siblings, while 490 of students have more than 3 siblings. It has been determined that protein consumption generally decreased as the number of siblings increases, except for the students who have no siblings and higher than 9 siblings. While the highest daily total protein consumption (36.31 g) was obtained from 20 students with more than 9 siblings, the lowest score as 33.07 g was obtained from 100 students whose number of siblings varied between 7 and 9. It was determined that only 3 students who did not have any siblings obtained the highest proportion of daily protein from fish (26.70%). It was determined that students with the number of siblings varying between 1-3, 4-6 and more than 9 mostly obtained protein from cheese (as 22.27, 23.46 and 22.73%, respectively), but, students with more than 6 siblings get from chicken (21.92%), (*Table 1, Fig. 2*). In developing countries, less educated and relatively poor families generally have higher birth rates. Considering the economic situation of such families, increasing the number of siblings can cause insufficient ASP intakes.

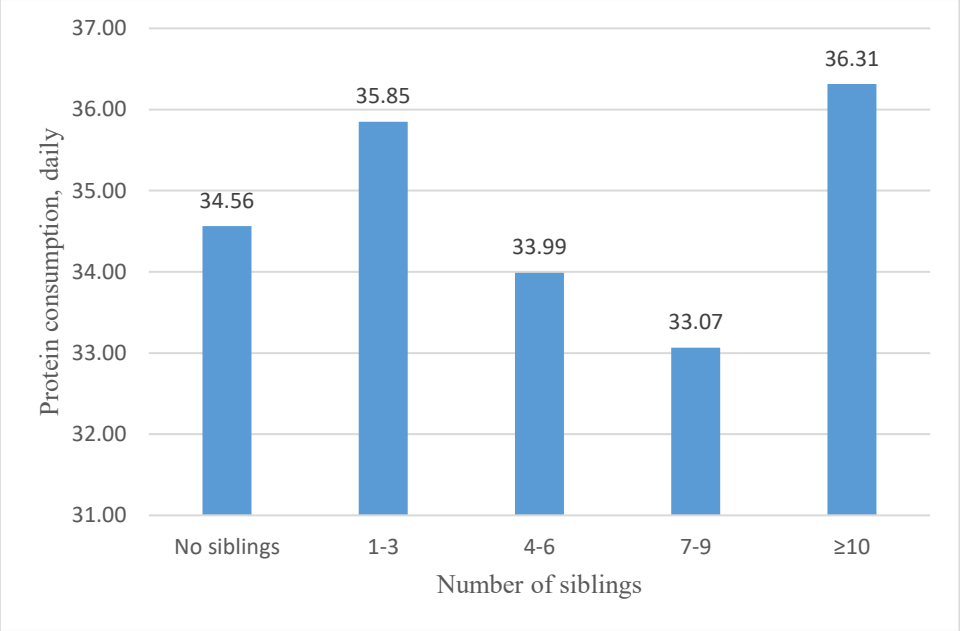

Figure 2. *Daily protein intakes considering the number of siblings (g)*

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Relationships between the daily protein consumption and body mass index (BMI)

Body mass index (BMI) was calculated by dividing the body weight of individuals by the square of their height. BMI categories defined by current World Health Organization (WHO) guidelines for children: underweight (<18.5 kg/m^2), normal weight (18.5-24.9 kg/m^2), overweight (25.0-29.9 kg/m^2), 1st degree obese (30.0-34.9 kg/m^2), 2nd degree obese (35-39.9 kg/m^2) and 3rd degree morbid obese (>40 kg/m^2), (WHO, 2024). A statistically significant difference was found between BMI and the weights of students, intakes of milk, cheese, yoghurt ($P < 0.01$). In the study, it was observed that 51.56% (412) of the students were in the normal weight category and 48.44% (387) were in the underweight category in terms of BMI (*Fig. 3*). Total daily animal protein consumption of students in both groups was found to be similar (34.98 kg v 34.30 g), (*Table 1*). In normal weight category, average body weight (54.90 kg) was found higher than underweight group (38.05 kg).

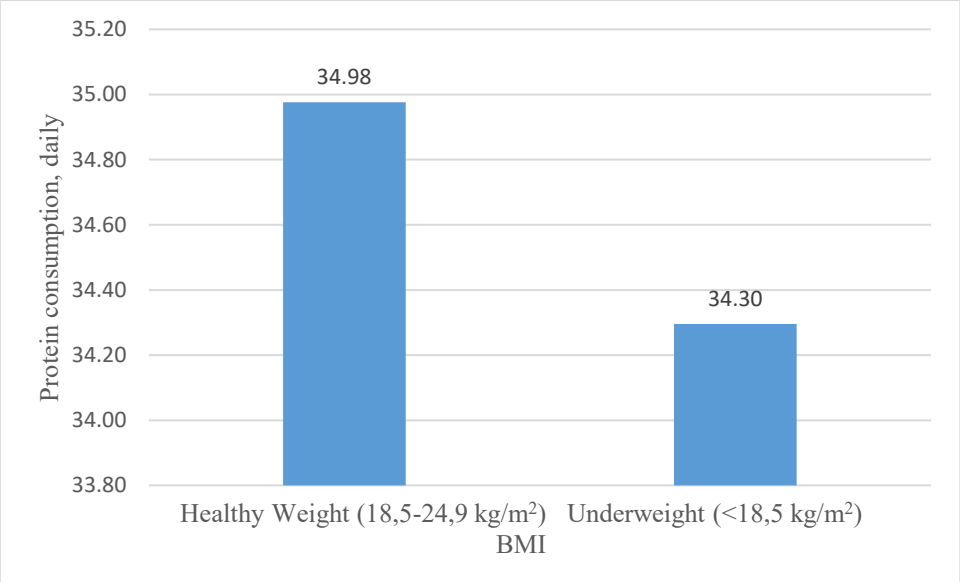

Figure 3. *Daily protein intakes considering BMI score of students (g)*

In a study, it was reported that the BMI values of elementary school students aged between 9-12 ranged from 17.7 to 17.8 (Taşdemir, 2019). In another study, when the BMI values of elementary school students aged between 7 - 14 were examined, it was stated that the numbers of overweight and obese were more than the underweight (Kutlu and Çivi, 2009). Additionally, it was reported that the majority of female students aged 12-14 in health vocational high school were found to be within normal weight limits, only 13.9% were found as obese and over weight (Kılınç and Çağdaş, 2012).

