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Factors affecting the individual consumption level of milk and dairy products

Fatores que afetam o nível de consumo individual de leite e produtos lácteos

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Highlights

Differences in individual milk and dairy products consumption were examined.
The consumption levels are particularly affected by biological and economic factors.
Marketing strategies should be created specifically to increase the breakfast habit.

Abstract

The quality and quantity of the demand for milk and dairy products are important indicators for the relevant sector stakeholders. This study aims to examine the amount and differences in individual milk and dairy products consumption, together with the factors affecting this consumption. The study was conducted through a survey on 221 consumers in Hatay, which is a multicultural and cosmopolitan city in Turkey. Monthly average consumptions of milk, cheese, yogurt, ayran/yogurt drink, butter, and milk equivalent products were determined to be 3.45 kg, 0.95 kg, 3.79 kg, 1.32 kg, 0.29 kg, and 30.55 kg, respectively. Consumption frequency was found to be "more than once a week" for milk and "every day" for dairy products. Statistically, men consume more ayran and butter than women ($P < 0.05$). There are significant differences among different income groups in terms of butter consumption, and among different education groups in terms of "milk and ayran" consumption ($P < 0.05$). Significant relationships in a positive direction were determined between height and education level and "ayran"; between weight and income level and "milk equivalent" ($P < 0.01$); between education and income level and "milk consumption" ($P < 0.05$). The socio-economic, demographic, and biological variables of the consumers should be carefully monitored in order to maintain and increase the demand for milk and dairy products, and marketing strategies should be created specifically to increase the breakfast habit.

Key words: Animal. Dairy product. Factor. Food. Milk consumption.

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Resumo

A qualidade e a quantidade da demanda por leite e produtos lácteos são indicadores importantes para as partes interessadas relevantes do setor. Este estudo visa examinar a quantidade e as diferenças no consumo individual de leite e produtos lácteos, juntamente com os fatores que afetam esse consumo. O estudo foi realizado por meio de uma pesquisa com 221 consumidores em Hatay, cidade multicultural e cosmopolita da Turquia. Os consumos médios mensais de leite, queijo, iogurte, bebida ayran/iogurte, manteiga e produtos lácteos equivalentes foram determinados em 3.45 kg, 0.95 kg, 3.79 kg, 1.32 kg, 0.29 kg e 30.55 kg, respectivamente. A frequência de consumo encontrada foi "mais de uma vez por semana" para leite e "todos os dias" para produtos lácteos. Estatisticamente, os homens consomem mais ayran e manteiga do que as mulheres ($P < 0.05$). Existem diferenças significativas entre os diferentes grupos de renda quanto ao consumo de manteiga e entre os diferentes grupos de escolaridade quanto ao consumo de "leite e ayran" ($P < 0.05$). Relações significativas em uma direção positiva foram determinadas entre altura e escolaridade e "ayran"; entre peso e nível de renda e "equivalente a leite" ($P < 0.01$); entre escolaridade e nível de renda e "consumo de leite" ($P < 0.05$). As variáveis socioeconômicas, demográficas e biológicas dos consumidores devem ser cuidadosamente monitoradas para manter e aumentar a demanda por leite e derivados, e estratégias de marketing devem ser criadas especificamente para aumentar o hábito do café da manhã.

Palavras-chave: Animal. Produto lácteo. Fator. Comida. Consumo de leite.

