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Original Article

Effects of Migration on Nutritional Habits: From Turkey to Germany

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Abstract

Background: Dietary habits are influenced by environmental factors. Among these environmental factors are the place of residence, cultural characteristics, food accessibility, and economic status, which can all contribute to changes in the dietary pattern. Migration is another factor that can influence changes in the aspects mentioned above. We aimed to assess the dietary habits of individuals who have migrated from Turkey to Germany in comparison to those living in Turkey.

Methods: In this descriptive and cross-sectional study, 254 individuals were enrolled with 102 individuals in Germany and 152 individuals in Turkey between April 2022 and July 2023. The data collection tools included Socio-demographic Characteristics Forms, Dietary Habits and Health Status Forms, and Food Consumption Frequency Forms. The data was collected online via Google Forms.

Results: There were statistically significant differences in the consumption frequency of processed meats, meat and poultry, sweetened beverages, sugar, desserts and pastries, vegetables, fruits, eggs and grains, olive oil, sunflower oil, hazelnut oil, grains, dairy products, coffee, starch, and carbonated beverages between the two groups ($P<0.05$). Statistically significant differences were not found in terms of butter and tea consumption frequency.

Conclusion: Overall, the study results have revealed significant differences in dietary habits between Turks living in Germany and those living in Turkey. The most noteworthy dimension of these differences is that individuals living in Turkey exhibit a stronger adherence to the Mediterranean dietary pattern, while those living in Germany tend to follow a Western dietary pattern.

Keywords: Migration; Nutritional habits; Health; Turkey; Germany

Introduction

Dietary habits are influenced by numerous individual and environmental factors, including cultural, political, physical, and socioeconomic determinants (1). Among the environmental factors, migration stands out as one of the most significant factors influencing dietary habits (2). Factors such as employment opportunities in the host country, the presence and affordability of cultural foods, and disposable income for purchasing food are among the circumstances that shape the dietary habits of migrants (3). Additionally, factors such as the strength of ties to the country of origin, the social context of migration, the formation of new social networks, the ability to

speak the language of the host country, the age at which migration occurs, life stage, and factors like employment or school attendance also constitute advanced-level determinants (4).

Among the immigrant groups living in Germany, individuals who migrated from Turkey constitute one of the largest immigrant groups (5). Under the scope of the "Agreement on the Recruitment of Turkish Workers for Employment in Germany," signed between Germany and Turkey on October 30, 1961, Turkish citizens began to migrate to Germany under the status of guest workers (Gastarbeiter). As time passed, these individuals transitioned from being guest workers to settling in the country (6). In 1961, the number of Turkish immigrants within the borders of Germany was 6,800. However, this number increased to 652,000 in 1971, further rising to 1,546,000 in 1981. By 1991, the Turkish immigrant population had reached 1,780,000 (7). The number of Turks living in Germany is now over 3 million, according to the latest available data (8).

In developed countries, industrialization has often transformed dietary patterns from being predominantly plant-based (vegetables, fruits, whole grains, legumes) to a diet rich in total and saturated fats, cholesterol, and energy-dense foods (9). The Mediterranean diet is a dietary pattern characterized by rich sources of fruits, vegetables, legumes, whole grains, and lean protein. Processed foods, trans fats, and sugar-sweetened beverages are minimized in this diet model (10). In Turkey, particularly in the Mediterranean and Aegean regions, dietary habits are aligned with the Mediterranean diet model (11). Dietary habits can undergo changes with migration as well (3). The dietary habits of second-generation individuals differ based on the region they live in compared to their parents' dietary habits (12). Similarly, a study in New Zealand has reported statistically significant changes in the dietary habits of South Asian individuals living there after migration (13).

The existing research and the fact that migration from Turkey to Germany started over half a century ago suggest that dietary habits of Turkish immigrants living in Germany may have changed. Germany's high level of industrialization and developed country status, coupled with the changes in the regions where individuals reside and the associated dietary habits and relationships with chronic diseases, are important factors to consider. However, there is a lack of studies in the literature that evaluate the dietary habits of Turks after migrating to Germany.

