

HEALTH ISSUES AND NUTRITION IN THE BALKANS

Dzengis Jasar^{1,4*}, Biljana Curcic², Katerina Kubelka - Sabit^{1,4},
Vanja Filipovski^{1,4}, Vladimir Kakurinov³

¹Department of Histopathology and Cytology, Clinical Hospital Acibadem-Sistina,
Skupi 5a, Skopje, Macedonia

²Department of Microbiology, Clinical Hospital Acibadem-Sistina,
Skupi 5 a, Skopje, Macedonia

³Consulting and Training Center KEY, Sv. Kiri li Metodij 52-1/3, 1000 Skopje, Macedonia

⁴Faculty of Medical Sciences, University "Goce Delchev" - Shtip,
Krste Misirkov 10-A, 2000 Shtip, Macedonia

*e-mail: dzjasar@acibademsistina.mk

Abstract

The aim of this study is to represent differences and similarities of Balkan cuisine and their reflection to the health among population in Balkan countries. Importance of this study is based on fact that this is the first study where an attempt to compile all known data about food related health issues in Balkan could reflect in improvement of the health care, considering the food as disease and remedy in the same time.

The available data from the reports of World Health Organization for different food-related diseases, as well as, from the available studies considering the same issue, have been used for this compilation. Data were processed through comparative analysis and descriptive statistic. Parameters that have been described include: water and sanitary facilities, hygiene, food processing, life expectancy, and the influence of traditional nutrition to the health issue, like cardiovascular diseases, diabetes and cancers of the digestive system.

The highest discrepancy of food-related diseases among Balkan countries where found in incidence and mortality of diabetes, cardiovascular diseases and gastric cancer. These parameters are strongly related by the traditional food processing and consumption in some parts of the Balkans as well as with rooted habits of the population for consumption some nutrition despite the damage that can cause serious health problems.

Balkan cuisine is more or less similar in all countries of this region, but the lifestyle, health system, tradition,

influence of the western world as well as food processing and industry are main parameters that have strong influence in health issue among the population of the Balkans.

Key words: *Balkans, Food, Health issues, Diseases.*

1. Introduction

The Balkan peninsula is part of the territory of Europe, between the Adriatic Sea to the west, the Ionian Mediterranean and the Aegean Sea to the south, and the Black Sea to the east. The Balkans include the countries of the former Yugoslavia (Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro and Macedonia), followed by Romania, Bulgaria, part of Turkey, Greece and Albania.

The Balkans is the only region in Europe where intersection between the influences of Eastern and Western culture can be found. The word Balkan itself comes from the Turkish words "bal" which means honey and "kan" which means blood. The symbolism of these words refers to two important terms; honey symbolizes the fertility of the soil and blood is a symbol of the constant wars for this fertile land. From a historical point of view, the Balkans were a place of division, first with the division of the Roman empire to Eastern (Byzantium) and Western part, then with the Ottoman Empire and the Habsburg Monarchy in the middle age period, until the First and Second World War, as well as last war on the territory of former Yugoslavia.

Having in mind these facts, the life of the peoples of the Balkans was not always easy, especially because of the frequent wars, there was not always enough food for everyone, even though the soil provided it. Due to the late industrialization of these areas, food production has always been difficult and laborious and relied solely on the physical strength of the population and their needs. Working on the fields was difficult, mostly manual involving all the family members and sometimes assisted with oxen, donkeys and horses. The food was mainly low calorie from produced cereals, fruits and vegetables. The high calorie diet needed for these people's energy, was made possible largely by the production of whole cheese, milk, dairy products and less than meat and meat products.

And so it remained for generations, forming the various cuisines of the Balkan countries that share many commonalities and yet are different due to influences from surrounding cultures.

The aim of this study is to represent differences and similarities of Balkan cuisine and their reflection to the health among population in Balkan countries. This is very important research because this is the first study trying to compile all known data about food related health issues in Balkan that could reflect in improvement of the health care, considering the food as disease and remedy in the same time.

2. Characteristics of Balkan cuisine and health issues

2.1 Characteristics of Balkan cuisine

Albanian cuisine falls within the category of the "Mediterranean diet", which includes low consumption of meat and milk products and a high consumption of carbohydrates, vegetables, fruit and olive oil. It is believed that because of this diet Albania has a very high life expectancy when its economic power is compared to other countries, characterized by some researchers as the "Albanian paradox" [1]. This causes the country to not be affected by cardiovascular when compared to countries like Hungary or Poland which have a two-to-three-times higher death rate from those diseases.

Bosnia and Herzegovina cuisine is balanced between Western and Eastern influences. The food is closely related to other Balkan cuisines. Bosnian cuisine uses moderate quantities of many spices, the sauces are fully natural, consisting of little more than the natural juices of the vegetables in the dish. Typical ingredients include: tomatoes, potatoes, onions, garlic, bell peppers, cucumbers, carrots, cabbage, mushrooms, spinach, dried and fresh beans, plums, milk, paprika, and milky cream called pavlaka and

kajmak. Typical meat dishes include primarily beef and lamb but in some parts the pork is also consumed. Some local specialties are *ćevapi*, *burek*, *dolma*, *sarma*, *pilav* (pilaf), *gulaš* (goulash), *ajvar* and a whole range of Eastern sweets. The best local wines come from Herzegovina where the climate is suitable for growing grapes [2, 3].

