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Research Article
A Study on Bread Consumption of Well-Educated Individuals in Turkey: A Sample of University Staff

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Abstract

Background and Objective: Bread is a most basic food item consumed commonly all over the world. Bread consumption habits mostly reflects lifestyle and the type and amount of the consumed bread varies with the changes in socioeconomic, cultural and educational conditions of societies. Previously, the bread consumption habits of the Turkish people were evaluated with different local and national studies. This study aimed to determine the bread consumption habits of well-educated individuals and the amount of nutrients provided from bread consumption. **Materials and Methods:** All academic staff members and civil servants, working in Karamanoğlu Mehmetbey University, included for the study. Within the scope of the study, a questionnaire including bread consumption habits was applied. Bread consumption and bread types in 24 h dietary recall were recorded and, energy and nutrient intake from bread consumption were analysed by a food analysis software. **Results:** The percentage of white bread consumers was 50.0%. This rate was 58.0% for men and 36.1% for women. The mean amount of bread consumption was 147.3±83.98 g for men and 86.5±47.92 g for women respectively. In addition, daily dietary intake of energy, carbohydrate, fiber, thiamine, vitamin B6, folate and sodium from bread consumption in men significantly higher than those in women. Carbohydrate intake from bread consumption provides averagely 54.7% of adequate intake of carbohydrate for men. This averagely rate was 31.6% in women. Moreover, bread consumption provided adequate micronutrient intake (AI) in men significantly higher than in women. **Conclusion:** The amounts of bread consumption of the present study are lower than that of the local and national studies. So, it is clear that education level is important for bread consumption awareness. Government-sponsored educational activities are thought to be able to change people's bread consumption habits significantly.

Key words: Bread consumption, bread types, energy intake from bread, nutrient intake from bread, white bread

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Bread has been produced in Anatolia for about eight thousand years and is a food item consumed commonly all over the world[1-3]. The first produced bread was obtained by mixing the roasted or ground cereal grains with water and baking the dough. While in the hunter-gatherer societies, lived in the Palaeolithic age, the diet was based on protein and fat, the consumption of cereal and bread increased in the Neolithic age and cereal-based products became the most important food items for humans[4]. Having high nutritional value, being cheap, the ease of obtaining the materials used in production, having a neutral taste and aroma and being consumed with many foods make bread the most basic food item[5].

The type and amount of the consumed bread varies with the changes in the health indicators and socioeconomic and cultural conditions of societies. It is known that there are so many types of bread that can not be counted in the world and some societies are known with their own specific bread types[6]. Bread is also the most valuable product related to wheat in Turkey and has an important place in Turkish cuisine[7].

It is clear that, bread has an important place in human nutrition because of being a good source of energy and nutrient[8]. It is specified that more than half of the people living around the world provide more than half of daily dietary energy intake from bread. In addition, in many Western European countries, daily bread consumption provides half of the daily dietary carbohydrate, one-third of the daily dietary protein, more than half of the B group vitamins and more than 75% of the vitamin E intakes[6].

The increasing awareness of consumers and interest in different types of bread in recent years has led to increased consumption of high fiber bread types[9]. There are many positive health effects of dietary fiber such as decreased postprandial glucose level, total and LDL cholesterol levels and prevention of colon cancer[10]. For this reason, nutrition and nutrient guidelines published in official institutions in many countries focus on whole grains as the most basic food item of a healthy and balanced diet[11].

Bread consumption levels of individuals living in Turkey were evaluated previously with local and national studies[1,7,12-14]. However, there is limited data on the contribution of bread consumption to daily dietary energy and nutrient intake. So, this study aimed to evaluate bread consumption of well-educated individuals, who are staff of a university in Turkey and contribution of bread consumption to daily dietary energy and nutrient intake.

MATERIALS AND METHODS

Study area and population: All academic and administrative units in Karamanoğlu Mehmetbey University were visited between March and July 2018 and all staff members were informed about the study. A total of 334 staff members (229 academic staff members and 105 civil servants) who agreed to participate the study with a written affirmation, were included in the study.