Relationships between the daily protein consumption and education levels of parents

There was no statistically significant difference between daily protein intake and education levels of their parents ($P > 0.05$), but there were significant differences between the education levels of fathers and some items (body weight ($P < 0.01$), the intake of milk ($P < 0.01$), yoghurt, cheese, chicken and red meat ($P < 0.05$), (*Table 2*). Also, higher education levels of fathers lead to increase in average body weights of the

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children and red meat intake, except elementary school graduates. The highest daily protein intake (35.70 g) was obtained with the university graduated fathers, but the lowest intake was found by the fathers who graduated from elementary school (*Fig. 4*). The highest portion of total protein intake was obtained from milk (11.93%) and cheese (25.00%) with the literate fathers, egg intake (8.73%) with middle school graduated; yoghurt (4.24%), fish (20.27%) and red meat (19.21%) with the fathers graduated from elementary school. However, it can be said that especially increasing education levels of mother result in higher daily protein intake of the students. Mostly fathers graduated from middle school (206), followed by elementary (187), university (176) and high school (170).

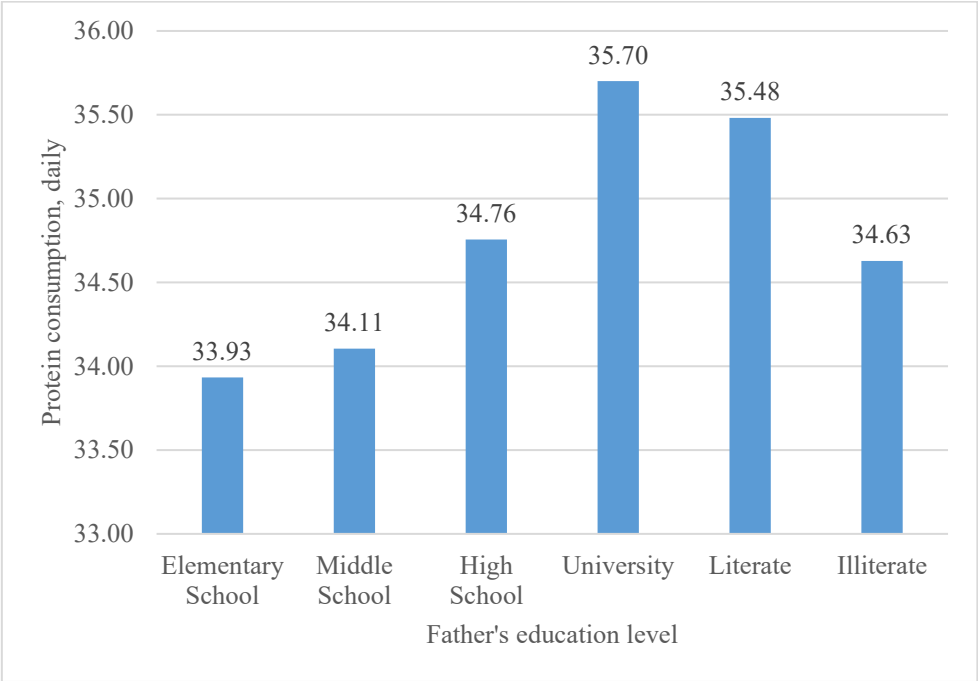

Figure 4. *Daily protein intakes considering the education levels of fathers (g)*

There were statistically significant differences between the education levels of mothers and body weights of students, ASP intakes, except for chicken ($P < 0.05$), however, no significant differences were determined between the education levels and daily total protein intake of the students ($P > 0.05$). The relations between the education levels of mothers and daily protein intakes of children are presented in *Figure 5*. The highest body weight (52.94 kg) were obtained by elementary school graduated mothers, but, the lowest from illiterate mothers (37.64 kg), (*Table 2*). Higher education levels of mothers lead to increase in average body weights of the children, intakes of milk and fish, except elementary school graduates. This result is in similar line with the findings of Aryanti (2019). who reported that the higher education levels of fathers, influenced the nutritional status of their children. It is expected that higher education degree of parents provide better life opportunity for their children. It was reported that the education levels of parents influence the nutritional habits of their children that affect them throughout future life as healthy (Törüner and Büyükgönenç, 2012; Bilgen-Sivri and Özpulat, 2015).