Bulgarian cuisine is a representative of the cuisine of Eastern Europe and Middle Eastern countries [4]. It shares characteristics with other Balkan cuisines. Bulgarian cooking traditions are diverse because of geographical factors such as climatic conditions suitable for a variety of vegetables, herbs and fruit. Aside from the vast variety of local Bulgarian dishes, Bulgarian cuisine shares a number of dishes with Persian, Turkish and Greek cuisine. Bulgarian food often incorporates salads as appetizers and is also noted for the prominence of dairy products [5]. Similarly to other Balkan cultures, the per capita consumption of yoghurt among Bulgarians is traditionally higher than the rest of Europe. The country is notable as the historical namesake for *Lactobacillus bulgaricus*, a microorganism chiefly responsible for the local variety of the dairy product [6]. Main courses are very typically water-based stews, either vegetarian or with lamb, goat meat, veal, chicken or pork. Deep-frying is not common, but grilling - especially different kinds of sausages is very prominent. Pork is common, often mixed with veal or lamb, although fish and chicken are also widely used especially on the seaside.

Croatian cuisine is heterogeneous and is known as a cuisine of the regions, since every region of Croatia has its own distinct culinary tradition (Istria, Dalmatia, Dubrovnik, Lika, Gorski Kotar, Zagorje, Međimurje, Podravina, and Slavonija). Its roots date back to ancient times. The differences in the selection of foodstuffs and forms of cooking are most notable between those in mainland and those in coastal regions. Mainland cuisine has influence from Hungarian and Turkish cuisine, using lard for cooking, and spices such as black pepper, paprika, and garlic [7, 8]. The coastal region bears the influences of the Greek and Roman cuisine, as well as of the Mediterranean cuisine, in particular Italian. Coastal cuisines use olive oil, and herbs and spices such as rosemary, sage, bay leaf, oregano, marjoram, cinnamon, clove, nutmeg, and lemon and orange rind. Peasant cooking traditions are based on imaginative variations of several basic ingredients (cereals, dairy products, meat, fish, vegetables, nuts) and cooking procedures (stewing, grilling, roasting, baking), while bourgeois cuisine involves more complicated procedures and use of selected herbs and spices. Food and recipes from other former Yugoslav countries are also popular in Croatia. Most dishes, however, can be found all across

the country, with local variants. The wine production is mostly in Istria, Dalmatia and Slavonija [9].

Greek cuisine is typical Mediterranean cuisine [10]. Contemporary Greek cookery makes wide use of vegetables, olive oil, grains, fish, wine (white and red), and meat (including lamb, poultry, veal, beef, rabbit, and pork). Other important ingredients include olives, pasta (especially hilopites, a kind of pasta similar to tagliatelle), cheese, lemon juice, herbs, bread, and yogurt. The most commonly used grain is wheat; barley is also used. Common dessert ingredients include nuts, honey, fruits, and filo pastries. It is strongly influenced by ottoman cuisine and thus, especially cuisine of Anatolian Greeks shares foods as baklava, tzatziki, gyro, moussaka, dolmades, yuvarlakia, and keftethes with the neighboring countries. It is also influenced by Italian cuisine and cuisines from the neighboring countries. Especially in southern regions and the islands it includes several kinds of pasta, like hilopites and goglies (goges) or giolia [10,11].

Macedonian cuisine is the traditional one, reflecting Mediterranean and Middle Eastern influences and shares characteristics of other Balkan cuisines. The relatively warm climate of the country provides excellent growth conditions for a variety of vegetables, herbs and fruits. Macedonian cuisine is also noted for the diversity and quality of its dairy products, wines, and local alcoholic beverages, such as rakija. Bread, meat, fruits, dairy and vegetables are important staples in Macedonian cuisine. With diversity of recipes, the Macedonian daily cuisine adjusts well to the country's occasional hot summers and the frequent long winters. As a result of its continental climate fresh vegetables are consumed in summer, while pickles throughout autumn and winter. This particular part of preparing vegetables in form of so called "ajvar" and "turshija" are almost unique for this region [12]. Also, a cheese called bieno sirenje is unique only for Macedonia. Tavče gravče, and mastika are considered the national dish and drink of Macedonia.

Montenegrin cuisine also varies geographically; the cuisine in the coastal area differs from that of the northern highland region. The coastal area is traditionally a representative of Mediterranean cuisine, like in Albania, Greece and Croatia, with seafood being a common dish. The traditional dishes of Montenegro's Adriatic coast, unlike its heartland, have a distinctively Italian influence as well. The central and northern highland region has similar cuisine to the continental cuisine of Serbia and Bosnia.

Romanian cuisine is a diverse blend of different dishes from several traditions with which it has come into contact, but it also maintains its own character.

The Turks brought meatballs, from the Greeks there is musaca, from the Austrians there is the şniţel, and the list could continue. The Romanians share many foods with the Balkan area (in which Turkey was the cultural vehicle), and Eastern Europe (including Moldova and Ukraine). There are quite a few different types of dishes, which are sometimes included under a generic term; for example, the category ciorbă includes a wide range of soups with a characteristic sour taste. These may be meat and vegetable soups, tripe (ciorbă de burtă) and calf foot soups, or fish soups, all of which are soured by lemon juice, sauerkraut juice, vinegar, or borş (traditionally made from bran). The category ţuică (plum brandy) is a name for a strong alcoholic spirit in Romania [13].

