

The Nutrition Transition in Turkey: Trends in Energy and Macronutrients Supply from 1961 to 2011

Türkiye Beslenme Değişimi: 1961'den 2011'e kadar Enerji ve Makro Besin Elementleri Alım Eğilimleri

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ABSTRACT

Objective: It has been aimed to evaluate the differences occurred between 1961 and 2011 regarding the amounts of energy–macronutrients per capita in Turkey.

Methods: Energy and macronutrient data (fat and protein) per capita between 1961 and 2011 for Turkey was downloaded from FAOSTAT data base as kg/year and then converted into g/day. The amount of carbohydrate per capita (g/day) was calculated. The changes in daily energy and macronutrient per capita were calculated according to each 10 years period (1961-1970, 1971-1980, 1981-1990, 1991-2000, 2001-2011) by taking the mean value for each period.

Results: It was found out that there had been a 19.5% increase in the daily energy amount per capita in Turkey from 1961 to 2011. It was determined that the biggest increase in the amount of daily fat per capita was between 2001 and 2011 (11.5% increase, 107.2±7.90 g/day) and the amount of daily fat per capita increased 50.5% in total from 1961 to 2011. The amount of protein per capita increased around 10.6% between 1961 and 2011. the amount of carbohydrate per capita increased 11.3% between 1961 and 2011. It was found out that there was an increase in the amounts of energy and macronutrients per capita in Turkey from 1961 to 2011.

Conclusion: That result is seemed to be an indicator for the increase in the food supply according to the development level of the country.

Key Words: Food balance sheets, FAOSTAT, nutrition transition, food supply, Turkey, macronutrients

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ÖZET

Amaç: Türkiye'de 1961-2011 yılları arasında kişi başına düşen enerji ve makro besin ögesi alımlarının değişiminin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntemler: Türkiye için 1961 ve 2011 yılları arasında kişi başına düşen enerji ve makrobesin ögesi (yağ ve protein) verisi FAOSTAT veri tabanından kg/yıl olarak indirilmiş ve daha sonra g/güne dönüştürülmüştür. Kişi başına karbonhidrat miktarı (g/gün) ise hesaplanmıştır. Kişi başına düşen günlük enerji ve makrobesin ögesi değerindeki değişiklikler her 10 yıllık dönem (1961-1970, 1971-1980, 1981-1990, 1991-2000, 2001-2011) için ortalama olarak hesaplanmıştır.

Bulgular: Günlük enerji miktarında 1961'den 2011'e kadar kişi başına % 19.5'lik bir artış olduğu belirlenmiştir. Kişi başına düşen günlük yağ miktarındaki en büyük artışın 2001 ve 2011 yılları arasında (% 11.5 artış, 107.2 ± 7.90 g/gün) olduğu ve kişi başına düşen günlük yağ miktarının 1961'den 2011'e kadar % 50.5 arttığı saptanmıştır. 1961 ile 2011 yılları arasında kişi başına düşen protein miktarı yaklaşık % 10.6, karbonhidrat miktarı % 11.3 artmıştır. Sonuç olarak; 1961 ve 2011 yılları arasında Türkiye'de kişi başına düşen enerji ve makro besin ögesi miktarında 1961'den 2011 yılına kadar bir artış olduğu bulunmuştur.

Sonuç: Bu sonuç, ülkenin kalkınma düzeyine göre besin teminindeki artışın bir göstergesi gibi görünmektedir.

Anahtar Sözcükler: Besin denge cetvelleri, FAOSTAT, beslenme değişimi, besin temini, Türkiye, makrobesin ögeleri

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INTRODUCTION

Turkey is a big Middle Eastern country with its 769.604 km² surface area and located on South Eastern Europe and South Western Asia. Turkey had a population of 76 million people in 2014 (median age: 30.4 years) the percentage of male population was 50.2% and the percentage of female population was 49.8% (1).

While the life expectancy at birth was stated as 75 by World Health Organization in 2012 (2), it is estimated that this figure increased to 76 by 2014 for the general public in Turkey and the population of Turkey will be 94.6 million in 2050 (3). However, concerns have been increasing day by day that obesity and chronic diseases associated with nutrition, which have become a globally epidemic dimension, would affect the life expectancy significantly in Turkey as it does throughout the world.