Introduction

Milk and dairy products (cheese, yogurt, ayran, butter, etc.) are essential animal-based food for adequate and balanced nutrition in terms of the high-quality proteins, minerals such as calcium, phosphorus, and vitamins B2 and B12 that they contain (Rogelj, 2000; Ranganathan, Nicklas, Yang, & Berenson, 2005; Yetişemiyen, 2010; Zamberlin, Antunac, Havranek, & Samaržija, 2012). However, the problem of safety in food of animal origin continues for various regions and different socioeconomic strata of the world today. For example, more than half of the recommended daily protein consumption (between 0.8-1.6% of body weight according to activity and physiology) for a healthy adult is of animal origin in developed countries. The increase in the difference between "dietary energy supply" and "animal protein consumption amount" between regions such as North America or Europe and Africa, Asia, or Latin America is also a concrete indicator (Wu, 2016; Food and Agriculture Organization of the United Nations [FAO], 2020). Consumption of milk and dairy products also serves a socioeconomic purpose apart from nutritional adequacy and food safety. This is because raw milk provides income and employment to industry stakeholders (farms, intermediaries, dairies, factories, markets, etc.) throughout the supply chain until the raw milk is converted into processed milk and dairy products and presented to consumers for final consumption (Can, Günlü, Aral, Şahin, & Arıkan, 2021). It is predicted that world milk and dairy products consumption will continue to increase particularly in developing countries in the coming years (Organisation for Economic Co-operation and Development / Food and Agriculture Organization of the United Nations

[OECD-FAO], 2019). Therefore, analyses on the production and consumption per capita of milk and dairy products, which are among the foods of animal origin, are important in terms of the strategies to be followed by the private sector from production to marketing as well as public policies on food and livestock farming.

Turkey produced approximately 22 million tons of raw milk in 2018 and received a share of 2.6% from the global milk production of 843 million tons (FAO, 2020). Hatay, the cosmopolitan and multicultural city of the Mediterranean Region where this study was carried out, produced 0,81% of the national production with 179 thousand tons of milk (Doğruel & Leman, 2009; Küçük, &Tapkı, 2020). Nearly 90% of the milk produced in the province is turned into dairy products, primarily yogurt, white cheese and local types of cheeses (sorke, kunefe, carra, etc.), as well as buttermilk and butter through processing in dairies (Küçük & Tapkı, 2020; Can et al., 2021).

Demand, market price, and supply are three dynamic economic variables that affect each other. The relevant sector cannot be guided rationally without knowledge on the quality and quantity of the demand for milk and dairy products. This is because the amount of consumption and the factors that impact this are components of the market research which starts during the investment stage and continues until marketing. The countries' development levels, product prices, structure of the milk supply chain, the adopted livestock farming policies, and geographical features can be considered among the macro factors determining the demand for animal products (Can, 2018; FAO, 2020; Can et al., 2021). The micro factors affecting demand are the biological, socioeconomic, demographic, psychological and sensory characteristics of the people. These include height, weight, age, gender, education level, income level, and occupation, as well as perceptions of the functional benefit and satisfaction provided by the dairy products (Wilcock, Pun, Khanona, & Aung, 2004; Smith, 2005; Can, Günlü, & Can, 2015; Rahnama & Rajabpour, 2017). Today, there is a continuous need for contemporary research because the changes in the economy, communication, technology, and the demographic and cultural structure affect the direction and size of the demand for animal products. This situation is not only limited at the local or regional level, also increases its importance in global markets.

This study aims to determine the amount of and differences in individual consumption of milk and some other selected dairy products and to examine the factors affecting consumption. It is thought that the cosmopolitan and multicultural structure of the Hatay province, which hosts different ethnic and religious groups, will convey the findings at a local level to wider dimensions and assist sector stakeholders in decision-making.

Material and Methods

Study area and sampling

This study was completed in 2021 in the province of Hatay in the Mediterranean Region of Turkey. The province Hatay is geographically in the Eastern Mediterranean Region (36°15'N, 36°08'E); and is a medium-sized multicultural city (Doğruel & Leman, 2009). The minimum sample size showing the lowest number of consumers to be included in the study was calculated with the formula below.

$$n = N / [1 + N * (e^2)]$$

In this formula, "n" is the minimum sample size, "N" 1 659 320 which is the population of Hatay and "e" is the maximum margin of error selected as 10%. The formula showed that the study should be conducted with a minimum of 100 consumers (Can, Altuğ, & Kaygısız, 2020; Turkish Statistical Institute [TSI], 2021). The study was completed with 221 people after considering possible incomplete and contradictory answers during data collection, as well as removing the outliers from the dataset before the statistical analysis.