Serbian cuisine is the traditional cuisine of Serbia, sharing characteristics with the rest of the Balkan nations (especially former Yugoslavia). Historically, Serbian food is characterized by a mixture of Byzantine-Greek, Mediterranean, Turkish-Oriental and cuisine of Austro-Hungarian Empire, as well as medieval Slavic influences [14]. The national dishes include gibanica (egg and cheese pie made with filo dough), pljeskavica (a ground beef/pork patty), ćevapi (grilled ground meat), and Karađorđeva šnicla (Karađorđe's schnitzel). The national drink is the unique plum brandy šljivovica or homemade rakija. Being located on the crossroads between East and West, its cuisine has gathered elements from different cooking styles across the Middle East and Europe to develop its own hearty gastronomy with an intricate balance of rich meats, vegetables, breads, cheese, fresh pastries and desserts. It has much in common with the cuisines of neighboring Balkan countries. Its flavors are mild, fresh and natural. Seasonings are usually salt, black pepper and paprika, while ingredients are fresh and of good quality. A number of foods which are usually bought in the West are often made at home in Serbia. These include rakija, slatko (boiled fruit in sugar), jam, jelly, various pickled foods, notably sauerkraut, or sausages. Food preparation is a strong part of the Serbian family tradition [14].

Slovenian cuisine is influenced by the diversity of Slovenia's landscape, climate, history and neighbouring cultures. In 2016, the leading Slovenian ethnologists divided the country into 23 gastronomic regions [15, 16]. The first Slovene-language cookbook was published by Valentin Vodnik in 1798. As of June 2015, twenty-two Slovenian foods and food products are protected at the European level [16].

Turkish cuisine is largely the heritage of Ottoman cuisine, which can be described as a fusion and refinement of Central Asian, Middle Eastern, Eastern European and Balkan cuisines. Turkish cuisine has in

turn influenced those and other neighboring cuisines, including those of Southeast Europe (Balkans), Central Europe, and Western Europe [17]. Turkish cuisine varies across the country. The cooking of European part of Turkey inherits many elements of Ottoman court cuisine, with a lighter use of spices, a preference for rice over bulgur, meatballs and a wider availability of vegetable stews and fish. Especially in the western parts of Turkey, where olive trees grow abundantly, olive oil is the major type of oil used for cooking [18]. The cuisines of the Aegean, Marmara and Mediterranean regions are rich in vegetables, herbs, and fish. A specialty's name sometimes includes that of a city or region, either in or outside of Turkey, and may refer to the specific technique or ingredients used in that area. For example, Urfa kebab is less spicy and thicker than Adana kebab. Although meat-based foods such as kebabs are the mainstay in Turkish cuisine as presented in foreign countries, native Turkish meals largely center on rice, vegetables, and bread [19].

2.2 General health issues

An improved sanitation facility is defined as one that hygienically separates human excreta from human contact. Living in satisfactory and sanitary housing conditions is one of the most important aspects of people's lives. Improved sanitation facilities include flush toilets (alternatively pour flush to piped sewer system, septic tank, or pit latrine); ventilated improved pit latrines; pit latrines with slab; and composting toilets. In 2015, 97.9% of the population in the Balkans had access to piped drinking water: 96.3% of the population in rural areas and 99.3% of the population in urban areas [20, 21]. General health issues are presented in Table 1.

2.2.1 Water

The human body is made 68 - 70% of water, which is the reason that drinking water is a key component of health. According to the World Health Organization

(WHO), most of the Balkan Peninsula has excellent access to drinking water, especially the countries from ex-Yugoslavia, with all of them having a range of 98 - 100% of the population having access to clean water. The only two countries in the region that fall short are Romania, with only 84% of the population having access to clean water and Albania with 95% [21].

2.2.2 Hygiene

It is an important part of health. The countries with the best access to sanitation are Bulgaria and Slovenia with 100% of the population having access, the worst is Romania with only 72% of the population having access to sanitation. Among the ex-Yugoslavian countries other than Slovenia, are Bosnia and Croatia with 99% population access to sanitation - the worst is Macedonia with 88% [21].

2.2.3 Medical doctors

They are part of a healthy lifestyle, which is why we included this statistic in our research. The country with the most doctors is Greece, with 4.6 per 1,000 population, while the worst are Albania with 1.2, and Turkey with 1.8 doctors per 1000 population. Among the former Yugoslavian countries, Serbia is the best with 3.1, followed by Croatia and Slovenia with 3 doctors per 1,000 population, and the worst is Bosnia with only 2 doctors per 1,000 population. These numbers are constantly changing due the migration of doctors to the European Union (EU) countries, especially from Romania and Bulgaria and in the last years from Macedonia, Serbia and Bosnia Herzegovina [20, 21].

2.2.4 Life expectancy

As calculated in the World Bank, gives the Greek (81 years) and the Albanians (78.3 years) the longest life expectancy. The lowest life expectancy in the region is 75 years in Romania and 74.6 in Bulgaria.

Table 1. Water and sanitation access, physicians per 1000 population and life expectancy in Balkan countries

Country	Water access (%)	Sanitation access (%)	Doctors per 1000 population	Life expectancy (years)
Albania	95	94	1.2	78.3
Bosnia and Herzegovina	99	99	2.0	76.9
Bulgaria	100	100	4.0	74.6
Croatia	99	99	3.0	78.0
Greece	100	98	4.6	81.0
Macedonia	99	88	2.9	75.7
Montenegro	98	90	2.3	77.1
Romania	84	72	2.3	75.0
Serbia	99	92	3.1	75.2
Slovenia	99	100	3.0	80.8
Turkey	85	80	1.8	75.8

Table 2. Daily available calories, average body mass index, percentage of country overweight and obesity in Balkans

Country	Calories	Average BMI	Overweight (%)	Obesity (%)
Albania	2,900	26.1	54.8	21.7
Bosnia and Herzegovina	3,100	26.1	53.8	17.9
Bulgaria	2,760	26	54.2	25
Croatia	3,000	25.5	53.9	24.4
Greece	3,700	27.3	68.5	24.9
Macedonia	3,000	26	47.2	19.9
Montenegro	2,700	26	54	23.3
Romania	3,500	25.3	39.1	22.5
Serbia	2,700	25.8	54.9	21.5
Slovenia	3,200	26.9	59.8	20.2
Turkey	3,100	27.8	61.5	32.1

The highest life expectancy among the ex-Yugoslavian countries is Slovenia (80.8 years), and the lowest is Serbia (75.2 years) [22, 23].