The studies that have searched the nutrition conditions and health problems of Turkish population, either in regional or larger extends have been carried out since 1960s and have gained speed in recent years. According to the results of studies conducted in that scope, it is stated that the nutrition conditions and health problems of Turkish population have a view reflecting the problems of both the developing and the developed countries (4, 5). For example, obesity frequency in Turkey is increasing day by day as it is in the other countries throughout the world. According to the "Turkish Nutrition and Health Survey (TBSA)-2010" conducted by Ministry of Health Public Health Agency of Turkey, the prevalence of obesity among adult individuals in Turkey was found out as 20.5% among males and 41.0% among females (4). However, it was found out that the rate of overweight individuals was 34.6%, the rate of overweight and obese individuals was 64.9%, and the rate of morbid obese individuals was 2.9% in total. Moreover, as the result of the Monitoring of Growth Among School Age Children (6 – 10 years) in Turkey Project Survey (TOÇBi) that was conducted in 2011 by Ministry of Health Public Health Agency of Turkey, it was found out that among 12301 children, 6.5% of them were obese (boys: 7.5%, girls: 5.4%), 14.3% of them were overweight (boys: 15.1%, girls: 13.5%) (6). In addition to that survey, a lot of other studies suggest that the problem of overweight and obesity among children, adolescents and adults in Turkey is at significant levels (7-9). As in the world, cardiovascular diseases are bearing an increasing role in Turkey as well as the major reason for mortality and morbidity. As the causes for deaths in Turkey (2013), cardiovascular diseases came first with 39.8% and 38.8% of them were caused by ischemic cardiac diseases, 25.2% of them were caused by cerebrovascular diseases, 17.7% of them were caused by other cardiac diseases and 12.8% of them were caused by hypertensive diseases (10). High blood pressure is also one of the significant health problems in Turkey as well. Turkish Adult Risk Factor Survey (TEKHARF) is one of the biggest monitoring studies to provide information regarding the frequency of hypertension in Turkey and when we look at its 1991 data we saw that hypertension prevalence in Turkey was 33.7% (11). According to the 2005 results of Turkish Hypertension Prevalence Study I (PatenT study) the prevalence was 31.8% (Males: 27.5%: Females: 36.1%) (12). The hypertension prevalence in general population aged over 18 years was found as 30.3% (Males: 28.4%; females: 32.3%) with the latest Patent Study 2 (13). Like hypertension, diabetes is another significant health problem seen in Turkey as well. With Turkish Diabetes Epidemiology Study I (TURDEP), which was conducted as cross sectional and based on public, the diabetics prevalence among 24788 individuals was found out as 7.2% (Males: 6.2%; Females: 8%) (14). According to TURDEP II it has been reported that the diabetes prevalence among Turkish adult population has reached 13.7% (15). Again, cancer is one of the most important health problems in Turkey. According to the 2013 data of Turkish Statistics Institute (TURKSTAT) cancer is at the second rank (21.3%) as the cause of deaths in Turkey and it is estimated that it will reach to first rank in 2015 (10). According to GLOBOCAN (2012) data, which was published by International Agency for Research on Cancer, standardized speed of extra – dermal cancer according to age in Turkey was similar to other countries and was 245.7 for males and 157.5 for females per 100000 individuals (16). In addition, iron deficiency anaemia is also an important public health problem in Turkey. According to the results obtained from various studies, anaemia is observed at around 50% of children between 0–5 years old, 30% of school age children, 50% of pregnant women. Growth and development retardation, rachitism, vitamin deficiency, iodine deficiency and tooth decay are common health problems among children between 0 and 5 years of age, school age children and adolescents in Turkey (5).

