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Original Contribution

COMPARATIVE ANALYSIS OF SUBJECTIVE ASSESSMENTS OF FACTORS FORMING HEALTHY LIFESTYLE IN ADULTS IN BULGARIA AND FRANCE

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ABSTRACT

Healthy lifestyles and their determinants are key prerequisites for healthy and active aging and constitute an important domain of the Active Aging Index. The purpose of this study is to investigate and compare the subjective assessments of elderly people living in Bulgaria and France regarding factors that shape a healthy lifestyle, with a focus on nutrition, health status and socio-economic conditions. Methods: An anonymous voluntary survey was conducted among elderly people living in urban areas, rural regions and institutions in Bulgaria and France during the period 2019–2021. Data were collected through questionnaires, direct observations and interviews. Statistical analysis was performed using SPSS, applying analysis of variance (ANOVA) and Student–Fisher t-tests to assess differences between groups and the influence of selected factors. Results: The average age of respondents in France was significantly higher than that of respondents in Bulgaria. Elderly people in France reported higher alcohol consumption and greater dissatisfaction with their financial status, despite more frequent consumption of healthy foods such as dairy products, fruits and vegetables. In both countries, respondents expressed a need for home-based care and hot meal delivery, with stronger demand observed in France. Conclusions: Differences in lifestyle, financial security and health status significantly influence subjective assessments of healthy aging. Elderly people in Bulgaria are more constrained by financial limitations, experience higher levels of social isolation and poorer oral health, and report more health-related dietary restrictions compared to their French counterparts.

Keywords: healthy lifestyle, nutritious diet, elderly, subjective assessments

THEORETICAL AND EMPIRICAL BACKGROUND

Issues related to healthy lifestyles and the factors that form them have been the focus of research over the past decades. The formation of healthy habits and attitudes is an ongoing process that depends on personal motivation, preferences, income, education, geographic specifications, culture, national traditions, the specifics of a nation's cuisine and other factors.

Healthy lifestyle and nutrition

Human health depends on a complex set of endogenous (internal) and exogenous (external) factors. A healthy lifestyle is one way to prevent and control health problems associated with chronic non-communicable diseases (NCDs). They are the main focus of global, European and national health organizations and systems.

The World Health Organization (WHO) adopts the Global Strategy for the Prevention and Control of Noncommunicable Diseases and its Action Plan. In Europe, a European Strategy for the Prevention and Control of Noncommunicable Diseases and its Action Plan have been adopted (1). Each Member State is also adopting its own national strategy in this area. These strategies are based on influencing the risk factors leading to the emergence of these diseases. Their effective prevention requires the simultaneous development of activities in several main areas: improving the health determinants (social, behavioural, environmental); involving the population in healthy lifestyles; developing and implementing programs for the prevention and early diagnosis of chronic non-communicable diseases at community level; implementing

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interdisciplinary models of interventions against these diseases, etc. (2).

Nutrition interacts directly with the aging process and the risk of nutrition-related health problems increases in later life (3).

Diet and healthy eating are important factors in promoting and maintaining health throughout the life cycle. Poor diet, overeating and unbalanced nutrition negatively affect body function and lifelong health. The role of diet and nutrient intake as determinants of chronic NCDs is well established and thus represent an important element in the prevention strategy (4).

One of the most popular diets worldwide among healthy eating advocates is the so-called Mediterranean diet, declared by UNESCO as "intangible heritage of mankind". It is a way of life, a set of eating habits and principles followed for centuries by the Mediterranean peoples - Greece, France, Italy, Spain and Morocco. Years of research among the residents of these countries have shown that they live longer than the other Europeans and suffer less from heart diseases and cancer. This is due to the local cuisine, which is characterized by increased consumption of olive oil, olives, fish, pasta and fresh fruit and vegetables (5).

Scientific searches into healthy eating and living patterns found that adherence to the Mediterranean diet, as assessed by a dietary biomarker, was associated with a lower risk of mortality in the elderly as a result of 20 years of follow-up.