2.2.5 Food consumption

It refers to the amount of food available for human consumption as estimated by the FAO Food balance sheets. According to the Food and Agriculture Organization of the UN, the average minimum daily energy requirement is about 1,800 calories. Within the Balkan region, Greece has the most calories available to them at 3,700 and the countries with the least are Serbia and Montenegro with 2,700 calories available daily. In the former Yugoslavian countries, Slovenia is the highest with 3,200 calories and Bosnia is a close second with 3,100 calories. According to the World Health Organization, all of the countries in the Balkan region have less than 5% below the minimum level of dietary energy consumption - meaning that less than 5% of the population's food intake falls below the minimum level of dietary energy requirements, and who therefore are undernourished or food-deprived. This means that Balkans have no need to worry about starving and wasting away, simply put, they are eating too much (Table 2) [23].

2.2.6 Body Mass Index (BMI)

Body mass index (BMI) is the most practical and most commonly used method for measuring fat accumulation in the body. It is represented as relation between weight and height (kg/m^2). Another interesting fact is that most Balkan countries, excluding Greece and Turkey, in terms of BMI, tend to fall in a very stable and comparable range from 25 to 26.9. The country with the highest BMI in both men and women is Greece with 28 and 27, respectively. The countries with the lowest BMIs both for men and women are Croatia and Romania at 25.5 and 25.3 respectively. Among the countries in former Yugoslavia, Slovenia is with the highest BMI, which counts at 26.9 (Table 2) [24].

2.2.7 Overweight and obesity

Obesity is disorder of energy balance. It is defined as increased body weight caused by adipose tissue accumulation. Obesity and excess body weight are associated with many human disorders. First and most important is the fact that obesity is associated with insulin resistance and hyperinsulinemia, important features of type 2 diabetes [25]. Obese persons generally have hypertriglyceridemia and low HDL (high density lipoproteins) cholesterol levels, factors that increase the risk of coronary artery disease. Nonalcoholic fatty liver disease is commonly associated with obesity and type 2 diabetes. It can progress to fibrosis and cirrhosis. Cholelithiasis (gallstones) is six times more common in obese than in lean subjects. Hypoventilation syndrome is a constellation of respiratory abnormalities in very obese persons. It has been called the pickwickian syndrome, after the fat lady who was constantly falling asleep in Charles Dickens' *The Pickwick Papers*. Hypersomnolence, both at night and during the day, is characteristic and is often associated with apneic pauses during sleep (sleep apnea), polycythemia, and eventual right-sided heart failure. Marked adiposity is a predisposing factor for the development of degenerative joint disease (osteoarthritis). This form of arthritis, which typically appears in older persons, is attributed in large part to the cumulative effects of wear and tear on joints.

There is an increased incidence of certain cancers in the overweight, including cancers of the esophagus, thyroid, colon, and kidney in men and cancers of the esophagus, endometrium, gallbladder, and kidney in women [26]. Probable pathway of carcinogenesis especially in gastrointestinal cancers are due to the change of human microbiota [27]. Overall, obesity is associated with approximately 20% of cancer deaths in women and 14% of deaths in men [28].

Worldwide obesity has nearly tripled since 1975, and doubled between 1980 and 2008. According to

country estimates for 2008 over 50% of both men and women in Europe were overweight and approximately 23% women and 20% men were obese. In 2013, WHO published a list of the fattest countries, where Greece came in as the fattest country in the Balkan region with 68.5% of its population either overweight or obese, followed by Turkey with 61.5%, but with highest rate of obesity - 32.1%. The slimmest countries in the region are Romania with 39.1% and Macedonia with 47.2% of the population overweight, but Bosnia and Herzegovina and Macedonia are with the lowest rate of obese population with 17.9% and 19.9%, respectively. The fattest country from ex-Yugoslavia is Slovenia with 59.8% of the population overweight or obese. The average annual rate of increase in the prevalence of obese adults in Balkans between 2003 and 2008 was 10.60% for men and 11.08% for women. The highest difference of this percent is in Turkey (12.9) and the lowest in Slovenia (0.9). The rate of difference in other Balkan countries, ranges from 1.4 in Montenegro to 3.1 in Bosnia and Herzegovina (Table 2).

This analysis showed that development of obesity in 5-year period in women is significantly positively associated with frequent consumption of "hidden" fats of animal origin and significantly negative with each higher education level. In all Balkan countries the percentage of obese females is higher than the percentage of obese males. The causes of this epidemic are tightly related to social changes in diet and levels of physical activity. At the end obesity and overweight remains a serious health problem for the Balkan population; the alarming rates of excess body weight continue to increase and that preventive measures should urgently be undertaken [24, 26, and 28].

2.2.8 Alcohol consumption

There is high variation in levels of alcohol consumption between Balkan countries (Table 3). The total consumption of pure alcohol is the amount of alcohol consumed per adult within a calendar year expressed in liters of pure alcohol. In Europe, the average per capita alcohol consumption within a calendar year was 8.6 liters of pure alcohol [20].