Diet and healthy living style are important components in preventing non-communicable chronic diseases and adequate and balanced diet. Because a lot of chronic diseases and under nutrition can be modified with diet,

definition of dietary intakes is important both for protection and development of health and for the establishment of public health strategies (17). Unfortunately, there is no data regarding countrywide nutrition and food intake studies conducted on samples to represent Turkey from 1974 to 2010 in Turkey. Within this frame, food production and export and import data come forward for determining dietary intake trends. In this sense, food balance sheets are important tools today especially for evaluating access to food and estimation of their relations with health problems. Food balance sheets reflect the food supply/demand, export and import information, the purpose, amount and variety of use of the food used at country level of a country in a given period of time. Starting from the amount of the accessible food for human consumption, it provides information on food consumption at national level, dietary features and micronutrient requirements based on current situation and variation trends (18). Today, there are a lot of food balance sheets used both at national and international fields (19, 20). Among them, Food and Agriculture Organization (FAO) Food Balance Sheets, which are in FAOSTAT database and issued annually, are one of the most important food balance sheets. In this study, the food groups per capita in Turkey between 1961 and 2011 and the evaluation of variations in the amounts of energy – macronutrients were aimed by using FAO food balance sheets.

MATERIALS and METHODS

Data Collection

The energy and macronutrient supply data together with food commodities supply data between 1961 and 2011 regarding Turkey were downloaded from FAO food balance sheet FAOSTAT database (http://faostat3.fao.org/download/FB/*/*E) as Microsoft Excel files and the evaluated. Because the latest data in FAOSTAT database for countries belong to 2011, the data for 2011 was evaluated as the latest.

Assessment of Trends in Energy and Macronutrients Supply (per capita/day)

In this study, the variations in the amounts of the daily energy and macronutrient elements (fat and protein) per capita were evaluated in one decade intervals (1961-1970, 1971-1980, 1981-1990, 1991-2000, 2001-2011). In each one of the decade intervals the average of all the data regarding the studied variant was taken and one value representing the decade was defined.

Although there are energy and protein amounts per capita in FAOSTAT database, there are not carbohydrate amounts. For that reason, the amounts (gram) of protein and fat per capita were converted into calorie [for protein (g)x4, for fat (g)x9]. Then, the amount of carbohydrate per capita (kcal) was calculated as energy - [protein (kcal) + fat (kcal)] and the amount of carbohydrate was stated in grams by dividing the calculated amount by 4.

Changes in the percentages of the energy and macronutrient elements per capita per day (increase and decrease) were calculated and evaluated according to the previous or first term.

Statistical Analysis

Windows Statistical Package for the Social Sciences (SPSS, version:16.0) was used for statistical evaluation of the data. Arithmetic mean \pm standard deviation ($\bar{x} \pm SD$) values were used as descriptive statistics for calculated variables. In normal distributed data, "One-Way Anova Analysis" was used for comparison of periodical differences in daily energy, fat, protein and carbohydrate supply amounts for 10 year periods between 1961 and 2011. "Scheffé Multiple Comparison Test" was used for the comparison of daily energy, fat, protein and carbohydrate supply amounts according to annual periods. Alfa(α)=0.05 value was used as level of significance in all analysis.

RESULTS

Assessment of Trends in Energy and Macronutrients Supply (per capita/day)

Assessment of Trends in Energy Supply (per capita/day)

When the changes in daily energy amount per capita in Turkey is examined in 10 year periods between 1961 and 2011 (Table 1, Figure 1) it is seen that; the daily estimate of energy per capita was 3032.6 \pm 68.99 kcal/day between 1961 and 1970 while it was 3295.2 \pm 87.50 kcal/day with an increase of 8.65% increase between 1971 and 1980($p < 0.05$), 3574.8 \pm 158.62 kcal/day with an increase of 8.68% increase between 1981 and 1990($p < 0.05$), 3683.5 \pm 46.19 kcal/day with an increase of 3.04% between 1991 and 2000 ($p > 0.05$) and 3623.8 \pm 26.27 kcal/day with a decrease of 1.62% between 2001 and 2010($p > 0.05$). It was found out that there had been an increase of 19.49% increase in the daily energy per capita between 1961 and 2011 (Table 1, Figure 1). The differences in the daily energy supply per capita in 10 year periods between 1961 and 2011 was found statistically significant ($p < 0.05$).