Data collection: Within the scope of the study, a questionnaire including bread consumption habits and general information about preference of bread was applied and data were collected by face to face interview. In addition, bread consumption levels and bread types in 24 h dietary recall were recorded. The 'Food and Meal Photo Catalog'[15], a photographic atlas including Turkish foods and meals, was used to determine the types and quantities of consumed bread.

Evaluation of energy and nutrients intakes from bread consumption: Energy and nutrient intake from bread consumption were analysed by a food analysis software, Nutrition Information System (BEBIS)[16]. For evaluation of percentage of adequate intake of nutrient from bread consumption, adequate intake levels for carbohydrate, fiber and minerals in Turkey Nutrition Guideline 2015[17] was took into account.

Statistical analysis: Statistical analysis was performed using IBM SPSS version 20.0 software (IBM Corp. Armonk, NY, US). Levene's and Kolmogorov-Smirnov tests were used for homogenity and normality. Binomial and one sample chi-square tests were used for evaluating the statistical difference between expected and observed values. For evaluation of qualitative and quantitative data, Pearson chi-square and Student's t tests were used respectively. Statistically significance was accepted at the level of 0.05.

Ethical approval: For the study, ethics committee approval numbered 02-2018/08 was obtained from Karamanoğlu Mehmetbey University Non-Interventional Clinical Research Ethics Committee.

RESULTS

The mean age of the participants in the study was 34.6±6.87 years (35.8±7.57 years for men and 32.4±4.73 years for women). The percentages of males, married participants and academic staff members were 63.5, 71.3 and

Table 1: General characteristics

Features	No.	Percentage	p-value	Test
Gender				
Male	212	63.5	<0.001	Binomial test
Female	122	36.5		
Marital status				
Married	238	71.3	<0.001	Binomial test
Single	96	28.7		
Staff status				
Academic staff member	229	68.6	<0.001	Binomial test
Civil servant	105	31.4		
Income level (TL)				
3000 TL and under	47	14.1	<0.001	One sample, $\chi^2 = 58.904$
3001-4000 TL	36	10.8		
4001-5000 TL	105	31.4		
5001-6000 TL	96	28.7		
Over 6000 TL	50	15.0		

68.6% respectively. There were statistically significant differences between expected and observed values in terms of gender, marital status, personal status and income level ($p<0.05$) (Table 1).

The percentage of white bread consumers was 50.0%. This rate was 58.0% for men and 36.1% for women. Participants stated that they consumed whole grain bread with the percentage of 28.7% (18.9% for men and 45.9% for women). Also, the academic staff members consumed white bread types more than the civil servants (53.3% for academic staff members and 42.9% for civil servants); on the other hand the civil servants consumed traditional bread types more than academic staff members (10.5% for academic staff and 23.8% for civil servants) ($p<0.05$). Men specified that their bread preference reason was 'habit' with the percentage of 51.9%; and women stated that they prefered bread firstly for 'health' with the percentage of 45.1%. It was determined that the breakfast was the most bread-consumed meal. Also, 28.8% of men stated that they preferred packed bread and this rate was 54.1% in women ($p<0.05$). There were no statistical significant differences between the academic staff members and civil servants in terms of the factors affecting the choice of bread, the most bread-consumed meal, bread purchase place and packed bread consumption ($p>0.05$) (Table 2).

Most of the participants, consumed white bread, declared their satisfaction level with bread consumption as moderate (33.5%) and good (33.5%). The good satisfaction rates were 44.9 and 41.7% in individuals who consumed traditional bread types and who consumed whole grain bread respectively. Also, 36.4% of the individuals consuming wholemeal bread expressed that they were not satisfied with the bread they consumed (Table 3).

The mean amount of bread consumptions were 147.3±83.98 g for men and 86.5±47.92 g for women respectively and there was a statistically significant difference between genders in terms of bread consumption ($p<0.05$). In addition, daily dietary intake of energy, carbohydrate, fiber, thiamine, vitamin B6, folate and sodium from bread consumption in men significantly higher than those in women ($p<0.05$). There were no statistically significant differences between academic staff members and civil servants in terms of bread consumption amounts and daily dietary intake from bread consumption ($p>0.05$) (Table 4).