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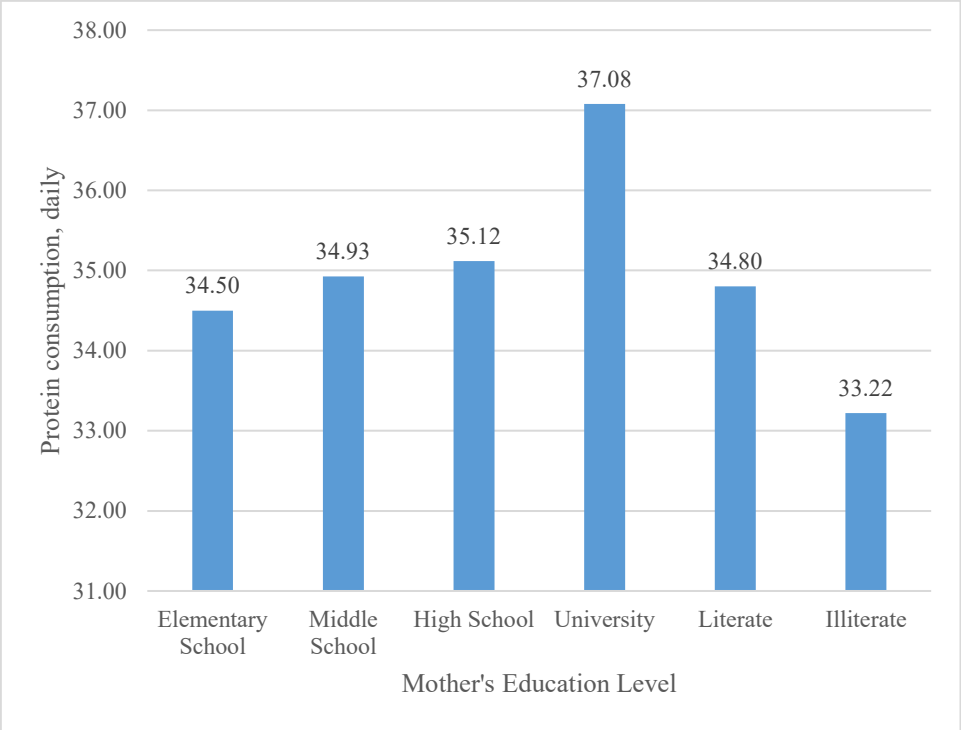

Figure 5. *Daily protein intakes considering the education levels of mothers (g)*

Relationships between the daily protein intake and occupations of parents

Statistically significant differences were determined between the father's job and daily protein intake ($P < 0.05$), body weight and intake of milk and red meat ($P > 0.01$), (*Table 2*). It was determined that fathers generally worked as workers (345), followed by civil servants (236) and self-employed workers (193). Statistically significant differences were determined between the daily total protein intake and the children of officer fathers (35.86 g) and worker's (33.76 g) ($P < 0.05$), but there were no significant differences between other jobs of fathers (*Table 2;* (*Fig. 6*). The students whose father worked as officer mainly gets protein from cheese (22.26 g), chicken (20.46 g), red meat (19.64 g) and fish (18.80 g), but lowest protein consumed group (worker fathers) obtained protein from cheese (23.22 g), chicken (20.61 g), fish (19.58 g) and red meat (16.79 g). The children of farmer-fathers consumed much more eggs, fish and chicken; however, the children of officer and worker preferred mostly milk, cheese, fish, chicken and red meat. In the case of the children of self-employed fathers preferred egg, cheese, yoghurt, chicken and red meat.

The number of mothers working regularly was quite low and only 43 (5.38%) of them worked as officers, 37 (4.63%) as workers, while the majority of the mothers as 719 (89.99%), were housewives.

There was statistically significant difference between daily protein intake and occupation of mothers ($P < 0.05$), the highest score was obtained by the children of officer mothers (38.02 g), followed by workers (37.36 g) and housewives (34.31 g), (*Fig. 7*). The children of housewife - mum consumed less milk than the children of worker and officer - mum. Statistically significant difference was found between the intake of milk protein and occupations of mothers ($P < 0.05$). The highest milk protein intake was determined

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with worker-mums (9.42 g), followed by officers (8.34 g) and housewives (6.36 g), ($P < 0.01$). The highest mother group with 353 person (44.51%) graduated from elementary school, followed by 136 (17.15%) illiterate, 132 (16.65%) middle school, 60 (7.57%) high school and university, 52 (6.56%) literate. There were statistically significant differences between the education levels of mothers and some items as body weights, egg, fish ($P < 0.05$), milk, yoghurt, cheese and red meat intakes ($P < 0.01$) of the students. University graduated mothers have better life conditions and more conscious on nutrition, so, their children have advantages of well nutrition consuming much more ASP. The results obtained from our study regarding the profession and education level of mothers show similarity with Taşdemir (2019) found that 95.2% of mothers are housewives; and the results of Bilgen-Sivri and Özpulat (2015) who reported the mothers of elementary school students are mostly housewives (83.7%) and graduated from elementary school (71.6%). Considering the education levels and occupation of mothers, our results are similar with the findings of some studies (Bilgen-Sivri and Özpulat, 2015; Taşdemir, 2019). It is expected that the children of busy parents who have not spent enough time for meal preparation lead to replicate nutritional mistakes of parents' in their future life (Gutkowska et al., 2023).