Questionnaires and selected dairy products

The required data were obtained through a questionnaire. The questionnaire queried consumers' specific individual characteristics (biological, demographic, and socioeconomic) and consumption amount and frequency of milk and dairy products. "Cheese," "yogurt," "ayran/yogurt drink," and "butter," were considered to be the dairy products as they are the most preferred products in the region and the country. The annual total "milk equivalent" consumption per capita in the province was also calculated for the purpose of comparison to the amount of milk consumed annually per capita in Turkey. This value is comprised of the amount of milk for drinking that is consumed and the amount of milk used for producing 1 kg of selected dairy products. While kefir, which is not widely consumed in Hatay, and ice cream, which exhibits seasonal consumption characteristics, were not included in the study at all, milk cream, which had a very low response rate in the surveys, was removed from the analysis (Hayaloglu, Guven, & Fox, 2002; Tekinşen, Atasever, & Keleş, 1997; Topçu & Saldamlı, 2006; El-Kholy, Abou El-Nour, Khalil, El-Safty, & Mokbel, 2020; Küçük & Tapkı, 2020; Can et al., 2021).

Statistical analyses

Before statistical analyses, outliers were determined by the box-plot method and removed from the data set (Nov & Peansupap, 2018; Zhou, Lin, Qi, Zheng, & Zhang, 2018). Individual characteristics and the amount and frequency of dairy products' consumption were determined by measures of central tendency and distribution. The conformity of the data to the normal distribution was examined first with the help of histograms and then with the Kolmogorov-Smirnov test since the number of subjects was greater than 50. Means of selected groups were compared with the help of the Mann-Whitney U test (effect size r: 0.1 small, 0.3 medium, 0.5 large) and the Kruskal-Wallis H test (effect size measured by ε2). First and third quartile were used as cut-off limits to define income and education groups. The Spearman's Rho Rank Order Correlation test was used in analyzing the relationship between variables (Can, 2014; Yau, Kang, Javier, & Convit, 2014; Altit, Shor, & Maeir, 2019; Příhodová et al., 2021). Microsoft Excel and IBM SPSS software were used for the statistical analysis, and $P < 0.05$ was accepted as significant.

Results and Discussion

Some biological, demographic, and socioeconomic characteristics of the consumers are provided in Table 1. The majority of the respondents are employed males. When the central tendency measurements are examined, it is appears that the consumers are "middle aged" and have a "middle education level."

Table 1
Descriptive statistics for consumers' main characteristics

Characteristics of consumers	N	Mean (X ± SD)	Median (min & max)	Percentages (%)
1. Age (year)	215	33.90 ± 11.00	-	-
2. Weight (kg)	213	73.03 ± 13.90	-	-
3. Height (cm)	214	171.95 ± 13.18	-	-
4. Monthly income	102	-	1 (1-3)[a]	-
5. Education level	209	-	2 (1-3)[b]	-
6. Gender	219	-	-	
6.a. Female	51	-	-	31.1
6.b. Male	168	-	-	68.9
7. Marital Status	221	-	-	
7.a. Single	95	-	-	43.0
7.b. Married	126	-	-	57.0
8. Occupation	215	-	-	
8.a. Unemployed	24	-	-	11.2
8.b. Employee	170	-	-	79.1
8.c. Employer	21	-	-	9.7

[a] 1: Low, less than 2100TRY; 2: Medium, 2100-5999; 3: High, more than 6000 TRY ($1 USD ≈ 8.50 TRY in 2021)
[b] 1: Low; 2: Medium; 3: High (first and third quartile were used as cut-off limits).