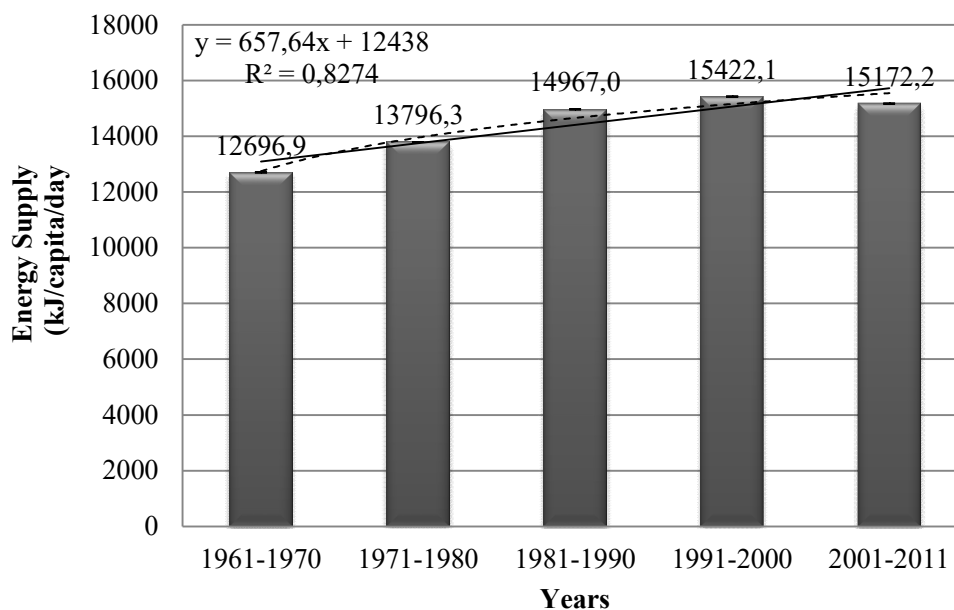


Figure 1: The Amounts of Energy Supply Per Capita in Turkey Based on Years (kcal/capita/day) ($p < 0.05$)

Assessment of Trends in Fat Supply (per capita/day)

When the changes in daily fat amount per capita in Turkey is examined in 10 year periods between 1961 and 2011 (Table 1, Figure 2) it is seen that; the daily estimate of fat per capita was 71.2 ± 3.86 g between 1961 and 1970, 9.6 ± 5.35 g/day with an increase of 11.73% between 1971 and 1980 ($p < 0.05$), 79.6 ± 5.35 g/day with an increase of 8.82% between 1981 and 1990 ($p > 0.05$), 96.1 ± 2.70 g/day with an increase of 10.98% between 1991 and

2000 ($p < 0.05$). There was an increase of 11.53% (107.2 ± 7.90 g/day) in the amount of fat per capita between 2001 and 2011 ($p > 0.05$), and there was an increase of 50.51% in the amount of fat per capita between 1961 and 2011 (Table 1, Figure 2). The differences in the daily fat supply per capita in 10 year periods between 1961 and 2011 was found statistically significant ($p < 0.05$).

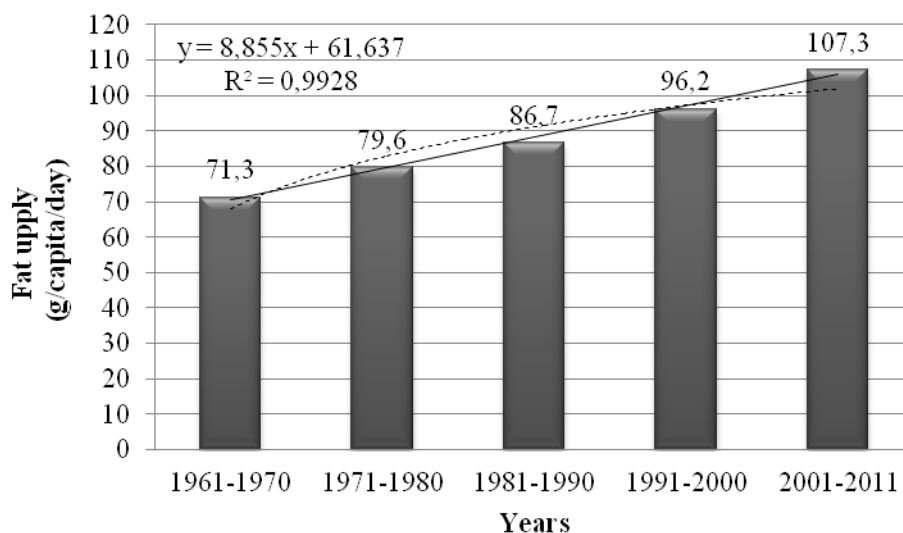


Figure 2: The Amounts of Fat Supply Per Capita in Turkey Based on Years (g/capita/day) ($p < 0.05$)