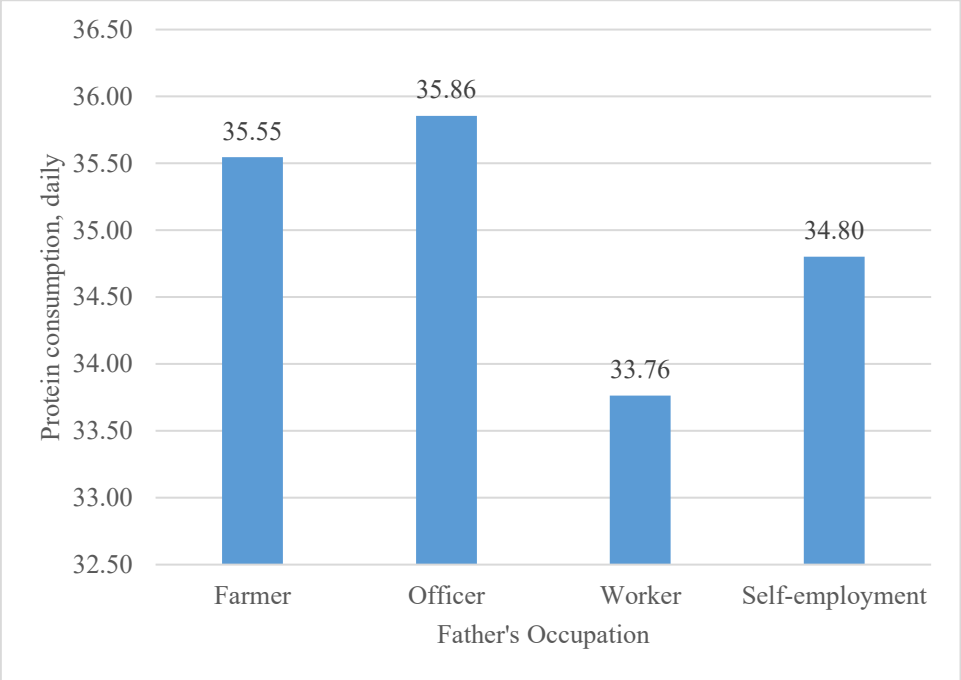

Figure 6. *Daily protein intakes considering the occupation of fathers (g)*

Relationships between protein intake and car-home owning

Having a car or house of families did not affect statistically significantly daily total protein intake of the students ($P > 0.05$), (*Table 2*). It is found that the majority of the students 532 (66.58%) lived in their own houses, but, the most of the students 516 (64.58%) did not have a car. There were no significant differences between the house ownership and body weight, animal food preferences ($P > 0.05$), except for red meat intake ($P < 0.05$). The higher red meat intake was determined as 19.42% with the students of living a rented house. Interestingly, having a house lead to decrease red meat intakes

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of the students. There were significant differences between the car ownership and some items as body weight, intakes of egg ($P < 0.05$), milk and yoghurt ($P < 0.01$), however, other parameters were not found significant ($P < 0.05$). Car ownerships caused less body weight (44.62 kg), higher milk (7.78%), but, lower levels of egg (7.94%) and yoghurt (3.79%) intake. Also, car ownership did not affect significantly total protein intake of the students, but these students consumed much more eggs and yoghurt than the others, however, consumed less amount of milk. The most important criteria which reflects the financial levels of families are car and house ownership. In general, better financial level of families, owning house and car should be increase in ASP intake of their children. It was determined that car - owner 283 children consumed 35.31 g daily total protein, but, other 516 student consumed 34.28 g. This result is expected due to car-ownership reflects the better financial situation of families. Car-owner students prefer mostly milk, cheese and chicken, but, other students prefer egg, yoghurt, fish and red meat. Considering the socio-economic structure of families in Turkey, families do not hesitate to use all their means to meet the nutritional needs of their children and prioritize the feeding of their children over the ownership of a house or a car.

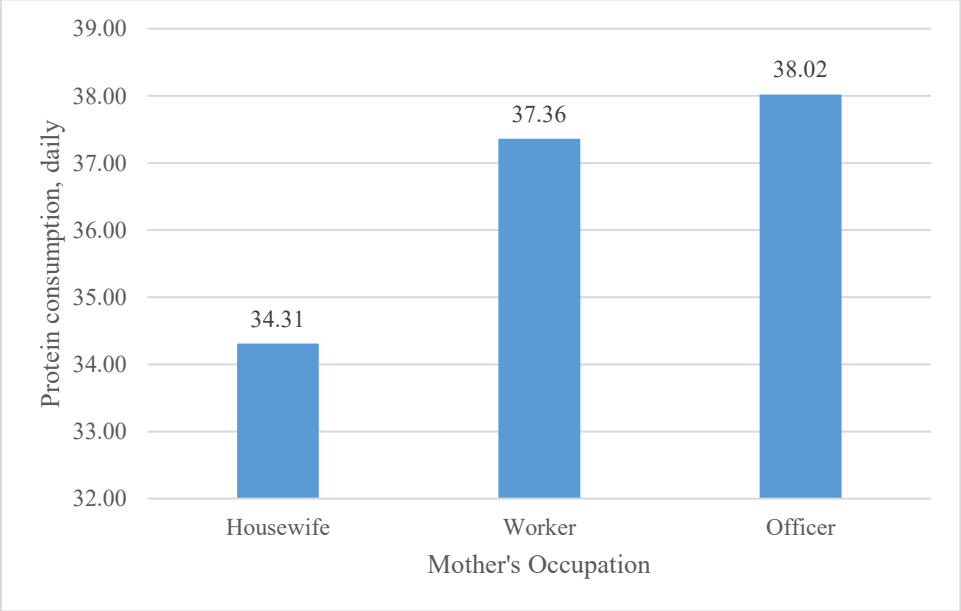

Figure 7. *Daily protein intakes considering the occupation of fathers (g)*

Children having good socioeconomic conditions generally consume nutritious, expensive foods with high content of protein, while the children having low socioeconomic conditions are probably leads to consume cheap and high in carbohydrates foods (Liberona et al., 2011). Positive correlations were found among socioeconomic status of families, parental educational expectations and academic performance of students (Zhang et al., 2023).

Relationships between occupation of parents and car-home owning

There was a statistically significant difference between the profession of the students' fathers and car ownership ($P < 0.01$). According to professions, the highest car ownership was among civil servants with 47.5%, followed by tradesmen and farmers with 31.6%

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and workers with 29%, respectively. The difference between the students' fathers' occupation and home ownership was found to be insignificant ($P > 0.05$). A statistically significant difference was determined between the education level of the fathers and car ownership ($P < 0.01$). According to fathers' educational status, the highest level of automobile ownership was among university graduates with 55.7%, followed by high school with 35.3%, secondary school graduates and literate individuals with 28.6%, elementary school graduates with 26.7%, and illiterate individuals with 23.8%. The difference between the education level of the fathers and home ownership was found to be insignificant ($P > 0.05$). There was a statistically significant difference between the education level of the students' mothers and car ownership ($P < 0.01$). According to education level, the highest car ownership was among elementary school graduates with 35.2%, followed by secondary school graduates with 16.5%, university graduates with 15.8%, illiterate mothers with 15.5%, high school graduates with 11.2% and literate mothers with 5.8%. The difference between their mothers' education level and home ownership was found to be insignificant ($P > 0.05$). A statistically significant difference was determined between the profession of the students' mothers and car ownership ($P < 0.01$). According to professions, the highest car ownership was among farmers with 82.3%, followed by civil servants with 11.0% and tradesman mothers with 6.7%, respectively. The difference between the occupation of the mothers and home ownership was found to be insignificant ($P > 0.05$).