The food quality problem

It is well known that nutrient deficiencies remain among the important problems facing poor people in most countries. The average daily protein intake has decreased in recent years by 10%-20% at the expense of animal protein, but is above the relevant dietary reference values and within the recommended range of 10-15% of the total energy value (4).

Preventing vitamin D deficiency resulting from low vitamin D status in bone loss, muscle weakness and falls and fragility fractures in older people are critical public health issues in terms of morbidity, quality of life and health service costs in Europe (6).

Advanced analytical techniques for the efficient isolation and identification of bioactive plant constituents and natural products, for the development of innovative nutraceuticals, dietary supplements or herbal medicinal products, can replace or enhance the effects of nutrients and lead to immune enhancement in the elderly people (7).

In addition, food products of various origins are also increasingly found to be contaminated with toxin-producing or antibiotic-resistant micro-organisms causing disease in humans worldwide. The indiscriminate use of antibiotics, including in animal husbandry, is also becoming a global threat to public health, as it leads to the emergence of resistance and a lack of effect in the treatment of the human organism (8-10)

The use of modern technologies for the detection of bacterial pathogens in food, the implementation of an effective infection control program and regular monitoring of antimicrobial resistance among bacteria would lead to better infection management, reduce outbreaks of diseases caused by the consumption of contaminated food and ensure the safety and security of public health (11, 12).

Healthy eating in elderly people

Promoting adequate nutrition and physical activity are crucial areas of well-defined public health and policy aimed at healthy aging. To maintain the well-being, independence and nutrition of the elderly population, important strategies are being undertaken, one promising strategy being to provide home care through the delivery of meals using a 'Meals on Wheels' (MoW) system (13).

The presence of physical disabilities and/or chronic diseases among the elderly requires the need for frequent and long-term health care (14).

A number of research studies provide evidence that healthier diet quality and dietary patterns can help prevent or delay mobility loss and limitation in the elderly people (15).

European projects and pilot studies aimed at eliminating the constraints and difficulties associated with food preparation, packaging and delivery, as well as activities aimed at empowering seniors to make healthier food choices and food environments in the European community are being implemented (16).

Strategic research programmes developed to address the growing problem of malnutrition (i.e. protein-energy malnutrition) in the older

population and to develop diets for healthy living are important for public health (17).

Limited consumption of quality organic food by the elderly, due to chronic diseases and lower income, is also a factor that negatively affects their health. Access to pesticide-free plant-based food products is becoming increasingly difficult in Europe (18, 19).

Surveys among the elderly people in France

In France, dietary and physical activity recommendations for the population have been developed and implemented by the public health authorities through the National Nutrition and Health Programme (PNNS), which is continuously updated and targeted at specific population groups. In 2002, guidelines on nutrition for elderly people were published (20, 21).

The dietary guidelines of the French National Nutrition and Health Programme (Recommandations alimentaires du Programme national nutrition santé) recommend eating organic, seasonal and locally produced foods; starchy foods (pasta, bread, rice, semolina, potatoes); fish twice a week; rapeseed, walnut oil and olive oil; dairy products 2 pcs per day for adults (20).

A large-scale survey of French adults establishes the importance of control over eating behaviour. The results show that French adults following the French dietary pattern: eating three meals at set times in company with others, are less likely to be overweight (OR=0.89; 95% CI 0.87, 0.92) or obese (0.76; 95% CI 0.74, 0.79) (22).

Another study of elderly men and women in France found 4 types of diet among the people studied. Older women consuming more fish, fruit and vegetables were found to have better cognitive function, higher self-esteem of their own health and a lack of depressive symptoms, compared to those consuming "convenience foods, albeit in moderation". The results suggest that health and psychological factors are influenced by diet and that men should be worked with more purposefully to achieve a healthier diet (23).