The aim of this study was to assess the dietary habits and chronic diseases of Turks living in Germany compared to those living in Turkey.

Materials and Methods

This study descriptive and cross-sectional study was conducted among Turks living in Germany and Turkey between April 2022 and July 2023.

The cohort of the research consisted of Turks living in Germany and Turkey. The snowball sampling method, a non-probability sampling method, was used to select the sample, reaching a total of 254 participants (n=152 in Turkey, n=102 in Germany). Post hoc power analysis was applied to determine the adequacy of the sample. The analysis revealed that at a 95% confidence interval and a significance level of 0.05, the effect size was 0.50 and the power was 0.98. These values indicate the sufficiency of the sample. Inclusion criteria for the study included being at least 35 years old, having lived in Germany for a minimum of 20 years for those in Germany, speaking Turkish, and owning a mobile communication device. Data Collection Instruments: The data was collected using the Socio-Demographic Characteristics Information Form, Diet Habits and Disease Form, and Food Consumption Frequency Form.

Socio-Demographic Characteristics Information Form consists of 4 questions regarding participants' age, gender, education, and employment status.

Dietary Habits and Disease Form includes 5 questions regarding participants' diet, frequency of daily meals, consumption of cultural foods, and frequency of home-cooked meals.

Food Consumption Frequency Form is a tool that allows participants to determine how often they consume specific foods or food groups on a daily, weekly, or monthly basis, as well as the quantity consumed; if desired. The food consumption frequency method is commonly used to determine the relationship between diet and disease risk. The form can be prepared in various ways depending on the purpose. The food consumption frequency form used in this research specifically includes preferred and cultural foods. Participants were asked to mark the consumption frequency for each listed food item by assigning scores to eight different categories (Every day = 1, 5-6 times a week = 2, 3-4 times a week = 3, once a week = 4, every 15 days = 5, once a month = 6, and never = 7).

Data Collection

The data was collected online via Google Forms. After reaching individuals who had been living in Germany for at least 20 years, the data collection form was then shared online with their consent to participate in the research. The first individual who had filled out the data form then passed the form to another person they knew, who had similar characteristics and agreed to participate in the study. This process continued until the data collection was completed. Data from Turks living in Turkey were collected in a similar manner.

Statistical Analysis

The statistical analysis of the data was performed using SPSS 22.0 software package (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented in terms of counts, percentages, and means ± standard deviations. The normal distribution of the data was assessed by examining Skewness and Kurtosis values. The obtained values were within the ±1.5 range, indicating that the data were normally distributed. Chi-square and independent t-tests were used for inferential analyses. A finding of $P < 0.05$ was considered statistically significant for all analyses.

Research Ethics

Approval was obtained from the Erzurum Technical University Scientific Research and Publication Ethics Board (Meeting Number: 03, Decision Number: 01, 28th March 2022 (2022:03:01)). Additionally, potential participants were informed about the research through the first page of the survey forms on Google Forms, and they were asked to indicate their consent by marking the consent link if they agreed to participate.

Results

When examining the socio-demographic characteristics of participants from Turkey, the average age was 51.50±9.22 yr, with 38.2% falling within the 46-55 age range in the study. In terms of gender distribution, 54.6% were female. Furthermore, 36.8% completed high school, and 55.3% were employed full-time. Among participants from Germany, the average age was 48.57±8.23, with 43.1% falling within the 46-55 age range. The gender distribution was 57.8% female. Moreover, 66.7% completed high school, and 48% were employed full-time (Table 1).

The participants' dietary habits and disease status are presented in Table 2. Among the individuals participating from Turkey, 4.6% identified as vegetarians, while 51.3% consumed three regular meals a day. 100% of the participants preferred local foods, with 90.1% regularly including local foods into their daily diet. Furthermore, 85.5% indicated that they consumed homemade meals all the time.

For participants from Germany, 2% identified as vegetarians, and 42.2% consumed three meals a day. 88.2% of the participants preferred traditional Turkish foods, with 71.1% including traditional Turkish foods into their daily diet. Additionally, 60.8% indicated that they consumed homemade traditional Turkish meals all the time.