Assessment of Trends in Protein Supply (per capita/day)

When the changes in daily protein amount per capita in Turkey is examined in 10 year periods between 1961 and 2011 (Table 1, Figure 3) it is seen that; the daily estimate of protein per capita was 92.7 ± 0.93 g between 1961 and 1970, 97.2 ± 2.27 g/day with an increase of 4.49% between 1971 and 1980 ($p < 0.05$), 105.0 ± 4.03 g/day with an increase of 8.04% between 1981 and 1990 ($p < 0.05$), 106.7 ± 2.23 g/day with an increase of 1.67% between 1991 and 2000 ($p > 0.05$).

Although there was a 3.67% decrease between 2001 and 2011, the increase in the amount of daily protein per capita was 10.57% between 1961 and 2011 ($p > 0.05$) (Table 1, Figure 3). The differences in the daily protein supply per capita in 10 year periods between 1961 and 2011 in Turkey was found statistically significant ($p < 0.05$).

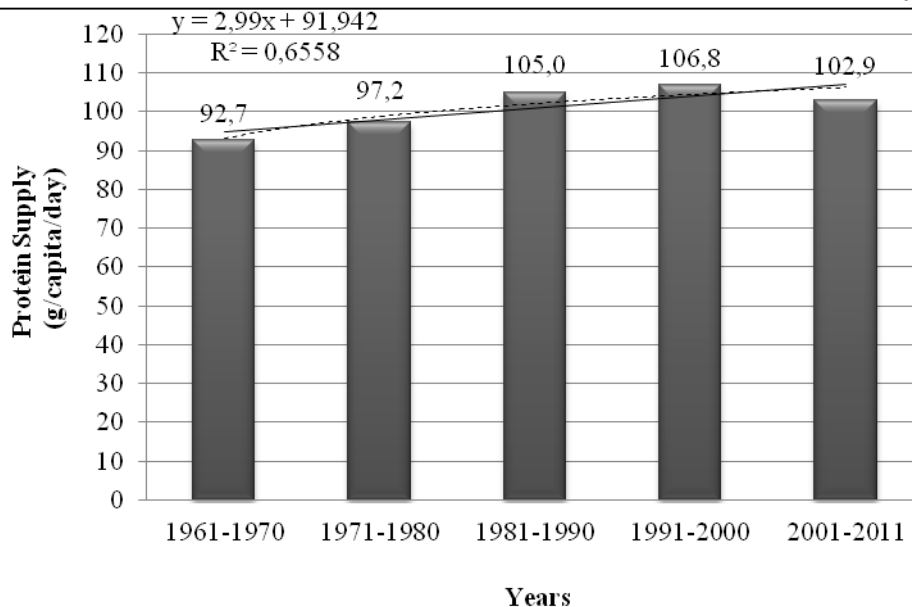


Figure 3: The Amounts of Protein Supply Per Capita in Turkey Based on Years (g/capita/day) (p<0.05)

Assessment of Trends in Carbohydrate Supply (per capita/day)

When the changes in daily carbohydrate amount per capita in Turkey is examined in 10 year periods between 1961 and 2011 (Table 1, Figure 4) it is seen that; the daily estimate of carbohydrate per capita was 505.0±13.04 g between 1961 and 1970, 547.4±13.07 g/day with an increase of 8.45% between 1971 and 1980(p<0.05), 593.6±21.74 g/day with an increase of

8.45% between 1981 and 1990(p<0.05), 597.6±12.06 g/day with an increase of 0.67% between 1991 and 2000(p>0.05). Although there was a 6.01% decrease between 2001 and 2011(p<0.05), the increase in the amount of daily carbohydrate per capita was 11.28% between 1961 and 2011 (Table 1, Figure 4). The differences in the daily carbohydrate supply per capita in 10 year periods between 1961 and 2011 in Turkey was found statistically significant (p<0.05).