In Balkans, according to European health report data from 2018, the highest average per capita was 14.4 in Romania, followed by Serbia with 12.6, and Croatia with 12.2 L per capita. The lowest rates of alcohol consumption were in Macedonia (6.7) and Turkey (2). Despite all the attention given to illegal drugs alcohol abuse is more widespread hazard. About 50% of adults drink alcohol and 5 - 10% of them have chronic alcoholism.

Table 3. Total alcohol consumption in liters per capita within a year, age-standardized mortality rate from liver cirrhosis and hepatocellular cancer for both sexes and all ages in Balkans

Country	Alcohol consumption	Liver cirrhosis	Hepatocellular cancer
Albania	7	22	7.6
Bosnia and Herzegovina	7.1	27.6	6.4
Bulgaria	11.4	40.7	3.6
Croatia	12.2	37.4	5.2
Greece	10.3	11.2	4.5
Macedonia	6.7	16.5	5
Montenegro	8.7	11.5	3.9
Romania	14.4	84.7	7.5
Serbia	12.6	15.5	4.7
Slovenia	11.6	39.9	5
Turkey	2	21.7	4.4

Alcohol consumption is responsible for more deaths in accidents than any other reason. It is also well known that the end stage of chronic alcoholism is liver cirrhosis [29], which is a good background for developing hepatocellular cancer [30 - 32]. The highest age-standardized mortality rate from liver cirrhosis was recorded as expected in Romania (84.7) while the lowest in Greece and Montenegro with 11.2 and 11.5 respectively. There was no high variety in estimated age-standardized mortality rate in Balkans from hepatocellular cancer. The highest rate was recorded in Albania and Romania (7.6 and 7.5 respectively) and the lowest in Bulgaria (3.6) and Montenegro (3.9).

2.2.9 Diabetes

Diabetes mellitus is a group of metabolic disorders characterized by hyperglycemia [33]. Hyperglycemia in diabetes results from defects in insulin secretion, insulin action, or, most commonly, both [34]. The chronic hyperglycemia and attendant metabolic abnormalities of diabetes are often associated with secondary damage in multiple organ systems, especially the kidneys, eyes, nerves, and blood vessels. Like in other countries, in Balkans diabetes is the leading cause of end-stage renal disease, adult-onset blindness, and nontraumatic lower-extremity amputations resulting from atherosclerosis of arteries [35].

There are two types of diabetes. Type 1 diabetes is defined as an autoimmune disease in which islet destruction is caused primarily by immune effector cells reacting against endogenous beta cell antigens, leading to destroy insulin producing cells in pancreas. The second type is characterized by two defects: (1) a decreased ability of peripheral tissues to respond to

insulin (insulin resistance) and (2) beta cell dysfunction that is manifested as inadequate insulin secretion in the face of insulin resistance and hyperglycemia [36]. According to data of International diabetes federation from 2017, the highest incidence of type 2 diabetes was recorded in Turkey (12.13) and the lowest in Greece (4.55). Even five countries from the Balkans share the 50th to 54th place in world rank according to incidence rate of diabetes (Montenegro, Macedonia, Bosnia and Herzegovina, Albania, and Serbia) that suggest the similarities in lifestyle, diet and the quality/quantity of food (Table 4) [25].

Table 4. Estimated age-standardized incidence rate of type 2 diabetes in Balkan countries and the world rank

Country	Incidence rate of type 2 diabetes	Rank
Albania	10.08	50 - 54
Bosnia and Herzegovina	10.08	50 - 54
Bulgaria	5.81	131
Croatia	5.59	137
Greece	4.55	157
Macedonia	10.08	50 - 54
Montenegro	10.08	50 - 54
Romania	9.74	57
Serbia	10.08	50 - 54
Slovenia	7.25	90
Turkey	12.13	31

2.3 Cardiovascular diseases

Cardiovascular diseases (CVD) are disorders of the heart and blood vessels which include atherosclerosis, ischemic heart disease (coronary artery disease), hypertension, cerebrovascular diseases and many other conditions. Four out of five CVD deaths are due heart attacks and strokes. Individuals at risk of CVD may demonstrate raised blood pressure, glucose and lipids as well as overweight and obesity. About 31% of all deaths worldwide are due CVD, more than 75% occur in low and middle developed countries and 85% are due heart attacks and strokes [37].

2.3.1 Hypertension

Like height and weight, blood pressure is a continuously distributed variable; moreover, detrimental consequences increase continuously as the pressure rises, with no rigidly defined threshold dependably predicting total safety [38]. Nevertheless, sustained diastolic pressures greater than 90 mm Hg or sustained systolic pressures in excess of 140 mm Hg are reliably associated with an increased risk for atherosclerosis and are therefore used as cutoffs in diagnosing hypertension in clinical practice. By these criteria, over 25% of individuals in the general population are hypertensive. As noted however,

these values are somewhat arbitrary, and in patients with other cardiovascular risk factors (e.g., diabetes), lower thresholds may be applicable [39]. Albania has the lowest mortality rate of hypertension (2.67) and in contrary Bulgaria is with the highest mortality rate (34.17). From ex-Yugoslavian countries the lowest mortality rate are in Bosnia and Herzegovina (4.57) and Slovenia (8.38) and the highest in Macedonia (16.95) (Table 5) [38].