Table 1: Socio-demographic characteristics of participants

Variable	*Turkey (n=152)*		*Germany (n=102)*	
	N	%	n	%
Age (X̄±SD)	51,50±9,22		48,57±8,23	
Age categories (years)				
35-45	39	25,7	38	37,3
46-55	58	38,2	44	43,1
56-65	44	28,9	17	16,7
65+	11	7,2	3	2,9
Gender				
Female	83	54,6	59	57,8
Male	69	45,4	43	42,2
Education				
Less than high school	20	13,2	10	9,8
High school or similar	56	36,8	68	66,7
Bachelor degree	57	37,5	21	20,6
Masters degree	19	12,5	3	2,9
Employment				
Full time employed	84	55,3	49	48,0
Part time employed	6	3,9	44	43,1
Unemployed	62	40,8	9	8,8
Total	152	100	102	100

Table 2: Dietary habits and health status of participants

Dietary Habits	*Turkey (n=152)*		*Germany (n=102)*	
	n	%	n	%
Dietary				
Non-Vegetarian	145	95,4	100	98,0
Vegetarian	7	4,6	2	2,0
Number of meals per day				
1	11	7,2	5	4,9
2	47	30,9	40	39,2
3	78	51,3	43	42,2
4	8	5,3	8	7,8
5	1	0,7	1	1,0
5+	7	4,6	5	4,9
Local food consumption				
No	0	0	12	11,8
Yes	152	100	90	88,2
Frequency of local foods consumption				
Daily	137	90,1	64	71,1
4-6 times a week	15	9,9	23	25,6
1-3 times a week	0	0	2	2,2
Rarely	0	0	1	1,1
Frequency of homemade food consumption				
Always	130	85,5	62	60,8
Usually	22	14,5	20	19,6
Sometimes	0	0	15	14,7
Rarely	0	0	5	4,9
Never	0	0	0	0
Total	152	100	102	100

There was a statistically significant difference between Turks living in Turkey and Germany in terms of the most commonly consumed oil, the most preferred cooking method, body mass indexes (BMIs), and chronic disease conditions (P<0.05). The difference in oil consumption arises from the preference for olive oil and sunflower oil, while the difference in cooking methods stems from the preference for frying and grilling techniques. Regarding participants' existing health conditions, no statistically significant difference was found (X^2 = 5.57, P = 0.062) (Table 3).

Table 3: Comparison of participants according to certain variables

Variable	*Turkey (n=152)*		*Germany (n=102)*		*Test Value*	*P*
	n	%	n	%		
Consumed Oil						
Olive oil	116	76,3	41	40,2	X^2 =34,99	.001
Sunflower oil	32	21,1	58	56,9		
Butter	4	2,6	3	2,9		
Hazelnut Oil	0	0	0	0		
Cooking Methods						
Frying	48	31,6	70	68,6		
Boiling	56	36,8	28	27,5	X^2 =42,49	.001
Grilling	47	30,9	4	3,9		
Baking	1	0,7	0	0		
BMI (X̄±SD)	27,73±8,90		30,74±8,29		t= -2.712	.007
Chronic diseaeses						
No	52	34,2	19	18,6	X^2 =7,36	.007
Yes	100	65,8	83	81,4		
Type of Disease						
Diabetes	40	26,3	39	38,2	X^2 =5.57	.062
CD	47	30,9	41	40,2		
Cancer	13	8,6	3	2,9		

BMI: Body Mass Index, CD: Cardiovascular Diseases
X^2: Chi Square, *t*: *t* test

The comparison of participants' food consumption frequency is presented in Table 4. According to the table, no statistically significant differences were found in terms of butter and tea consumption frequency between Turks living in Turkey and Germany. However, there were statistically significant differences in the consumption frequency of processed meats, meat and poultry, sweetened beverages, sugar, desserts and pastries, vegetables, fruits, eggs and grains, olive oil, sunflower oil, hazelnut oil, grains, dairy products, coffee, starch, and carbonated beverages between the two groups (P < 0.05).