Relation between protein consumption and nutritional awareness on ASP

A statistically significant difference was observed between the groups who are aware of the nutritive values of animal foods and some items as daily total protein ($P < 0.05$), milk and red meat intake ($P < 0.01$), The highest number of students 335 (41.93%) stated that they partially know, 269 (33.67%) have enough knowledge and 195 (24.41%) did not have knowledge on the nutritional values of ASP (*Table 2*). According to the groups, there was no significant difference between the levels of knowledge of ASP and body weights of the students. The group of having knowledge about animal foods consumed much more milk (7.69%) than the other groups, while this group consumed minimum amount of red meat (17.23%). The group who know the nutritive values of animal foods has the lowest body weight (43.93 kg), followed by partially knowing group (47.76 kg), and having no knowledge group (48.85 kg). The fact that the students who know the nutritional value of ASP are consumed higher levels of daily animal food with having lesser body weight shows that the students are conscious of this issue and healthy nutrition. Our results are in line with the findings of Gutkowskaet al. (2023) who emphasized that the children of having nutrition literacy parents tend to eat more correctly and display a significant nutritional awareness in their next life. Also, in elementary school students found that nutrition education topics were generally related to food groups (Follong et al., 2022). It is clear that nutrition education of elementary school students can help them making nutritional choices that support lifelong healthy habits and contribute to reduction in future government health policy (Ülker et al., 2024). Teachers are the most effective factor in the elementary school students as their role model. So, especially elementary school teachers should be well educated about food literacy and preferences in order to inform students (Parlak and Ener, 2023). It is also reported that food preference patterns of school-age children are a risk for unhealthy food consumption as well as for the increase in obesity prevalence in the population (Sánchez-García et al., 2014).

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Correlation coefficients between some variables were presented in *Table 3*. In general, there were low levels of correlation coefficients between variables. Negative and low levels of correlations were found between the mother's education levels and red meat intake; negative and moderate correlations between live weight; but positive and moderate correlations were calculated with milk intake.

Table 3. *Correlation coefficients between some variables*

	Live weight	**Daily protein intake, g**	**Egg**	**Milk**	**Yoghurt**	**Cheese**	**Fish**	**Chicken**	**Red meat**
Gender	-0.164**	-0.064*	-0.056	-0.013	-0.021	-0.004	0.006	0.013	0.024
Number of siblings	0.121**	-0.092**	0.058	-0.175**	0.108**	0.017	-0.011	-0.003	0.056
Father's education level	-0.209**	0.081*	-0.064*	0.248**	-0.097**	0.038	-0.057	0.003	-0.109**
Father's occupation	0.033	-0.056	0.046	-0.119**	0.038	0.018	0.027	-0.027	0.029
Mother's education level	-0.446**	-0.028	-0.020	0.322**	-0.096**	0.072*	0.019	0.002	-0.266**
Mother's occupation	-0.036	0.114**	-0.047	0.135**	-0.060*	0.008	0.021	-0.046	-0.039
Does her father earn a regular income?	-0.020	-0.127**	0.033	-0.048	0.070*	0.017	0.048	0.020	-0.067*
Does his mum earn regular money?	0.047	-0.111**	0.063*	-0.131**	0.055	-0.005	-0.010	0.053	0.014
Is your house rented?	0.007	0.022	-0.018	0.045	-0.021	0.074*	-0.001	-0.022	-0.079*
Do you have a car?	0.113**	-0.058	0.075*	-0.154**	0.088**	-0.016	0.043	-0.018	0.048
Do you know the nutritional value of animal foods?	0.114**	-0.085**	0.010	-0.147**	0.026	-0.041	-0.009	0.022	0.115**

Conclusion

Statistically significant relations were determined between the daily total protein intake of students and some items (grade of schools, gender, age, body weight, the number of siblings, occupations of parents, getting regular income of parents and awareness of the nutritive values of animal source proteins, food preferences). It can be said that elementary school students in the center of Diyarbakır have an adequate and balanced diet in terms of animal source protein consumption per capita, which is one of the most important development criteria of communities today. Healthy and balanced nutrition of young school-aged generations is important for the construction of the society of the future. Globally, persistent food insecurity, poor growth and micronutrient deficiencies continue to plague school-age children and adolescents, as the new challenge of obesity emerges (Wrottesley et al., 2023). In addition to food prices, family income and nutrition habits dominate the food preferences of students. It has a great importance to acquire healthy and balanced eating habits in children during their growth and development period at an early age. Nutrition education interventions in schools can prevent malnutrition, especially elementary schools (Ülker et al., 2024). It was also reported that the socioeconomic environment has an effect on childhood physical health problems, such as obesity and asthma (Hannah et al., 2013). It was determined that a significant portion of the students participating in the survey (195 people, 24.41%) did not have sufficient knowledge about the nutritional levels of animal proteins. It would be beneficial to add the subject to existing program to educate students about the subject and to raise awareness levels of families.

Author contributions. All authors contributed to the writing of the manuscript and literature search.

Conflict of interests. The authors declare that they have no conflict of interests.