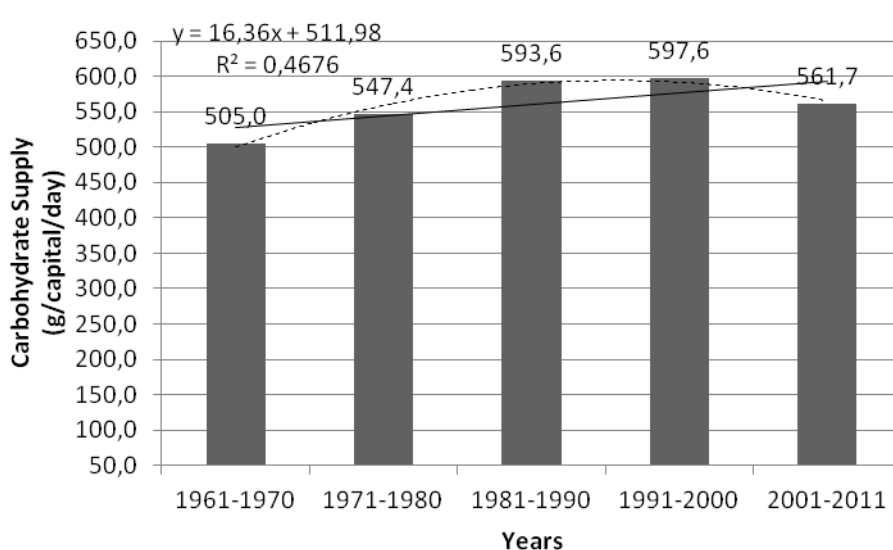


Figure 4: The Amounts of Carbohydrate Supply Per Capita in Turkey Based on Years (g/capita/day) (p<0.05)

Table 1. Estimated Amounts and Periodical Changes (%) of Energy and Macronutrient Amounts Per Capita in Turkey between 1961 and 2011¹

Terms for Years	Term 1 1961-1970	Term 2 1971-1980	Term 3 1981-1990	Term 4 1991-2000	Term 5 2001-2011	Term 5-Term 1 1961-2011	p value
Energy supply ² (kcal/capita/day)	3032.6±68.99 ^a	3295.2±87.50 ^b	3574.8±158.62 ^c	3683.5±46.19 ^c	3623.8±26.27 ^c		0.000
Change (%)	-	+8.65	+8.48	+3.04	-1.62	+19.49	
Fat supply quantity ² (g/capita/day)	71.2±3.86 ^a	79.6±5.35 ^b	86.6±7.63 ^b	96.1±2.70 ^c	107.2±7.90 ^c		0.000
Change (%)	-	+11.73	+8.82	+10.98	+11.53	+50.51	
Protein supply quantity ² (g/capita/day)	92.7±0.93 ^a	97.2±2.27 ^b	105.0±4.03 ^c	106.7±2.23 ^c	102.8±1.17 ^c		0.000
Change (%)	-	+4.49	+8.04	+1.67	-3.67	+10.57	
Carbohydrate supply quantity ² (g/capita/day)	505.0±13.04 ^a	547.4±13.07 ^b	593.6±21.74 ^c	597.6±12.06 ^c	561.7±13.91 ^b		0.000
Change (%)	-	+8.45	+8.45	+0.67	-6.01	+11.28	

¹ All values are means ±SD and percentage (%) ² Different letters represent differences between periods

As far as we know, this was the first study of analysis for the commodity data from the FAO food balance sheets for Turkey from 1961 to 2007 in order to determine how the country's energy and macronutrient supply has changed over recent decades. Overall, there has been a rapid increase in energy (19.49% increase) and protein (10.57% increase), fat (50.51% increase), carbohydrate (11.28% increase) supply since the 1960s, consistent with what has happened in most developing and developed countries.

Nutrition transition means changes of the diets of the individuals both in qualitative and quantitative terms. Increase in the intake of fat, added sugar and saturated fat and decrease in the complex carbohydrates intake with the diet together with the increase in the energy density means a change in an adverse way in the diet (17). Those dietary changes may occur as the result of changes in the life style, globalization, and accessibility of food. There have been fast and significant changes in nutrition status all over the world since 1960s. According to the FAOSTAT data there has been an estimate 450 calories increase in the energy supply value globally from the midst of 1960 till the end of 1990s where there was a 600 calories increase in the developing countries during the same period. And that increase in the energy supply level continued from 1990s till 2011 with a figure of 249 calories (17). According to the results of this study, it was found out that, similar with the world, there was approximately 542 kcal (17.13%) increase in Turkey from 1960 – 1971s to 1990 – 1999 and a slower increase (49 kcal, 1.42%) from 1990 – 1999 to 2011 – 2011 and in total, there was 19.49% increase in energy supply value per capita.