The monthly consumption levels and frequencies of milk and dairy products are summarized in Table 2. Milk and yogurt are the most consumed products. Drinking milk consumption frequency of the participants was more than once a week in 34.9%, every day in 24.5%, once a week in 17.5%, more than once a month in 4.7%, once a month in 9%, and every few months in 9.4% of participants. In dairy products, the frequency was discovered to be every day in 70.9% of the participants, more than once a week in 17.4%, once a week in 7.5%, more than once a month in 2.8%, and once a month in 1.4%

Table 2
Amount and frequency of milk and dairy consumption

Monthly consumption level (kg) and consumption frequency	N	Mean (X ± SD)	Median (min & max)
Milk consumption level	195	3.45 ± 2.73	-
Cheese consumption level	178	0.95 ± 0.75	-
Yogurt consumption level	202	3.79 ± 2.75	-
Ayran consumption level	185	1.32 ± 1.55	-
Butter consumption level	182	0.29 ± 0.28	-
Milk equivalent [a]	188	30.55 ± 19.65	-
Milk consumption frequency	212	-	2 (1-6) [b]
Dairy product consumption frequency	213	-	1 (1-6) [b]

[a] The value is comprised of the amount of milk for drinking that is consumed and the amount of milk used for producing 1 kg of selected dairy products.
[b] 1: Every day; 2: More than once a week; 3: Once a week; 4: More than once a month; 5: Once a month; 6: Every few months.

In Table 3, the differences between the consumption values of the subgroups for "gender" and "marital status" are given together with the impact sizes. Males consume ayran and butter significantly more than women. The impact value for this difference is low. There is no significant difference between the consumption averages of single and married individuals.

Table 4 shows the differences between the consumption values of the sub-groups divided into three categories such as "income," "education" and "occupational groups." Statistically, middle-income group consume more butter than low- and high-income groups, middle and upper education groups consume more milk and ayran than the lower education group, unemployed and employers consume more ayran than employees.

Table 3
Consumption differences according to gender and marital status (Mann Whitney U test)

Characteristics	Milk			Cheese			Yogurt			Ayran			Butter		
	U	r	P	U	r	P	U	r	P	U	r	P	U	r	P
1. Gender	3257,0	-0,11	N	3200,5	-0.01	N	3977.5	-0,03	N	2752,5	-0,16	*	2706,5	-0,16	*
1.a.Female	Mean: 2,88 kg Mean rank: 87,22			Mean: 0,93 kg Mean rank: 87,39			Mean: 3,71 kg Mean rank: 97,42			Mean: 0,94 kg Mean rank: 78,74			Mean: 0,23 kg Mean rank: 77,62		
1.b.Male	Mean: 3,72 kg Mean rank: 101,57			Mean: 0,96 kg Mean rank: 88,98			Mean: 3,80 kg Mean rank: 101,79			Mean: 1,50 kg Mean rank: 97,66			Mean: 0,32 kg Mean rank: 96,02		
2. Marital Status	U	r	P	U	r	P	U	r	P	U	r	P	U	r	P
	4245,5	-0,08	N	3734,5	-0,05	N	4930,5	-0,01	N	4152,5	-0,00	N	3711,5	-0,06	N
2.a.Single	Mean: 3,15 kg Mean rank: 92,87			Mean: 0,96 kg Mean rank: 87,38			Mean: 3,76 kg Mean rank: 100,53			Mean: 1,28 kg Mean rank: 93,44			Mean: 0,27 kg Mean rank: 87,34		
2.b.Married	Mean: 3,71 kg Mean rank: 102,05			Mean: 0,95 kg Mean rank: 91,16			Mean: 3,80 kg Mean rank: 102,25			Mean: 1,35 kg Mean rank: 92,67			Mean: 0,31 kg Mean rank: 94,49		

r=Effect size (Z /√N); N= No significance; * P < 0.05.

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Table 4
Consumption differences acc. to income, education and occupation (Kruskal Wallis H test)