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DOI: http://dx.doi.org/10.15666/aeer/2401_12571277

REFERENCES

[1] Açıkgöz, S. (2006): The assessment of relations nutrition habits of students of university with self-efficacy and optimism: Ankara University model. – MSc Thesis, Ankara University. Ankara.
[2] Alejandra, N. M., Paula, C. M., Patricia, A. M. (2016): Study of nutrition habits in primary school students. – J. Clin. Nutr. Diet 2(4): 1-5.
[3] Ange, E. N. B. P., Manga, E., Mabiama, G., Evariste, F., Marlene, N. (2024): Analysis of the feeding habits and nutritional status of adolescents in private non-boarding secondary schools in Bamenda II Municipality, Cameroon. – Asian Food Sci. J 23(6): 58-74.
[4] Aryanti, S. (2019): Factors that influence the nutritional status of elementary school children. –Journal of Physics: Conference Series 1166(1): 012010.
[5] Aydin, E., Demir, P. A. (2022): The effect of the pandemic on the consumption of animal products: the case of Kafkas University of Turkey. – Online Journal of Animal and Feed Research 12(1): 37-45.
[6] Azzarri, C., Cross, E., Haile, B., Zezza, A. (2014): Does Livestock Ownership Affect Animal Source Foods Consumption and Child Nutritional Status. – World Bank, Poverty and Inequality Team Development Research Group, Washington, DC.
[7] Baykan, S. (1999): Investigation of Development Status of 0–6-Year-Old Children in Different Socio-Economic Levels of Ankara. – General Directorate of Pre-School Education, The Ministry of National Education, Ankara.
[8] Baysal, A. (1999): Breakfast and school success. – Nutrition and Diet Journal 28(1): 1-3.
[9] Baysal, A. (2022): Nutrition. – Hatiboğlu Publications, Ankara.
[10] Bilgen-Sivri, B., Özpulat, F. (2015): Nutritional habits of primary school students and their mothers' knowledge level about nutrition. – ACED International Journal of Family, Child and Education 7: 20-30.
[11] Canavan, C. R., Fawzi, W. W. (2019): Addressing knowledge gaps in adolescent nutrition: toward advancing public health and sustainable development. – Current Developments in Nutrition 4: 3(7): nzz062. DOI: 10.1093/cdn/nzz062.
[12] Charlton, K., Comerford, T., Deavin, N., Walton, K. (2021): Characteristics of successful primary school-based experiential nutrition programmes: a systematic literature review. – Public Health Nutrition 24(14): 4642-4662.
[13] de Oliveira, M. F. B., do Carmo, C. N., da Silva Menezes, E. M., Colares, L. G. T., Ribeiro, B. G. (2015): Acceptance evaluation of school meals through different method approaches by children in Brazil. – Journal of Culinary Science & Technology 13(1): 49-65.
[14] Duncan, D. B. (1955): Multiple range and multiple F tests. – Biometrics 11(1): 1-42.
[15] Follong, B. M., Verdonschot, A., Prieto-Rodriguez, E., Miller, A., Collins, C. E., Bucher, T. (2022): Nutrition across the curriculum: a scoping review exploring the integration of nutrition education within primary schools. – Nutrition Research Reviews 35(2): 181-196.
[16] Garipağaoğlu, M., Özgüneş, N. (2008): Nutrition practices in schools. – Journal of Child 8(3): 152-159.
[17] Grasso, A. C., Hung, Y., Olthof, M. R., Verbeke, W., Brouwer, I. A. (2019): Older consumers' readiness to accept alternative, more sustainable protein sources in the European Union. – Nutrients 11(8): 1904. DOI: 10.3390/nu11081904.
[18] Gropper, S. S., Smith, J. L. (2013): Advanced Nutrition and Human Metabolism. 7th Ed. E-Book. – Cengage Learning, Boston, MA.
[19] Gürer, B., Ören, M. N. (2013): Analysis of food security in animal products in Turkey. – MSc Thesis, Çukurova University, Agricultural Economics, Adana.
[20] Gutkowska, K., Hamułka, J., Czarniecka-Skubina, E. (2023): The attitudes of 7–9 year old primary school students towards food and nutrition: insights from qualitative FGI research—The Junior-Edu-Żywienie (JEŻ) Project. – Nutrients 15(22): 4732. DOI: 10.3390/nu15224732.

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
DOI: http://dx.doi.org/10.15666/aeer/2401_12571277