Geographical factors are also influential. French people living in the Mediterranean area are more likely to adhere to the Mediterranean diet and form healthy eating habits. The food and the way in which it is eaten are the result of a long development of French culture and traditions. It has been found that the inhabitants of southern France, despite their high consumption of fat, are virtually free of diabetes, obesity and cardiovascular disease. According to the research, the following statistics show a 33% lower risk of developing cardiovascular disease and a 24% lower risk of developing cancer.

It has also been found that French elderly people who cannot provide their own food are more at risk of malnutrition than their peers who can provide their own food. However, no difference was found between people living at home receiving food from institutions and people living in a nursing home (24).

Surveys among elderly people in Bulgaria

Since 2005 a National Action Plan on Food and Nutrition has been developed and implemented in Bulgaria. Scientifically proven food-based dietary guidelines, taking into account current national nutritional problems, have been included as an important tool for positive change of Bulgarian nutrition in our food policy (3).

Studies in Bulgaria report unhealthy dietary patterns and low physical activity as major risk factors for the deterioration of the health of Bulgarians and for the significant prevalence and development of chronic non-communicable diseases (NCDs). Other causes are smoking and alcohol consumption. All these factors have a negative impact on the health status of people and lead to high mortality - over 80% of deaths in the country. The most common causes of death are diseases of the circulatory organs - 67.5%, followed by malignant diseases - 15.1%, chronic respiratory diseases, diabetes and others (25).

It is believed that there is an untapped potential to achieve better health of the population in Bulgaria, to prevent the majority of diseases and premature death - this is preventive health behaviour (26).

A nutritious diet, moderate physical activity and absence of diseases, access to health and dental care, financial security, level of education, degree of independence are important prerequisites for healthy aging and elements forming one of the domains of the Active Ageing Index in Bulgaria (27).

In our previous studies (2020) among elderly people in Bulgaria, we found that a large proportion of them have poor dietary intake and

are reluctant to receive additional information on healthy eating because of their knowledge deficit in this area. Based on these data, we have developed a model program for education on rational nutrition for elderly people (28).

Obesity is also a problem negatively affecting the health of some Bulgarians. Measures to control nutrition require overweight people to become aware of the risks to their health, to form a desire for treatment and to undertake communication with medical professionals (29, 30).

Elderly people over the age of 65 have a lower health-related quality of life. The beneficial impact of activity in daily life on the quality of life of Bulgarians directs to community interventions: expanding opportunities for socializing and physical activity (31).

The aim of this publication is to study and compare the subjective assessments of elderly people from Bulgaria and France on parameters of healthy eating and factors influencing it.

MATERIALS AND METHODS

In the period 2019-2021 an anonymous voluntary survey was conducted among groups of elderly people in Bulgaria and France, living in cities, villages and institutions for the elderly, in the period 2019-2021. The sample was formed according to accessibility and randomly from the patient list of GP practices in cities and villages. The study was carried out on:

- 293 Bulgarian adults (43.7% men and 56.3% women) aged 57 to 89, of whom 51% lived in urban areas and 49% in rural areas.
- 110 persons from France - (61 males and 48 females 55,4% males and 43,6% females) aged from 62 to 101 years. According to their place of residence, the respondents from France were distributed as follows: in rural areas – 30%, in cities – 18.18%, 46.34% in senior homes.

The questionnaire was constructed in three modules: parameters of healthy eating, subjective assessments of health factors and demographic characteristics. The questionnaire contains 32 close-ended questions, some of which are dichotomous scales, others contain Likert-type scaling and 5 open-ended questions to collect emic-type information. The subjective ratings of the elderly people from Bulgaria and France relate to several important factors forming healthy lifestyles, namely: diet and consumption of healthy foods, physical activity and shopping opportunities; alcohol consumption; health status, dental health, environmental safety, handling of financial resources, need for social services, etc.