Table 4: Comparison of participants' food consumption frequency

Foods	***Food Consumption Frequency***			
	X̄	SD	*t*	*P*
Processed meat				
Turkey	4.09	1.19	7.617	.000
Germany	2.93	1.18		
Meat, poultry				
Turkey	4.76	0.88	6,924	.000
Germany	3,78	1,23		
Sweet drinks				
Turkey	1,88	1.00	2,054	.041
Germany	1,61	0,99		
Sugar, sweets, baked goods				
Turkey	3,40	1,88	8.822	.000
Germany	1,78	1,02		
Vegetables				
Turkey	1,82	0,97	-3,434	.001
Germany	2,24	0,94		
Eggs, beans				
Turkey	2,42	1,60	3,862	.000
Germany	1,82	0,84		
Fruits				
Turkey	2,14	1,21	2,536	.012
Germany	1,80	0,92		
Olive oil				
Turkey	1,86	0,86	-5,204	.000
Germany	2,61	1,28		
Sunflower oil				
Turkey	2,80	1,39	8,472	.000
Germany	1,61	0,84		
Butter				
Turkey	3,23	1,65	0,677	.499
Germany	3,08	1,80		
Hazelnut Oil				
Turkey	1,19	0,88	-69,033	.000
Germany	6,92	0,41		
Wholegrains				
Turkey	2,40	1,15	3,438	.001
Germany	1,93	1,00		
Dairy foods				
Turkey	2,32	1,35	2,865	.005
Germany	1,88	1,08		
Coffee				
Turkey	1,55	0,81	-3,873	.000
Germany	1,99	0,94		
Tea				
Turkey	1,20	0,40	0,690	.491
Germany	1,16	0,44		
Starches				
Turkey	3,40	1,52	7,535	.000
Germany	2,16	1,09		
Acidic beverages				
Turkey	3,17	1,52	10,863	.000
Germany	1,55	0,82		

t: t test

Discussion

The purpose of this study is to evaluate the dietary habits and chronic diseases of Turks living in Germany and Turks living in Turkey. The sample of individuals living in Germany in the study consists of Turkish individuals who have been residing in Germany for at least 20 years. According to a conducted study, it is reported that dietary habits of immigrants are influenced starting from the second generation (14). In this study, the inclusion of individuals who have been living in Germany for at least 20 years is considered to provide a sufficient timeframe for evaluating post-migration dietary habits.

Migration and industrialization are considered among the most influential factors in changing dietary habits (12, 15, 16). Factors such as the culture of the region, the presence of other migrating communities from different cultures to the region, accessibility to food, and economic status are among the effects of migration (17, 18). In this study, it has been observed that the frequency of consuming homemade meals, which is among the dietary habits, has decreased (Table 2). The increase in industrialization, which leads to increased employment, is also resulting in a higher frequency of eating outside of home due to the rise in economic status and associated opportunities (19). According to the results of this study, the full-time and part-time employment rates of those living in Germany are higher compared to those living in Turkey (Table 1). One of the most significant factors contributing to the change in dietary habits is industrialization.

There are some other previous studies which also looked into changes in individuals' eating habits when they move to another country. In a study, for example, when asked about the reasons why regional dietary habits replace traditional dietary habits, it has been reported that the duration of residence in the region and the difficulty in accessing traditional dietary foods are contributing factors. The same study also indicates that gradual transitions to new types of food occur through experimentation (20). In another study examining the changes in post-migration dietary habits, which included individuals of Pakistani origin living in Norway, it was reported that individuals tended to prefer foods belonging to Norwegian culture instead of traditional foods (21). Similarly, in a study evaluating the dietary habits of individuals of South Asian origin living in Australia, it is reported that individuals tend to prefer foods and meals from Australian culture, with a higher preference for foods in line with the Australian culture in their dietary habits and meals (22). In contrast, the majority of individuals living in Germany consume traditional Turkish foods (Table 2). However, the frequency of consuming traditional foods tends to decrease among those living in Germany. It is believed that the accessibility to foods and the higher prevalence of dining out, as seen in previous study results, contribute to the emergence of these findings. Another study evaluating the dietary habits of South Asians living in the United Kingdom it was reported that an adaptation to the local region had developed. Individuals not only continue to consume traditional sweets, but also incorporate Western sweets, including cakes, chocolates, and biscuits, into their diets (23). In another study where changes in dietary diversity were reported, South Asians living in Norway had increased their consumption of frozen meat dishes (21). Similarly, among South Asian individuals living in the United States, as the duration of residence increases, alcohol consumption also tends to increase (24).