[21] Hannah, M. C., Schreier, M. A., Chen, E. (2013): Socioeconomic status and the health of youth: a multi-level, multi-domain approach to conceptualizing pathways. – Psychol Bull. 139(3): 606-654. DOI: 10.1037/a0029416.
[22] Hoffman, J. R., Falvo, M. J. (2004): Protein–which is best? – Journal of Sports Science & Medicine 3(3): 118-130.
[23] Hoppe, C., Udam, T. R., Lauritzen, L., Mølgaard, C., Juul, A., Michaelsen, K. F. (2004): Animal protein intake, serum insulin-like growth factor I, and growth in healthy 2.5-y-old Danish children. – The American Journal of Clinical Nutrition 80(2): 447-452.
[24] Karaca, P., Pekyaman, A., Güney, H. (2007): A study on parents' ethical perception of the effects of television advertisement content on children. – Journal of Social Sciences 9(2): 233-249.
[25] Kılıç, E., Şanlıer, N. (2007): Comparison of eating habits of three generations of women. – Kastamonu Education Journal 15(1): 31-44.
[26] Kılınç, F. N., Çağdaş, D. (2012): Evaluation of body compositions, dietary habits and nutritional knowledge of health college students. – Turkish Archives of Pediatrics 47(3): 181-188.
[27] Kubberød, E., Ueland, Ø., Rødbotten, M., Westad, F., Risvik, E. (2002): Gender specific preferences and attitudes towards meat. – Food Quality and Preference 13(5): 285-294.
[28] Kutlu, R., Çivi, S. (2009): The assessment of nutritional habits and body mass indexes of the students attending on a private primary school. – Fırat Medical Journal 14(1): 18-24.
[29] Liberona, Y., Castillo, O., Engler, V., Villarroel, L., Rozowski, J. (2011): Nutritional profile of schoolchildren from different socio-economic levels in Santiago, Chile. – Public Health Nutrition 14(1): 142-149.
[30] Merlino, V. M., Massaglia, S., Borra, D., Mimosi, A., Cornale, P. (2021): Which factors drive consumer decisions during milk purchase? New individuals' profiles considering fresh pasteurized and UHT treated milk. – Foods 11(1): 77.
[31] Murphy, S. P., Allen, L. H. (2003): Nutritional importance of animal source foods. – The Journal of Nutrition 133(11): 3932S-3935S.
[32] Neumann, C., Harris, D. M., Rogers, L. M. (2002): Contribution of animal source foods in improving diet quality and function in children in the developing world. – Nutrition Research 22(1-2): 193-220.
[33] Neumann, C. G., Bwibo, N. O., Murphy, S. P., Sigman, M., Whaley, S., Allen, L. H., Demment, M. W. (2003): Animal source foods improve dietary quality, micronutrient status, growth and cognitive function in Kenyan school children: background, study design and baseline findings. – The Journal of Nutrition 133(11): 3941S-3949S.
[34] Papadaki, A., Hondros, G., Scott, J. A., Kapsokefalou, M. (2007): Eating habits of university students living at, or away from home in Greece. – Appetite 49(1): 169-176.
[35] Parlak, M. E., Ener, D. (2023): Nutritional knowledge levels and food preferences of teachers. – Medicine Science 12(1): 1-8.
[36] Pekşen-Akça, R. (2010): Child Development and Education "I am nourished by games". – Mungan Concept Publishing, İzmir.
[37] Perveen, R., Raiz, A., Khan, U. M. (2017): Assessing the influence of nutrition education among adolescent Girls (13-16 years). – Adv. Obes. Weight Manag. Control 6(4): 144-147.
[38] Qin, D. X., Zhu Kun, Z. K., Trube, A., Zhang Qian, Z. Q., Ma Guan Sheng, M. G., Hu Xiao Qi, H. X., Greenfield, H. (2004): School-milk intervention trial enhances growth and bone mineral accretion in Chinese girls aged 10-12 years in Beijing. – Br. J. Nutr. 92: 159-168.
[39] Rahmawaty, S., Karo, A., Khusna, D. N., Shofwah, U. M., Nindiyanti, A. M., Astuti, N. D., Øyen, J. (2023): Socioeconomic Status and Protein Intake Adequacy in Elementary Children in Surakarta. – In: Pambuko, Z. B. et al. (eds.) Proceedings of the 4th Borobudur International Symposium on Humanities and Social Science 2022 (BIS-HSS 2022), Advances in Social Science, Education and Humanities Research 778. Atlantis Press, Paris. doi.org/10.2991/978-2-38476-118-0_71.

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
DOI: http://dx.doi.org/10.15666/aeer/2401_12571277

[40] Sá, A. G. A., Moreno, Y. M. F., Carciofi, B. A. M. (2020): Plant proteins as high-quality nutritional source for human diet. – Trends in Food Science & Technology 97: 170-184.
[41] Sánchez-García, R., Reyes-Morales, H., González-Unzaga, M. A. (2014): Preferencias alimentarias y estado de nutrición en niños escolares de la Ciudad de México. – Boletín Médico del Hospital Infantil de México 71(6): 358-366.
[42] Saygı, H. (2020): Determining the fisheries consumption preferences of Ege University students. – Turkish Journal of Agriculture, Food Science and Technology 8(12): 2785-2789.
[43] Seidler, T., Ksiazek, J., Sobczak, A. (2013): Determining levels of mineral consumption from foodstuff sources in the daily diets of adolescent students living in Kamien Pomorski. A pilot study. – Roczniki Państwowego Zakładu Higieny 64(4): 309-315.
[44] Serban, I. C., Dragomir, N., Vidu, L. (2022): Study of behavior of school children on milk consumption in school program. – Scientific Papers. Series, D. Animal Science 65(2).
[45] Siekmann, J. H., Allen, L. H., Bwibo, N. O., Demment, M. W., Murphy, S. P., Neumann, C. G. (2003): Kenyan school children have multiple micronutrient deficiencies, but increased plasma vitamin B-12 is the only detectable micronutrient response to meat or milk supplementation. – The Journal of Nutrition 133(11): 3972S-3980S.
[46] Sosanya, M. E., Freeland-Graves, J. H., Gbemileke, A. O., Adesanya, O. D., Akinyemi, O. O., Ojezele, S. O., Samuel, F. O. (2024): Why acute undernutrition? A qualitative exploration of food preferences, perceptions and factors underlying diet in adolescent girls in rural communities in Nigeria. – Nutrients 16(2): 204.
[47] SPSS Inc (2021): SPSS for Windows. Version 21.00. – SPSS Inc, Chicago.
[48] Sudfeld, C. R., Charles McCoy, D., Danaei, G., Fink, G., Ezzati, M., Andrews, K. G., Fawzi, W. W. (2015): Linear growth and child development in low-and middle-income countries: a meta-analysis. – Pediatrics 135(5): e1266-e1275.
[49] Taşdemir, A. (2019): A research on nutrition education in primary school students. – Kastamonu Health Academy 4(1): 34-52.
[50] Törüner, E. K., Büyükgönenç, L. (2012): Child Health: Basic Nursing Approaches. – Göktuğ Publishing, Amasya.
[51] Uauy, R., Kurpad, A., Tano-Debrah, K., Otoo, G. E., Aaron, G. A., Toride, Y., Ghosh, S. (2015): Role of protein and amino acids in infant and young child nutrition: protein and amino acid needs and Relationship with child growth. – Journal of Nutritional Science and Vitaminology 61(Supplement): S192-S194.
[52] Ülker, M. T., Elmacioglu, F., Büyükateş, H. S., Özdemir, A., Kuşçu, H., Gündüz, S. N. (2024): The effect of sustainable food literacy education on primary school nutrition attitudes and behaviours. – Toros University Journal of Food Nutrition and Gastronomy 3(1): 29-34.
[53] Wądołowska, L., Babicz-Zielińska, E., Czarnocińska, J. (2008): Food choice models and their relation with food preferences and eating frequency in the Polish population: POFPRES study. – Food Policy 33(2): 122-134.
[54] Whaley, S. E., Sigman, M., Neumann, C., Bwibo, N., Guthrie, D., Weiss, R. E., Murphy, S. P. (2003): The impact of dietary intervention on the cognitive development of Kenyan school children. – The Journal of Nutrition 133(11): 3965S-3971S.
[55] World Health Organization (WHO) (2019): Adolescent Health. – World Health Organization, Geneva. https://www.who.int/health-topics/adolescent-health#tab=tab_1.
[56] World Health Organization (WHO) (2024): – https://www.who.int/data/gho/data/themes/topics/topic-details/GHO/mean-body-mass-index-trends-age-standardized-(kg-m-).
[57] Workicho, A., Belachew, T., Feyissa, G. T., Wondafrash, B., Lachat, C., Verstraeten, R., Kolsteren, P. (2016): Household dietary diversity and animal source food consumption in Ethiopia: evidence from the 2011 welfare monitoring survey. – BMC Public Health 16: 1-11. DOI: 10.1186/s12889-016-3861-8.