Statistical processing of the empirical data was performed using the statistical analysis package designed for social science research SPSS (32), and the following statistical analyses were applied: dispersion analysis (ANOVA) - to determine the influence of different factors on healthy eating; Student-Fischer t-test - to measure statistical significance of differences between groups within the same variable; and between dependent or independent variables.

RESULTS AND DISCUSSION

The data show **(Table 1)** that the average age of the French seniors covered in the study is statistically significantly higher than that of the Bulgarians, which is relevant to the average life expectancy. According to the 2018 EuropaIn Numbers.com ranking, France ranks among the top ten countries in Europe and the world for this indicator (33).

Many studies have shown the significantly lower average survival rate of seniors in Bulgaria, with the most frequently cited reasons being the lower standard of living, health care problems and the higher uncertainty of living conditions in Bulgaria due to the still young democracy of public life, the insufficiently strong economy and environmental problems in food production, air cleanliness, etc. Recent studies show that after the Covid-19 pandemic, the average life expectancy of the Bulgarians has decreased by about 2 years (34).

Table 1. *Relationship between nationality and age (dispersion analysis)*

Dependent variable	**F**	**p**	**Independent variable**	
			Mean Of the dependent variable	
			bg	**fr**
Age	10,51	0,00	71,64	76,22

When comparing the studied parameters of a healthy diet, it becomes evident that, in general, the elderly people from France statistically significantly more often claim that they consume weekly fruits (F=105.01; p<0.001), vegetables (F=68.60; p<0.001), meat (including fish) (F=55.52; p<0.001), as well as milk and dairy products (F=14.61; p<0.001), compared to the Bulgarians (**Table 2)**. This is due to differences in the standard of living of the elderly in the two countries, still significantly lower in Bulgaria, confirmed in the low subjective assessments of the Bulgarians presented below as to whether they have enough money for the food they need (F= 39.84; p<0.001, **Table 5**).

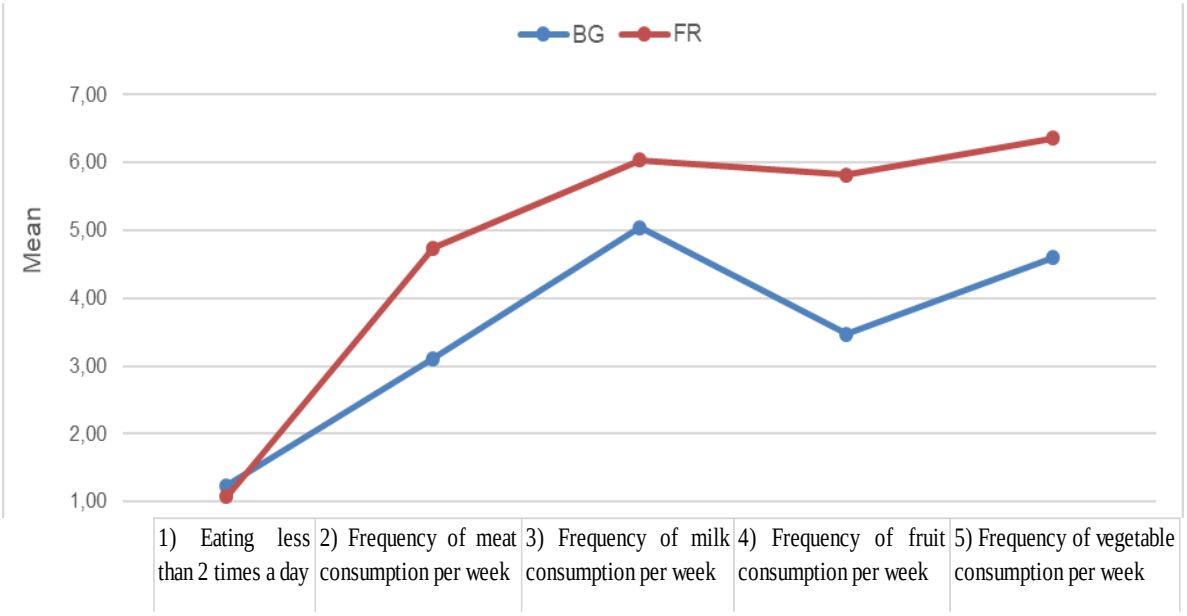

Figure 1. Comparison of healthy diet indicators in elderly people in Bulgaria and France

There were no statistically significant differences in the statements of the respondents of both nationalities in the answers to the question identifying food intake less than twice a day.