One of the most significant indicators of the nutrition status at national level of the countries is the quantitative and qualitative increase in dietary fat. Significant differences are seen according to the regions in the total fat supply amount (dietary fats, added fat, olive oil, etc) in the world (17). It is especially stated that the lowest fat supply value is in Africa where the highest consumption is in America and Europe (17). The fat supply value per capita in the world in 1960s was 67.37 g, from where it increased to 82.56 g with 15.19 g increase in 2011 (20). In this study, it was found out that, in parallel with the increase in the energy supply level per capita, there was approximately 36 grams increase double in the amount in the world in the fat supply value in Turkey from 1960 – 1969 to 2000 – 2011.

It was found out in this study that there had been an increase in the carbohydrates supply values in Turkey per capita from 1961s. However, a comparison between the carbohydrate supply value in Turkey and in the world trend could not be done, because there is no carbohydrate supply value in FAOSTAT database. Nevertheless, there is no information regarding fibre supply amount per capita either.

When the protein supply values per capita are evaluated, it is found out that there has been an increase (+10.57% - approximately 30 g) similar to the approximate increases in energy and fat amounts in Turkey between 1961 – 1970 and 2000 -2011. When it is considered from a global perspective, it is seen that the 61.48 g protein supply value in 1961 increased to 80.48 g in 2011 (20). When this result is examined, it is considered that the increase in the protein supply value in Turkey according to the years is relatively less than the increase in the world, and it would be because that Turkey is among the developing countries. However, the changes in the energy and total macronutrient supply values determined as the result of this study in general are the indicators that the diet of Turkish individuals might change in an adverse manner.

A food balance sheet presents a comprehensive picture of the pattern of a country's food supply during a specified reference period. The food balance sheet shows for each food item i.e. each primary commodity availability for human consumption which corresponds to the sources of supply and its utilization (18, 21). Starting from the point of the amount of the available food for human consumption, it gives information regarding the consumption of food, dietary features, current situation and change tendencies of macronutrient requirements at national level. Today, there are a lot of food balance sheets that are used both at national and international levels (19, 20). Food and Agriculture Organization (FAO) food balance sheets that are included in the FAOSTAT database are the most significant food balance sheets. However, there are some limitations in the FAO food balance sheets; which are reporting the nutrients more or less than the existing amounts, errors in the numbers regarding the population, not showing the existing differences in diet of different socio-economic groups or genders, not stating the carbohydrate and micronutrients of the diet, using the food composition tables of FAO and generally not applying to national food composition table in the calculation of some local food and some mistakes in statistical analysis made in FAOSTAT programme (21). However, in spite of those limitations there are many advantages of FAO food balance sheets.

In countries like Turkey, where the food consumption studies at national level are in limited number, it can estimate the nutrient requirements and over consumptions by evaluating the energy values in addition to fat, protein and carbohydrate values. It can establish food supply and malnutrition relation at national level and develop projects and action plans for food demands. It can evaluate the efficiency of the food and nutrition policies through food assurance. It sets light to the development of national diet advices and enables comparison with the data from other countries.