Characteristics	Milk		Cheese		Yogurt		Ayran		Butter	
	H	P	H	P	H	P	H	P	H	P
1. Monthly income	5,511	N	1,050	N	2,984	N	0.988	N	9,059	*
1.a.Low	Mean: 2,64 kg Mean rank: 40,17		Mean: 0,87 kg Mean rank: 42,22		Mean: 3,16 kg Mean rank: 44,21		Mean: 1,52kg Mean rank: 44,87		Mean: 0,22 kg Mean rank: 37,73	
1.b.Medium	Mean: 3,99 kg Mean rank: 53,62		Mean: 0,96 kg Mean rank: 43,89		Mean: 4,08 kg Mean rank: 49,38		Mean: 1,33 kg Mean rank: 43,19		Mean: 0,36kg Mean rank: 55,41	
1.c. High	Mean: 3,99 kg Mean rank: 52,93		Mean: 1,30 kg Mean rank: 51,35		Mean: 4,99 kg Mean rank: 58,86		Mean: 0,99 kg Mean rank: 37,53		Mean: 0,25 kg Mean rank: 48,41	
2. Education level	H	P	H	P	H	P	H	P	H	P
	8,144	*	1,445	N	3,887	N	9,122	*	3,374	N
2.a.Low	Mean: 2,46 kg Mean rank: 73,20		Mean: 0,83 kg Mean rank: 79,22		Mean: 3,17 kg Mean rank: 82,49		Mean: 0,77 kg Mean rank: 67,86		Mean: 0,36 kg Mean rank: 98,39	
2.b.Medium	Mean: 3,76 kg Mean rank: 97,74		Mean: 1,04 kg Mean rank: 90,27		Mean: 4,03 kg Mean rank: 100,24		Mean: 1,57 kg Mean rank: 94,06		Mean: 0,28 kg Mean rank: 80,73	
2.c. High	Mean: 3,86 kg Mean rank: 101,30		Mean: 0,96 kg Mean rank: 83,34		Mean: 4,04 kg Mean rank: 101,53		Mean: 1,54 kg Mean rank: 94,63		Mean: 0,30 kg Mean rank: 85,42	
3. Occupation	H	P	H	P	H	P	H	P	H	P
	1,458	N	3,701	N	0,081	N	8,372	*	3,709	N
3.a. Unemployed	Mean: 4,00 kg Mean rank: 104.00		Mean: 0,69 kg Mean rank: 69,24		Mean: 3,86 kg Mean rank: 99,90		Mean: 1,94 kg Mean rank: 113,69		Mean: 0,19 kg Mean rank: 70,70	
3.b. Employee	Mean: 3,44 kg Mean rank: 92,48		Mean: 1,01 kg Mean rank: 90,19		Mean: 3,82 kg Mean rank: 98,70		Mean: 1,18 kg Mean rank: 84,77		Mean: 0,30 kg Mean rank: 90,21	
3.c. Employer	Mean: 3,82 kg Mean rank: 104,26		Mean: 0,87 kg Mean rank: 78,71		Mean: 3,79 kg Mean rank: 95,30		Mean: 1,71 kg Mean rank: 108,31		Mean: 0,32 kg Mean rank: 98,44	

* P < 0.05; ** P < 0.01.

Table 5 provides the correlations between some characteristics of consumers, the consumption amount and frequency. There is a significant positive correlation between all characteristics except education and "butter consumption." There are significant positive correlations between height and education level and "ayran," between weight and income level and "milk equivalent," and between education and income level and "milk consumption." There is a negative correlation between the consumption amount and frequencies. In other words, those who consume higher amounts consume more all at once with less frequent intervals. No significant correlation was found between individual characteristics and consumption frequency.

Table 5
The relationships between consumers' characteristics and the amount and frequency of dairy consumption

Consumers' characteristics	Consumption Levels						Frequency	
	Milk Equivalent	Milk	Cheese	Yogurt	Ayran	Butter	Only Milk	Dairy Products
Age (year)	0.112	0.036	0.062	0.081	-0.024	0.171*	0.111	-0.072
Weight (kg)	0.187*	0.134	0.089	0.122	0.077	0.212**	0.023	-0.107
Height (cm)	0.131	0.082	0.034	0.076	0.214**	0.198**	-0.069	-0.081
Monthly income	0.292**	0.225*	0.089	0.168	-0.096	0.264*	-0.043	-0.009
Education level	0.030	0.181*	0.019	0.119	0.184*	-0.084	-0.190	-0.154

* $P < 0.05$; ** $P < 0.01$.