Table 2. *Influence of nationality on healthy diet parameters*

Dependent variable	**F**	**p**	**Independent variable**	
			Nationality	
Frequency of intake per week			**Mean bg**	**Mean fr**
Meat	55,52	0,00	3,11	4,74
Milk	14,61	0,00	5,04	6,04
Fruits	105,01	0,00	3,47	5,82
Vegetables	68,60	0,00	4,60	6,36

A more detailed analysis showed that those living in villages were statistically significantly less likely to consume dairy products compared to the elderly people in the cities and senior homes (F=3.74; p<0.01, **Table 3**). On the other hand, however, respondents living in nursing homes who were only from France were statistically significantly more likely to consume fruits and vegetables compared to those living in the community in villages and cities in the larger part of Bulgaria (F=16.34; p<0.01 and F=6.81; p<0.01, respectively, **Table 3**). It can be assumed that the managers, social and health workers in the senior homes monitor and provide the healthy amount of fruits and vegetables for the elderly people, and this is more difficult to implement and control by the elderly living in the community themselves (35).

Table 3. *Influence of place of residence on healthy diet parameters for the whole group of respondents from Bulgaria and France.*

Dependent variable	F	p	Independent variable	Mean On the dependent variable	t-test p<0,05
Frequency of consumption			Location	Frequency of consumption	
Milk/ weekly	3,74	0,01	Village City Home for the elderly	4,92 5,76 5,22	$t_{1,2}$=-3,47
Fruits/ weekly	16,34	0,00	Village City Home for the elderly	3,94 3,68 6,04	$t_{1,3}$=-6,18 $t_{2,3}$=-7,20
Vegetables/ weekly	6,81	0,00	Village City Home for the elderly	4,96 4,87 6,22	$t_{1,3}$=-4,21 $t_{2,3}$=-4,30

There were no statistically significant differences in meat consumption by place of residence for the total respondents.

Place of residence is a factor of different importance for the elderly people in the two countries **(Table 4 and Table 5).**

For the elderly in Bulgaria, a statistically significant difference was observed only in milk consumption by place of residence **(Table 4).** Elderly Bulgarians living in villages significantly less frequently consume milk and dairy products (F=40.07; p<0.001). This is probably due to two reasons: more limited access in villages to large retail outlets offering a variety of dairy products and/or fewer animals raised for milk on household farms in rural Bulgaria.

Table 4. *Influence of place of residence on the parameters of healthy diet for elderly people in Bulgaria*

Dependent variable	F	p	Independent variable	Mean On the dependent variable
Frequency of consumption			Location	Frequency of consumption/week
Milk	40,07	0,00	Village City	4,38 5,69

Therefore, it would be very useful and necessary for health and social services in villages and towns, especially in Bulgaria, to assist the elderly in the formulation and organization of diets, as well as in the regular marketing and delivery of vegetables and especially fruits to them.

The dispersion analysis also showed that French elderly people living in senior houses were statistically significantly less likely to consume meat (F=4.82; p<0.05) and milk (F=3.06; p<0.05) compared with French seniors living in their homes **(Table 5).** This fact can be explained by the greater ability of the latter to shop by themselves and to select their food as they wish.