In this study, the frequency of individuals' food consumption has been evaluated, and differences have been identified among the consumption frequencies of processed meat, meat and poultry, sweetened beverages, sugar, sweets and baked goods, vegetables, fruits, eggs and grains, olive oil, sunflower oil, hazelnut oil, cereals, dairy products, coffee, starch, and acidic beverages (Table 4). Increased economic means resulting in a higher frequency of dining out again could be considered the primary factor behind the emergence of these habits. Moreover, among these results, the most notable observation is the high-

er accessibility to acidic beverages and foods such as sugar, sweets, and baked goods in Germany compared to Turkey.

Cardiovascular disease is reported as the most common cause of death worldwide (25). The Mediterranean diet is emphasized as the best dietary approach for protecting against cardiovascular diseases (10). The Mediterranean diet pattern is a form of nutrition based on traditional foods frequently consumed in countries with a coastline along the Mediterranean Sea, such as Spain, Italy, and southern Greece. This model emphasizes minimal consumption of processed foods. All kinds of fruits and vegetables, whole-grain products, nuts, olive oil, olives, oily seeds like flaxseed and sesame, herbs, and spices constitute the foundation of this dietary style. Nutrient-rich, low-energy fruits and vegetables play a larger role. Saturated fats, highly processed refined grains, refined carbohydrates, and similar foods are restricted in the Mediterranean diet. Additionally, olive oil is used as the preferred type of fat for food preparation. (26, 27). The energy obtained from added sugar constitutes ≥ 15% of the total energy intake, the risk for cardiovascular diseases increases 1.08 times (28).

According to our results, when comparing the prevalence of chronic diseases among individuals with respect to their countries of residence, the rate of chronic diseases in individuals living in Germany is higher than those living in Turkey (Table 3). Although there was no statistically significant difference observed among the types of diseases, including cardiovascular diseases, diabetes, and cancer, given the sample sizes of the study groups, the higher number of individuals living in Turkey has led to this outcome. The higher prevalence of chronic diseases among individuals living in Germany is thought to be associated with dietary habits. When evaluating the types of fats used in foods and food preparation methods, it can be observed that individuals living in Germany tend to follow a Western dietary pattern more frequently. When assessing the frequency of food consumption, the recommended foods in the Mediterranean diet are consumed less frequently (Table 4). Furthermore, the use of frying as a food preparation method and the greater use of sunflower oil, which is not endorsed by the Mediterranean diet, could be linked to chronic diseases.

The primary limitation of the study is that the data were collected through online surveys. Additionally, obtaining 7-day dietary intake records from the study participants could have yielded stronger results regarding dietary habits. Analysing dietary intake records at the level of individual nutrients could provide significant contributions to the results, and considering these limitations will serve as valuable guidance for future research endeavours.

Conclusion

Overall, the study results have revealed significant differences in dietary habits between Turks living in Germany and those living in Turkey. The most noteworthy dimension of these differences is that individuals living in Turkey exhibit a stronger adherence to the Mediterranean dietary pattern, while those living in Germany tend to follow a Western dietary pattern. This difference could be attributed to higher industrialization and employment rates in Germany, leading to a greater prevalence of eating outside the home. Considering the protective effects of the Mediterranean diet against various diseases, individuals living in Germany would have a lower risk of developing chronic diseases if they were to shift their dietary habits back towards the Mediterranean pattern. While this study has provided a general insight, further research with a larger sample size is needed to validate these findings.

Journalism ethics considerations

Ethical issues (including plagiarism, informed con-sent, misconduct, data fabrication, and/or falsification, double publication and/or submission, and redundancy) were observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interest.

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