For evaluation of adequacy levels of nutrients from daily bread consumption of individuals 'adequate intakes (AI) in Turkey Nutrition Guideline 2015' were took into account. Carbohydrate intake from bread consumption provides averagely 54.7% of adequate intake of daily dietary carbohydrate in men. This averagely rate was 31.6% in women and the difference in genders was statistically significant ($p<0.05$). Further, bread consumption provided adequate nutrient intake (AI) in men significantly higher than those in women ($p<0.05$) (Table 5).

DISCUSSION

Bread consumption is indispensable for Turkish society and consuming nutrient-rich bread types is important in terms of providing adequate nutrient intake. There was no significant difference in terms of bread consumption habits in general between academic staff members and civil servants. On the other hand, there were significant differences in terms of bread type preference, bread consumption habits and bread consumption amounts between genders ($p<0.05$).

It was determined that the most consumed bread type was white loaf bread with the percentage of 50.0% in the present sample. Also, whole grain bread, traditional bread types such as lavash, yufka and leavened bread and wholemeal bread were commonly consumed with the percentages of 28.7, 14.7 and 6.6% respectively. In two studies

Table2: Some characteristics of bread consumption according to gender and staff status

	Gender						Staff status					
	Male		Female				Academic staff		Civil servant			
	No.	Percentage	No.	Percentage	χ^{2*}	p-value	No.	Percentage	No.	Percentage	χ^{2*}	p-value
Bread type												
White loaf bread	123	58.0	44	36.1	28.283	<0.001	122	53.3	45	42.9	10.512	0.015
Traditional bread	33	15.6	16	13.1			24	10.5	25	23.8		
Whole grain bread	40	18.9	56	45.9			68	29.7	28	26.7		
Wholemeal bread	16	7.5	6	4.9			15	6.6	7	6.7		
Factor affecting bread preference												
Habit	110	51.9	32	26.2	24.916	<0.001	97	42.4	45	42.9	2.999	0.392
Healthy	67	31.6	55	45.1			87	38.0	35	33.3		
Tasty	28	13.2	21	17.2			34	14.8	15	14.3		
Professional advice	7	3.3	14	11.5			11	4.8	10	9.5		
Most bread consumed meals												
Breakfast	88	41.5	92	75.4	35.823	<0.001	132	57.6	48	45.7	4.428	0.109
Lunch	40	18.9	10	8.2			30	13.1	20	19.0		
Dinner	84	39.6	20	16.4			67	29.3	37	35.2		
Bread purchase place												
Market	104	49.1	73	59.9	4.871	0.301	127	55.5	50	47.6	4.752	0.314
Bakery	84	39.6	41	33.6			84	36.7	41	39.0		
Grocery	18	8.5	5	4.1			12	5.2	11	10.5		
Buffet	3	1.4	1	0.8			2	0.9	2	1.9		
Homemade	3	1.4	2	1.6			4	1.7	1	1.0		
Packed bread consumption												
Packed bread	61	28.8	66	54.1	21.075	<0.001	85	37.1	42	40.0	0.254	0.614
Unpacked bread	151	71.2	56	45.9			144	62.9	63	60.0		

*Pearson chi square test

Table 3: Satisfaction levels according to the general consumed bread types

	Generally consumed bread types									
	White loaf bread		Traditional bread		Whole grain bread		Wholemeal bread			
Satisfaction level	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage	χ^{2*}	p-value
Very good	5	3.0	1	2.0	8	8.3	3	13.6	24.566	0.017
Good	56	33.5	22	44.9	40	41.7	6	27.3		
Moderate	56	33.5	19	38.8	33	34.4	5	22.7		
Poor	45	27.0	5	10.2	11	11.5	8	36.4		
Very poor	5	3.0	2	4.1	4	4.2	-	-		