The strong aspect of this study is that the amount and frequency of current individual dairy products consumption in this multicultural region of Turkey has been presented together with differences and associations among groups and variables. A weakness of the study that the data were obtained from a medium-large city, however, the cosmopolitan structure of the Hatay supports the reliability and generalizability of the findings. Another negative aspect of this study may be that foods that are rarely or seasonally consumed (kefir, ice cream and milk cream) were excluded from the study. But since they cannot effect on the general consumption trend in the market, the study can provides valuable clues to relevant stakeholders from production to consumption.

The adequacy of amounts for consumption in the province must be discussed before addressing the aspects of factors impacting consumption that overlap and conflict with literature. While doing this, one point should be reminded. The per capita consumption in literature principally reports based on national production and population and rarely on net consumption. However, these two concepts, which are generally used in the same sense, are different. Estimating consumption through production

may be practically accurate in countries like Turkey with low imports and exports (Kart & Demircan, 2014). Taking exports, imports, and current stocks into account in the per capita consumption is the method that is more difficult but correct (Unakitan, Azabağaoğlu, & Abdikoğlu, 2017). This is the point at which milk equivalent consumption stands out. This is a relatively good indicator since it includes the total milk content of the selected products. The annual equivalent of the monthly milk equivalent consumption (30.55 kg) in this study is ≈ 367 kg. This value is higher than the per capita production values by Turkey, EU-27, United States of America and China, which are 265 kg, 326 kg, 295 kg, and 25 kg respectively (European Statistics [EUROSTAT], 2019; FAO, 2020; TSI, 2021; United States Department of Agriculture [USDA], 2021). When the monthly consumption values for drinking milk, yogurt, ayran, cheese, and butter are calculated for the province of Hatay annually, they are ≈ 41 kg, 45 kg, 16 kg, 11 kg, and 3.5 kg, respectively. Per capita consumption in Turkey, EU-27, USA, and China in 2019 are respectively ≈40 kg, 63 kg, 65 kg, and 14 kg for milk; ≈ 17 kg, 22 kg, 18 kg, and below 1 kg for cheese; and 1.67 kg, 5.14 kg, 2.79 kg, and below1 kg for butter. In addition, yogurt and ayran consumptions per capita in Turkey are around 31 kg and 19 kg, respectively (He, Yang, Xia, Zhao, & Yang, 2016; Turkish National Dairy Council [TNDC], 2017; EUROSTAT, 2019; USDA, 2021). Therefore, the consumption values of Hatay province are above the national values except for cheese and ayran; butter consumption is above the global reports except for the EU-27. Considering that developed countries consume 5 times more milk than developing countries currently, these values can be deemed decent (Prentice, 2014). However, drinking milk consumption in this study can be slightly lower than the found value. This is because even if the packaged milk purchased from the markets is consumed as drinking milk, the milk purchased from the mobile milkman/street seller is mostly used for making yogurt and occasionally baked goods (pies, cakes, etc.). Some studies in Turkey also reported higher consumption values. For example, in a study conducted in the urban areas of three different provinces, the per capita consumption of drinking milk, yogurt, and cheese were found to be 64 kg, 55 kg, and 24 kg, respectively (Savran et al., 2011). The reason for this is that the study in question was only based on an urban area, and urban consumption is generally higher than rural (He et al., 2016). When the weekly consumption values of another local study conducted on 7116 students in Turkey were calculated annually, it was observed that the per capita consumptions of milk, yogurt, and cheese for the age group 12-18 were 65 kg, 43 kg, and 18 kg, respectively. This high milk consumption may be due to the fact that the relevant study was only based on young people (Koca, Akcam, Serdaroglu, & Dereci, 2017). This is because milk consumption tends to decrease with age (Klesges et al., 1999; Demory-Luce et al., 2004; He et al., 2016).

Consumption of milk and dairy products is influenced by several geographical, economic, political, biological, and cultural variables. However, many studies have shown that economic and financial factors (I), biological and physiological status (II), habits and sensory characteristics (III) are more dominant on the amount and frequency of consumption (Watanabe, Suzuki, & Kaiser, 1999; Wilcock et al., 2004; Smith, 2005; Can et al., 2015; Rahnama & Rajabpour, 2017).