At national level or wide range, the studies "National Nutrition-Health and Food Consumption Survey of Turkey" in 1974 (22) and "Food Consumption and Nutrition Survey" in 1984 (23) and "Turkey Nutrition and Health Survey-TBSA" in 2010 (4) were conducted. The level of energy that was taken with the diet by adults decreased through the years and they were calculated as 2291, 2281 and 1909.9 kcal in 1974, 1984 and 2010 respectively. Dietary protein intake decreased through the years and they were 68 g in 1974 and 1984 and 61.8 g in 2011 and the fat intake increased from 62 g in 1974 and 1984 studies to 73.6 g in 2011 study. When the dietary carbohydrate intake is evaluated, it was calculated as 369, 364 and 240 g in 1974, 1984 and 2010 respectively and decreased through the years contrary to this study. The energy and nutrient intake values that are calculated in all those studies varied according to the age groups, residential areas (rural - urban) and gender of the individuals. In the Household Food Wastage in Turkey-2006 report of FAO, the energy per capita in Turkey was calculated as ($x \pm SD$): 2207.9 \pm 11081.24 kcal, where protein: 71.4 \pm 45.46 g, fat: 78.5 \pm 52.40 g and carbohydrate: 286.7 \pm 142.0 g. Other significant studies in Turkey were nutritional habits and nutritional patterns of participants of TEKHARF 2003-2004 (24) and 2003-2007 (25). In 2003 – 2004 study, the estimated daily energy intake of the individuals with the diet was found out as 1825 \pm 711.7 kcal and 1323 \pm 520.7 kcal for males and females respectively and the percentage of carbohydrate constituted 53.0%, protein constituted 14% and fats constituted 33.3% of that daily energy intake.

Energy and micronutrient elements intake levels of adult individuals determined within the scope of all those national, regional and widespread studies conducted in Turkey are at lower levels than FAO food balance sheets. Being FAO Food Balance sheets are the indicator of food accessibility, food waste rates cannot be established and the real consumption rates of the individuals cannot be reached are the most important reasons of that.

In the Household Food Wastage in Turkey-2006 report of FAO, it was reported that cereal, bread and vegetable oil wastes in household contributed to the energy loss at the highest degree. The daily energy loss through plate waste was calculated as an estimate of 215.7 kcal per capita and that value means an estimated 9.8% loss per capita in daily energy intake (26). Again in the FAO Food Losses and Waste Report in Turkey issued in 2013, it was reported that there was a 5% waste for cereals, fruit and vegetables, 4% waste for oily seeds and legumes, 2% loss for fish and sea foods in the consumption at household level (27). When the nutrition status of Turkish people is examined, it is seen that bread and the other cereals are the basic nutrients (28). When it is considered as a nutrient, which is one of the most important energy source of Turkish people, is also the one that contributes the most to the energy loss, it is inevitable that the results of this study is different than the results of other studies, which search the food consumption.

It is thought that the increase in the levels of energy and macronutrient element supply per capita calculated according to the results of this study might be related with the increase in the gross domestic product of the country and in the development level (1). However, although there is an increase in the income level of Turkey (the income inequality still continues. The fact that gini coefficient was 0.400 in 2013 according to Turkish Statistics Institute Income and Living Conditions Survey, 2006-2013 data (29) and 0.412 in 2011 according to Organisation for Economic Co-operation and Development (OECD) data is an indicator for that (30). As a result of that situation, Turkey has a view gathering the problems of both developing and developed countries in terms of nutrition. Thus, the nutrition status of Turkey has significant differences and unequal distribution according to the regions and rural or urban, residential areas (5, 28). In the Household Food Wastage in Turkey Report of FAO (26), which has a supporting nature of this fact, its stated that the energy and nutrient element intake levels of the individuals change according to their socio-economic levels, especially the protein intake of the individuals with high, middle and low socio-economic levels were different (76.5 \pm 45.05 g, 71.7 \pm 34.57 g, 64.9 \pm 55.26 g respectively). In current years, globalization of food trade, depending on increased access to energy intensive foods and consumption of these foods may be reasons for this different.

In brief, although the food balance sheets do not enable us to reach to a certainly correct result for the energy and nutrient element intake levels as in this study in the countries with socio-economic level inequalities and lack of nutrition knowledge like Turkey, they may help us make assumptions and make comparisons with world supply and trends.

CONCLUSION

It was found out that there was an increase in the amounts of energy and macronutrients per capita in Turkey from 1961 to 2011 using FAO food balance sheets. In order to develop national food and nutrition plans and policies, which would enable a society to nourish at an adequate and balanced level, nutrition, food consumption and health data of that county is required. For that reason, keeping regular records regarding foods as constituting source for food balance sheets special to each country is vital for being basis for the national and international policies to be developed in the future. Despite all the limitations, food balance sheets have particular importance for those reasons in countries where the food consumption studies are in a limited number like Turkey for the estimation of energy and nutrient intake levels.

Conflict of interest

No conflict of interest was declared by the authors.

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