*Pearson chi square test

Table 4: Bread consumption amount and nutrient intakes from bread consumption with 24 hour dietary recall according to the gender and staff status

	Gender ($\bar{X}\pm SD$)				Staff status ($\bar{X}\pm SD$)				
Amount of bread and dietary intake	Male	Female	t*	p-value	Academic staff	Civil servant	t*	p-value	Total ($\bar{X}\pm SD$)
Amount of bread (g)	147.3±83.98	86.50±47.92	-8.422	<0.001	120.30±74.22	135.40±86.59	-1.639	0.102	125.1±78.51
Energy (kcal)	392.7±217.59	230.00±127.49	-8.615	<0.001	322.40±198.61	357.20±217.62	-1.442	0.150	333.3±205.09
Carbohydrate (g)	71.4±40.97	41.00±23.32	-8.641	<0.001	58.00±36.47	65.50±42.10	-1.665	0.097	60.3±38.42
Dietary fiber (g)	6.6±4.11	4.20±3.10	-6.229	<0.001	5.60±4.05	6.00±3.74	-0.833	0.406	5.7±3.96
Thiamine (mg)	0.3±0.15	0.20±0.09	-8.987	<0.001	0.20±0.14	0.20±0.14	-0.923	0.357	0.2±0.14
Niacin (mg)	2.5±3.27	2.70±3.04	0.604	0.546	2.60±3.23	2.60±3.11	-0.121	0.904	2.6±3.19
Vitamin B6 (mg)	0.1±0.09	0.07±0.04	-9.526	<0.001	0.11±0.08	0.13±0.09	-1.638	0.102	0.1±0.08
Folate (µg)	56.2±31.98	33.00±21.21	-7.980	<0.001	47.00±30.83	49.30±30.22	-0.645	0.519	47.7±30.62
Sodium (mg)	465.0±325.82	223.90±244.02	-7.669	<0.001	360.60±311.96	412.70±335.75	-1.383	0.168	377.0±320.04

*Student's t test

Table5: The providing rates of adequate intake (AI; reported in Turkey Nutrition Guideline 2015) from bread consumption

	Gender ($\bar{X}\pm SD$)				
Nutrients	Male	Female	Total ($\bar{X}\pm SD$)	t*	p-value
Carbohydrate (%)	54.7±31.52	31.6±17.94	46.4±29.56	-8.641	<0.001
Dietary fiber (%)	26.5±16.46	16.6±12.40	22.9±15.82	-6.229	<0.001
Thiamine (%)	22.3±12.55	13.7±8.11	19.2±11.89	-7.675	<0.001
Vitamin B6 (%)	10.7±6.58	5.7±3.41	8.9±6.13	-9.240	<0.001
Folate (%)	17.0±9.69	10.0±6.43	14.5±9.28	-7.980	<0.001
Sodium (%)	31.4±22.02	14.9±16.27	25.4±21.60	-7.800	<0.001

*Student's t test

conducted in Turkey, it was reported that the most common bread type consumed was white bread[12,13]. In a national survey conducted in Sweden, it was found that the most consumed bread types were whole grain bread and white bread with the percentages of 37 and 36% respectively[18]. These results show that bread is one of the most important elements of Turkish diet. Moreover, it is striking that the preference rates of white bread in the local studies on bread consumption of the Turkish society are quite high compared to this study[1,7,12-14]. So, it is thought that education is an important factor affecting bread consumption.

While 58.0% of men primarily prefered white loaf bread, 45.1% of women stated that they primarily consumed whole grain bread ($p<0.05$). Similarly, Aksoylu *et al.*[8] reported that women consumed non-refined bread types significantly higher than men. The results show that women are more sensitive than men to healthy bread consumption.

Breakfast takes attention as a meal most bread-consumed with 53.9%. In the study conducted by Aksoylu *et al.*[8], 48.3% of the participants stated that they mostly consumed bread at the breakfast. So, it is thought that because of consuming cereal meals such as rice, pasta, bulgur pilaf and Turkish ravioli, bread consumption was less in the lunch and dinner.