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
DOI: http://dx.doi.org/10.15666/aeer/2401_12571277

[58] Wrottesley, S. V., Mates, E., Brennan, E., Bijalwan, V., Menezes, R., Ray, S., Lelijveld, N. (2023): Nutritional status of school-age children and adolescents in low-and middle-income countries across seven global regions: a synthesis of scoping reviews. – Public Health Nutrition 26(1): 63-95.
[59] Zhang, M., Hu, Y., Hu, Y. (2023): The influences of socioeconomic status on parental educational expectations: mediating and moderating effects. – Sustainability 15(16): 12308. DOI: 10.3390/su151612308.

APPENDIX

Survey form applied to students

Determination of animal protein consumption habits of students in Diyarbakir Province

Student's gender:	District and school:
Age: Number of siblings:	Your height: Your weight:
Your father's profession:	Your mother's profession:
Does your father earn regular money:	Does your mother earn money by working:
Do you pay rent for your home?	Do you have a car:

1. Is there anyone in your family involved in animal husbandry?
A) Yes B) No
2. Do you know the nutritional values of animal foods?
A) Yes B) No C) Partially
3. What benefits do animal products provide us?
A) Develops bones B) Increases our growth and intelligence C) Provides vitamins D) Increases our height E) All
4. How many eggs do you consume in a week?
A) 0 B) 1-3 C) 4-5 D) 6-7 E) More than 8
5. In which season do you consume eggs?
A) Spring B) Summer C) Autumn D) Winter E) It doesn't matter
6. How do you like eggs?
A) Omelet B) Soft-boiled C) Well-cooked D) Sucuklu E) Menemen
7. Which part of a boiled egg do you prefer?
A) White B) Yolk C) All D) None
8. Which meal do you prefer to eat eggs at?
A) Morning B) Midday C) Evening D) Always E) None
9. Which egg do you consume other than chicken?
A) Quail B) Goose C) Duck D) Turkey E) None
10. How many glasses of milk do you drink in a day?
A) 0 B) 1 C) 2 D) 3 E) More than 4
11. How many days do you drink milk in a week?
A) 0 B) 1-3 C) 4-5 D) 6-7
12. Where do you buy milk?
A) Ready-made milk from the market B) Fresh raw milk
13. Where do you buy yogurt?
A) Market B) Helke - village yogurt C) Homemade

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14. How many days do you consume yogurt in a week?
A) 0 B) 1-3 C) 4-5 D) 6-7
15. How many days do you consume cheese in a week?
A) 0 B) 1-3 C) 4-5 D) 6-7
16. Which cheese do you prefer?
A) Kashar B) White C) Knitted D) Herbed E) All F) None
17. How many times do you consume fish in a month?
A) 0 B) 1-3 C) 4-5 D) 6-7 E) More than 8
18. How many days do you consume chicken in a week?
A) 0 B) 1- 2 C) 3-4 D) 5-6 E) 7
19. How many days do you consume red meat in a week?
A) 0 B) 1- 2 C) 3-4 D) 5-6 E) 7
20. Which meat do you prefer?
A) Lamb B) Beef C) Chicken D) Fish E) All F) None
21. How do you like red meat?
A) Cubed, shish B) Adana kebap C) Boiled D) Döner E) All
22. How do you like chicken?
A) Cubed, shish B) In the oven C) Boiled D) Döner E) All
23. Which meat do you think is the healthiest and most nutritious?
A) Lamb B) Beef C) Chicken D) Fish E) All
24. How do you like fish?
A) Fried B) Grilled C) Steamed D) Boiled E) All
25. How many days a week do you think milk and eggs should be consumed?
A) 0 B) 1-3 C) 4-5 D) 6-7 E) More than 8
26. What did you have for breakfast today? Underline it:
Milk, Eggs, Cheese - Toast, Olives, Walnuts, Dessert

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