Economic and financial factors (I) are related to consumer income and product unit market price. These two concepts bring to mind the price and income elasticity of demand. Today, especially in developed and some developing countries, "price elasticity of demand" and "income elasticity of demand" for milk and dairy products are generally low/insensitive and are below 1 (Can, 2018). This means that the demand for milk and dairy products weakly responds to relative changes in price and income in general. Thus, it cannot be said that "price" and "income" shape the consumption of milk and some dairy products except for low socioeconomic groups (Andreyeva, Long, & Brownell, 2010; Topcu, Baran, & Denizli, 2014). However, this condition can differ depending on the country and the nature of the product. For example, there is an apparent correlation between consumption amount and income in underdeveloped and developing countries (OECD-FAO, 2019). A study conducted in Japan, one of the developed countries, found that only taste and health variables were effective in milk consumption, whereas the price factor also came into play in "cheese" consumption (Watanabe et al., 1999). In addition, organic product prices can impact consumer preference and amount in high income groups (Topcu, et al., 2014). A similar finding in our study is valid for "butter." Higher butter consumption of the middle income group compared to low income group can be explained by the fact that butter is superior to margarine and certain oil products and/or the unit price is higher. The reason for the low consumption in the upper income group may be due to health concerns. Although more things can be said on the economic aspect, from food inflation to purchasing power, it is necessary to mention the economic rationality in dairy products consumption. Achieving rationality, which is in closely correlated to consumer welfare, is possible by purchasing unit protein or energy of a certain quality (health, biological usefulness, nutritional elements, etc.) at the most affordable price.

Biological and physiological factors (II) such as weight, height, age, physical activity, and general health are important in consumer preferences and amounts. Among these, "weight," "age," and "health" stand out. The weight factor is an important measure in the global comparison of milk and dairy products consumption (Prentice, 2014). The recommended daily protein consumption, at least half of which is already satisfied from animal products, for an adult and healthy person is calculated according to body weight (Wu, 2016). A study conducted on military personnel in the United States reported a positive correlation between body weight and milk consumption (Klesges et al., 1999). In our study, there are positive correlations between the "weight" of individuals and "equivalent milk consumption." As stated before, there is a negative correlation between milk consumption and age (Klesses et al., 1999; Demory-Luce et al., 2004; He et al., 2016). Consumption of milk and dairy products is notably higher in children and young people than in adults, which can be explained by breakfast habits. The fact that breakfast habits are lower in overweight and obese children than in other groups also shows the importance of breakfast (Koca et al., 2017). Breakfast is actually an important meal that the industry should focus on in terms of marketing strategies. If we consider the health aspect of the issue, it is emphasized that milk and dairy products are beneficial not only for growth, development, and bone health but also for

cardiovascular diseases, hypertension, diabetes, and many types of cancer (Rogelj, 2000; Ranganathan et al., 2005; Prentice, 2014). It was reported by a study conducted in the USA that the risk of breaking bones in women who consumed less than one meal a week during childhood increased twice compared to those who drank milk more than one meal a day (Kalkwarf, Khoury, & Lanphear, 2003). Parallel to the increase in the risk of developing osteoporosis as age progresses, it was determined that the most important factor in the consumption preference of dairy products by adults is the vitamin and mineral content of the product (Ranganathan et al., 2005). However, milk-related stomach problems and lactose intolerance can have a negative impact on consumption, especially in women (Klesses et al., 1999). Today, there is an increasing trend towards functional dairy products that support body functions and increase resistance against infectious diseases (Wu, 2016; Banjari, Domiter, Ostrognjaj, & Petrović Vidić, 2020). Since fermented milk products such as yogurt, ayran, and kefir are easy to digest by the organism, they are superior and advantageous foods in terms of nutrition physiology. The coagulation of the proteins resulting from pre-digestion of the proteins and a decrease in pH levels during the fermentation of milk products facilitate digestion. Again, the conversion of lactose, which is milk sugar, into lactic acid in these products provides an advantage for lactose intolerant individuals who cannot digest lactose (Yetişemiyen, 2010; Prentice, 2014).