Table 5. Estimated age-standardized mortality rate per 100,000 people, both sexes and all ages for hypertension, coronary heart disease and stroke in Balkan countries

Country	Hypertension	Coronary heart disease	Stroke
Albania	2.67	126.59	105.31
Bosnia and Herzegovina	4.57	123.19	102.85
Bulgaria	34.17	211.28	131.98
Croatia	10.96	149.56	76.19
Greece	6.69	112.4	65.08
Macedonia	16.95	121.15	130.87
Montenegro	15.34	119.86	82.12
Romania	21.01	212.34	109.24
Serbia	15.34	118.68	80.28
Slovenia	8.38	85.67	41.68
Turkey	15.2	108.59	58.99

2.3.2 Atherosclerosis

Atherosclerosis is characterized by intimal lesions called atheromas (or atheromatous or atherosclerotic plaques) that impinge on the vascular lumen and can rupture to cause sudden occlusion. It underlies the pathogenesis of coronary, cerebral, and peripheral vascular disease, and causes more morbidity and mortality (roughly half of all deaths than any other disorder).

Atheromatous plaques are raised lesions composed of soft friable (grumous) lipid cores (mainly cholesterol and cholesterol esters, with necrotic debris) covered by fibrous caps [33]. As they enlarged, atherosclerotic plaques may mechanically obstruct vascular lumina, leading to stenosis. Of greater concern, however, atherosclerotic plaques also are prone to rupture, an event that may result in thrombosis and sudden occlusion of the vessel. Hyperlipidemia and, more specifically, hypercholesterolemia, are a major risk factor for development of atherosclerosis and is sufficient to induce lesions in the absence of other risk factors. Conditions reliable to atherosclerosis are high dietary intake of cholesterol, cigarette smoking, diabetes type 2, hypertension as well as physical activity, age and gender [39, 40].

2.3.3 Ischemic heart disease (IHD)

IHD is a broad term encompassing several closely related syndromes caused by myocardial ischemia - an imbalance between cardiac blood supply (perfusion) and myocardial oxygen and nutritional requirements [33]. In more than 90% of cases, IHD is a consequence of reduced coronary blood flow secondary to obstructive atherosclerotic vascular disease, and it is major cause of morbidity and mortality in many countries worldwide [41]. Myocardial infarction (MI), also commonly referred to as "heart attack," is necrosis of the heart muscle resulting from ischemia. The vast majority of MIs are caused by acute thrombosis within coronary arteries [42].

Chronic IHD, also called ischemic cardiomyopathy, is progressive heart failure secondary to ischemic myocardial damage [43]. In most instances, there is a known clinical history of previous MI [44]. As expected, in relation to the mortality rate of hypertension, Bulgaria and Romania have the highest mortality rate for coronary heart disease with 211.28 and 212.34 respectively. The lowest mortality rate was estimated in Slovenia 85.67, due to the low rate for hypertension and probably good health care system for cardiovascular diseases, (Table 5) [41].

2.3.4 Stroke

Cerebrovascular diseases are brain disorders caused by pathologic processes involving blood vessels. They are a major cause of death in the developed world and are the most prevalent cause of neurologic morbidity. The three main pathogenic mechanisms are (1) thrombotic occlusion, (2) embolic occlusion, and (3) vascular rupture. Stroke is the clinical designation applied to all of these conditions when symptoms begin acutely. Thrombosis and embolism have similar consequences for the brain: loss of oxygen and metabolic substrates, resulting in infarction or ischemic injury of regions

supplied by the affected vessel [45]. Among the Balkan countries, the lowest mortality rate from cerebrovascular diseases was noted in Slovenia (46.68), and Turkey (58.99), while Macedonia (130.87), and Bulgaria (131.98) have the highest rate (Table 5).

2.4 Gastric and colorectal cancer

Gastric adenocarcinoma (GAC), is the most common malignancy of the stomach, comprising more than 90% of all gastric cancers [33, 46]. Rates of this disease vary markedly with geography. Japan, Chile and Eastern Europe including part of the Balkans have 20 times higher incidence than Northern Europe, Africa and Southeast Asia. It is more common in lower socioeconomic groups. By the biological nature gastric adenocarcinoma is genetically heterogeneous disease but the bases of it are molecular alterations, very possibly triggered by *Helicobacter pylori* induced chronic gastritis [47].

Adenocarcinoma of the large bowel (colorectal cancer - CRC), is the most common malignancy and a major contributor to morbidity and mortality worldwide [33]. Colorectal cancer is most prevalent in Western world or so-called developed countries with high income [48]. All these countries share same lifestyle and diet of the "west". Dietary factors most closely associated with colorectal cancer are high intake of refined carbohydrates and fat and low intake of dietary fibers [48, 49].

There is variability in the incidence and mortality rate of gastric cancer across Balkan countries (Table 6). The lowest incidence and mortality rate are recorded in Montenegro (5 and 4.3). The highest estimated values of incidence rate are in Albania (12.7) and Turkey (12.5), followed by Macedonia (10.5) and Bosnia and Herzegovina (10.1). They have similar distribution of mortality rate leading by Turkey (10.3) and Albania (9.6) and followed again with Macedonia (8.1) and Bosnia and Herzegovina (7.4). These data strongly

Table 6. Estimated age-standardized incidence and mortality rates for both sexes and all ages, for gastric adenocarcinoma (GAC) and colorectal adenocarcinoma (CRC) per 100,000 population

Country	GAC-incidence	GAC-mortality	CRC-incidence	CRC-mortality
Albania	12.7	9.6	8.4	3.7
Bosnia and Herzegovina	10.1	7.4	26.1	13.3
Bulgaria	8	6.2	28.5	14.9
Croatia	8.4	6.9	34.1	18.9
Greece	6.5	4.4	26.2	9.7
Macedonia	10.5	8.1	28.4	12.5
Montenegro	5	4.3	18.6	9.2
Romania	8.3	6.8	26.7	13.7
Serbia	7.1	5.5	36.7	16.8
Slovenia	8.9	5.5	41.1	12.5
Turkey	12.5	10.3	21	10.2

suggest that social and economic factors in these countries and dietary lifestyle are of great importance in developing this deleterious disease. In contrary, the highest incidence rate of colorectal cancer are in most developed countries of the Balkan, Slovenia (41.1), Serbia (36.7), and Croatia (34.1) that have also the highest mortality rate, leading by Croatia (18.9) and followed by Serbia (16.8), [50,51].