Homemade bread consumption in rural areas is replaced by fabricated bread consumption in urban areas. As expected, the majority of participants (53.0%) declared that they bought bread from supermarkets where is easy to access. In a study conducted in Saudi Arabia, it was reported that the most preferred places to purchase bread were bakeries, groceries and supermarkets with the percentages of 35.9, 16.0 and 12.4% respectively[19]. From these results, it can be concluded that the places close to the home were preferred to purchase bread.

In the present study the mean daily bread consumption amounts were 147.3±83.98 g for men and 86.5±47.92 g for women respectively. According to the Turkey Nutrition and Health Survey 2010[14] results, in urban areas the mean bread consumption amounts for men were 237.63 g in the 19-30 age group, 236.61 g in the 31-50 age group and 205.65 g in the 51-64 age group respectively. For women, these rates were 142.83 g in the 19-30 age group, 143.15 g in the 31-50 age group and 140.18 g in the 51-64 age group respectively. In the study conducted in Sweden[18] and in the National Diet and Nutrition Survey[20] conducted in United Kingdom, the mean bread consumption amounts were quietly lower in comparison with this study. These results reveals the fact that bread is one of the basic food in Turkish diet. However, the fact that the bread consumption amounts of the participants are lower than the data of Turkey Nutrition and Health Survey 2010 suggests that the education level is important for bread consumption awareness.

In the National Diet and Nutrition Survey[21] in UK, it has been reported that 1% of adequate intake of folate was provided from bread consumption in adult men and this rate was 3% in adult women. It has also been reported that 20% of daily dietary carbohydrate intake was provided from bread consumption. In this study, averagely 17.0 and 10.0% of adequate intake of folate was provided from bread consumption in men and women respectively. In addition, 46.4% of adequate intake of carbohydrate was provided from bread consumption. In the previous National Diet and Nutrition Survey[22] in UK, it was reported that 14% of adequate intake of thiamine and about one in five of adequate intake of dietary fiber provided from bread consumption. On the other hand, in this study 19.2% of adequate intake of thiamine and 22.9% of adequate intake of dietary fiber were provided from bread consumption. All these results show that bread is the main carbohydrate source in Turkish diet. Bread type is quite important in terms of adequate intake of nutrients such as B vitamins and dietary fiber.

Dietary fiber is an important component of the mediterranean diet and is an effective nutrient in the prevention of many diseases such as diabetes, hipercolesterolemia and colon cancer[23]. In the present study, the mean dietary fiber intakes from bread consumption were 6.6±4.11 g for men and 4.2±3.10 g for women. In another study conducted in the Netherlands, these mean amounts were 11.9 and 9.9 g for men and women respectively[24]. In the light of these data it is considered that the consumption of whole grains instead of refined grains may have a significant effect on providing dietary fiber intake.

CONCLUSION

It is concluded that one of the determinants of bread consumption habits is education level. However, dietary carbohydrate intake is a matter of debate nowadays and more detailed awareness of people about healthy carbohydrate sources is considerable for food safety. It is not realistic that removing entirely the bread, the most basic components of the Turkish diet, from diet. In healthy nutrition, the type of bread is also important as much as amount of bread. Bread types produced from non-refined grain flours are important source for dietary fiber and B vitamins.

It is believed that government-sponsored activities such as education about healthy bread consumption in public open spaces, public spots posted on national and local media and addressing the subject in school curriculum able to change people's bread consumption habits significantly.

SIGNIFICANCE STATEMENT

This study discovers the contribution of bread consumption to daily dietary energy and nutrient intake in university staff that can be beneficial for evaluation of the place of bread in diet of Turkish well-educated individuals. The study will help authorities to determine the policies about healthy eating and healthy bread consumption in Turkish society. Also the study will help the researcher to uncover the critical areas of causes of unhealthy bread consumption that many researchers were not able to explore. Thus a new theory related to the parameters that can effect bread consumption may be arrived at.

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