Consumption habits (III) is a multidimensional concept. In terms of milk and dairy products, one aspect of habits is the emotional (taste, comfort, etc.) and functional (feeling of satiety, healthy life, etc.) satisfaction provided by consumption (Rahnama & Rajabpour, 2017). The products' biological quality, belief, culture, and traditions are the basis of these behaviors. Habits influence not only the amount of consumption but also its frequency. For example, the majority of individuals who participated in the study answered the question on the frequency of consumption of dairy products as "every day" because of their breakfast habit and the fact that cheese is indispensable for breakfast. Here, the economic importance of breakfast for the sector is revealed once again. In a study conducted in Turkey, the rate of those who have breakfast every day was 62% for 6-18 years old and 52% for 12-18 years old although the frequency of milk and dairy products consumption by children and young people was reported as "every day" (Koca et al., 2017). On the other hand, yogurt and ayran hold a special place for Turkish people and are an almost integral part of meals (Yetişemiyen, 2010). In our study, the fact that the frequency of drinking milk consumption was “once a week” rather than every day could be explained by the globally recognized negative correlation between age and milk consumption.

The average age of 33.90 in the study is a sign that consumers are now turning to yogurt and ayran instead of milk. The positive relationship between age and butter consumption can be explained by the “traditional eating habits” of middle-aged and aged people. Another issue related to habits is “faith,” that is, religion and sect. Although faith principally concerns meat consumption, it can also be influential on milk and dairy products consumption. Questions about religion or sect could not be queried through the questionnaire since they were private and sensitive issues in the multi-cultural Hatay province. However, to

mention briefly, while the chymosin enzyme is generally used in cheese making, pepsin enzyme obtained from other animals (cattle, pig, chicken) can also be used at a restricted level (Garg & Johri, 1994; Yetişemiyen, 2010). It is stated that milk coagulating enzymes obtained from religiously prohibited are not used in industry in Turkey (Coşkun & Akgündüz, 2020).

Lastly, the effect of education and gender on consumption can be mentioned. In this study, education had a positive correlation only with milk consumption. The correlation can stem from the better understanding of the importance of milk for children in the developmental age by the educated families. Some conducted studies support this finding (Ahmed et al., 1998; Schmit, Dong, Chung, Kaiser, & Gould, 2002; Akbay & Tiryaki, 2008). In addition, it was stated that educated families prefer packaged milk (pasteurized or sterilized) more (Akbay & Tiryaki, 2008). On the other hand, a negative relationship was determined by a study conducted in the USA between milk consumption and education (Klesges et al., 1999). It was found by a study investigating the effects of ethnicity and gender on the consumption of dairy products by adults in the United States that whites consumed more milk and cheese than blacks (African Americans) and women consumed significantly more than men such dairy products as yogurt and cheese (Ranganathan et al., 2005). In our study, the reason for finding higher consumption rate of ayran by men than women can be the consumption of ayran while having lunch outside by the working population, which is predominantly male. Additionally, the fact that butter consumption is higher in men can be explained by higher body weight and physical activity.

Conclusion

This study not only allowed the comparison of local consumption to national and international values, but it also analyzed the consumption differences between various groups and the factors affecting consumption. Thus, the current size and direction of the demand for milk and dairy products have emerged. The findings showed that the consumption levels of milk and dairy products differed significantly between demographic and socioeconomic subgroups, and the consumption level was particularly affected by biological and economic factors. The local limit of the findings can be considered among the study's limitations. However, Hatay's multi-faith, multi-cultural, and cosmopolitan character minimizes the disadvantage and allows for the results' evaluation on a larger scale.

Socioeconomic, demographic, and biological characteristics of the consumers should be carefully monitored by the industry stakeholders to sustain the current demand for milk and dairy products from the local to national level. It is thought that awareness activities supported by marketing strategies for the importance of breakfast will significantly contribute to increasing the consumption of dairy products.

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