3. Conclusions

- The traditional food pattern in the Balkan countries is very similar to the Mediterranean diet. This diet is rich in antioxidants that are found in basic food products which are regularly consumed in Balkan countries: traditional fermented milk products, bee products, multigrain products, cereals, typical seasonal fruits, nuts and vegetables, fish or seafood's, white and red meat and eggs, poultry etc.

- Balkan cuisine is more or less similar in all countries of this region, but the lifestyle, health care system, tradition, influence of the western world as well as food processing and industry are main parameters that have strong influence in health issue among the population of the Balkans. That is the reason why there are no great diversities among Balkan countries in peculiar gastrointestinal diseases.

- Although different in many aspects, as culture, history, politics and tradition, all the people in Balkans share the same joy when prepare the food and the same pain when illness occupy everyday habits.

4. References

- [1] Gjonca A., Bobak M. (1997). *Albanian paradox, another example of protective effect of Mediterranean lifestyle?* The Lancet.
<URL: <https://search.proquest.com/docview/198996405>. Accessed 28 June 2018.
- [2] Clancy T. (2004). *Bosnia and Herzegovina: The Bradt Travel Guide*. Bradt Travel Guides, Chalfont Saint Peter, UK, pp. 93-97.
- [3] Goldstein D., Merkle K. (Eds.). (2005). *Culinary cultures of Europe: Identity, diversity and dialogue*. Council of Europe, pp. 87-94.
- [4] Deutsch I. J. (2015). *Bulgaria in Ethnic American Food Today*. In: Long M. L. (Ed.), *A Cultural Encyclopedia* Rowman and Littlefield Publishers, Lanham, USA.
- [5] Kay A. (2015). *Bulgaria: The Bradt Travel Guide* (2nd Ed.). Bradt Travel Guides, Chalfont Saint Peter, UK, pp. 57.
- [6] Ross F. (2011). *Bulgaria*. In: Albala K. (Ed.), *Food Cultures of the World Encyclopedia*, Greenwood, Westport, USA.
- [7] Bilušić I. (Ed.) (1996). *Croatia at the table - Smells and tastes of Croatia* (in Croatian). Alfa, Koprivnica, Croatia.
- [8] Butković D., Ugarković A. (2005). *New Croatian cuisine*. Profil international, Zagreb, Croatia, pp. 272.
- [9] Christian C. (2003). *Wine: A Comprehensive Look at the World's Best Wine*. Random House, New York, USA.
- [10] Armstrong K., Hellander P. (2006). *Lonely Planet - Greece*. Lonely Planet Publications, Hawthorn, Australia, pp. 76.
- [11] Vasilopoulou E., Dilis V., Trichopoulou A. (2013). *Nutrition claims: A potentially important tool for the endorsement of greek mediterranean traditional foods*. *Mediterranean Journal of Nutrition and Metabolism*, 6, (2), pp. 105-111.
- [12] Aslimoski P., Gerasimoski S. (2012). *Food and nutrition as tourist phenomenon*. *Social and Behavioral Sciences*, 44, pp. 357-362.
- [13] Klepper N. (1999). *Taste of Romania*. Hippocrene, New York, USA.
- [14] Sheward T. (2014). *Europe's Foodie Secret*. Lonely Planet.
<URL: <https://www.lonelyplanet.com/articles/europes-foodie-secret-serbian-cuisine>. Accessed 24 June 2018.
- [15] Maribor Multidisciplinary Research Institute. (2006). *The Strategy of the Development of the Gastronomy of Slovenia* (in Slovenian). Slovenian Tourist Board.
<URL: https://web.archive.org/web/20160303204329/http://www.slovenia.info/pictures/business_event/attachments_1/2006/Strategija_gastro_nomije-31.8.2006_4277.pdf. Accessed 24 June 2018.
- [16] Bogataj J. (2007). *Taste Slovenia*. National Geographic, Washington, USA.
- [17] Ilkin N., Kaufman S. (2002). *A Taste of Turkish cuisine*. Hippocrene Books.
<URL: <https://archive.org/details/tasteofturkishcu00ilki>. Accessed 12 December 2017.
- [18] Yerasimos M. (2007). *500 Years of Ottoman Cuisine* (2nd Ed.). Boyut Publishing, Istanbul, Turkey.
- [19] Şavkay T. (2003). *Turkish Cuisine*. Mert Basim Yayin, Istanbul, Turkey.
- [20] WHO. *WHO Global Health Workforce Statistics*.
<URL: <https://datacatalog.worldbank.org/public-licence.ac.by-4.0>. Accessed 27 June 2018.
- [21] WHO. *European Health Report 2018*.
<URL: www.euro.who.int/who.ehr.2018. Accessed 27 September 2018.
- [22] World Bank. *Life expectancy at birth*.
<URL: <http://data.worldbank.org/SH.SV.BD.CD>. Accessed 10 August 2015.
- [23] WHO. *Global Health Workforce Statistics*.
<URL: <http://worldlifeexpectancy.com/cause-of-death/hypertension/by-country>. Accessed 27 September 2018.
- [24] WHO. *Global Health Workforce Statistics*.
<URL: www.euro.who.int/obesity 2013. Accessed 10 August 2015.
- [25] International Diabetes Federation. *Indicators*.
<URL: www.indexmundi.com/facts/indicators/SH.STA.DIAB.ZS/rank. Accessed 27 September 2018.
- [26] Roberts D. L., Dive C., Renahan A. G. (2010). *Biological mechanisms linking obesity and cancer risk: New perspectives*. *Annu. Rev. Med.*, 61, pp. 301.
- [27] Graham C., Mullen A., Whelan K. (2016). *Obesity and gastrointestinal microbiota: A review of associations and mechanisms*. *Nutr. Rev.*, 73, pp. 376.
- [28] WHO. *Global Health Workforce Statistics*.
<URL: www.worldpopulationreview.com/countries/most-obese. Accessed 27 September 2018.
- [29] Louvet A., Mathurin P. (2015). *Alcoholic liver disease: Mechanisms of injury and targeted treatment*. *Nat. Rev. Gastroenterol. Hepatol.*, 12, pp. 231.
- [30] Seitz H. K., Stickel F. (2007). *Molecular mechanisms of alcohol-mediated carcinogenesis*. *Nat. Rev. Cancer*, 7, pp. 599.
- [31] Forner A., Llovet J. M., Bruix J. (2012). *Hepatocellular carcinoma*. *Lancet*, 379, pp. 1245.

- [32] Kocabayoglu P., Friedman S. L. (2013). *Cellular basis of hepatic fibrosis and its role in inflammation and cancer*. Front. Biosci., (Schol Ed), 5, pp. 217.
- [33] Kumar V., Abbas K. A., Aster C. J. (2018). *Basic pathology* (10th Ed.). Elsevier, Philadelphia, USA.
- [34] DeFronzo R. A., Ferrannini E., Groop L., Henry R. R., Herman H. W., Holst J. J., Hu B. F., Kahn R. C., Raz I., Shulman I. G., Simonson C. D., Testa A. M., Weiss R. (2015). *Type 2 diabetes mellitus*. Nat. Rev. Dis. Primers, 23, 1, pp. 15019.
- [35] Tuomi T., Santoro N., Caprio S., Cai M., Weng J., Groop L. (2014). *The many faces of diabetes: A disease with increasing heterogeneity*. Lancet, 383, pp. 1084-1094.
- [36] Andersen D. K., Andren-Sandberg A., Duell E. J., Goggins M., Korc M., Petersen M. P., Smith P. J., Whitcomb C. D. (2013). *Pancreatitis, diabetes, pancreatic cancer: Summary of a NCI-NIDDK workshop*. Pancreas, 42, pp. 1227-1237.
- [37] WHO. *Global Health Workforce Statistics*.
<URL: www.who.int/health-topics/CVD. Accessed 27 September 2018.
- [38] IHME. (2017). *European cardiovascular disease statistics*.
<URL: www.healthdata.org/gbd/data. Accessed 27 September 2018.
- [39] WHO. *Mortality data*.
<URL: <https://www.who.int/data/mortality/country-profile>. Accessed 28 September 2018.
- [40] Fishbein M. C., Fishbein G. A. (2015). *Arteriosclerosis: Facts and fancy*. Cardiovasc. Pathol., 24, pp. 335.
- [41] Finegold A. J., Asaria P., Francis P. D. (2013). *Mortality from ischemic heart disease by country, region and age: Statistics from WHO and UN*. Int. J. Cardiology, 168, (2), pp. 934-945.
- [42] Libby P., Lichtman A. H., Hansson G. K. (2013). *Immune effector mechanisms implicated in atherosclerosis: From mice to humans*. Immunity, 38, pp. 1092.
- [43] Hausenloy D. J., Yellon D. M. (2013). *Myocardial ischemia-reperfusion injury: A neglected therapeutic target*. J. Clin. Invest., 123, pp. 92.
- [44] Heusch G., Libby P., Gersh B., Yellon D., Böhm M., Lopaschuk G., Opie L. (2014). *Cardiovascular remodelling in coronary artery disease and heart failure*. Lancet, 383, pp. 1933.
- [45] McKee C. A., Stein D. T., Kiernan T. P., Alvarez E. V. (2015). *The neuropathology of chronic traumatic encephalopathy*. Brain Pathol., 25, (3), pp. 350-364.
- [46] European National Cancer Register. *Cancer Factsheets*.
<URL: https://www.enrcr.eu/images/docs/factsheets/ENCR_factsheet_Stomach2017. Accessed 28 September 2018.
- [47] Wroblewski L. E., Peek R. M. Jr. (2013). *Helicobacter pylori in gastric carcinogenesis: Mechanisms*. Gastroenterol. Clin. North Am., 42, pp. 285-298.
- [48] Brenner H., Kloor M., Pox C. P. (2014). *Colorectal cancer*. Lancet, 383, pp. 1490-1502.
- [49] Corley D. A., Levin T. R., Doubeni C. A. (2014). *Adenoma detection rate and risk of colorectal cancer and death*. N. Engl. J. Med., 370, pp. 2541.
- [50] International Agency of research on Cancer. *Cancer today*.
<URL: <https://gco.iarc.fr/today/home>. Accessed 28 September 2018.
- [51] International Agency of research on Cancer. *Cancer today*.
<URL: <https://gco.iarc.fr/today/home>. Accessed 30 September 2018.