Table 5. *Influence of the place of residence on the healthy diet parameters for elderly people in France.*

Frequency of consumption weekly	F	p	Independent variable	Mean of a dependent variable	t-test p<0,05
			Location	Frequency of consumption	
Meat	4,82	0,003	Village City Senior house	5,69 5,20 4,15	$t_{1,3}$=-3,03
Milk	3,06	0,03	Village City Senior house	7,27 6,30 5,21	$t_{1,3}$=-2,94

Nationality also influences subjective assessments of several factors related to the healthy diet. The study shows that the French consume statistically significantly more unhealthy amounts of alcohol than the Bulgarians (F=4.82; p<0.05). This may be explained by the fact that elderly French residents are not prohibited from accessing minimal amounts of alcohol when it does not conflict with their health status. For Bulgarian elderly living in institutions access to alcohol is prohibited. According to the 2021 WHO report, Bulgarians rank in the top ten for alcohol consumption per capita, while the French rank 12th among the countries in Europe.

A much higher proportion of the French people claim to lose money (F=209.33; p<0.05) and are more critical of their financial status (F=39.84; p<0.05), compared to the Bulgarians **(Figure 2 and Table 6)**, although they were statistically significantly more likely to consume meat, milk, fruits and vegetables weekly **(Figure 1 and Table 2)** and less likely to be restricted in terms of these foods (F=51.24; p<0.05, **Table 6**), compared to the elderly in Bulgaria.

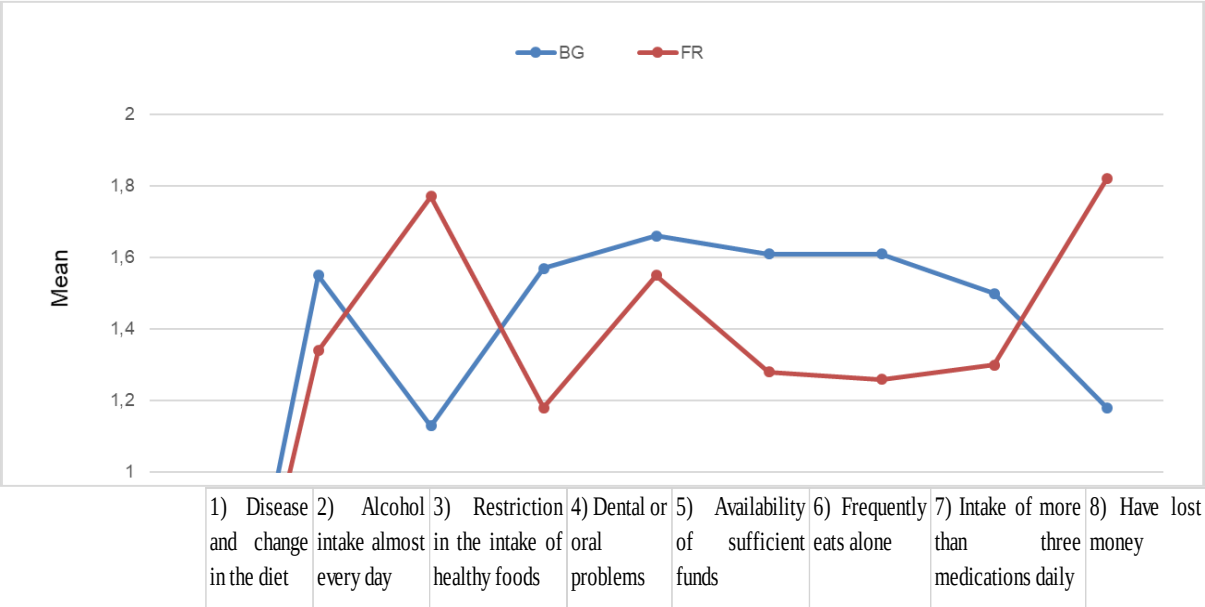

Figure 2. Comparison of the subjective assessments of the healthy diet indicators for Bulgarians and French

The comparison of subjective ratings of other health factors according to nationality shows that the elderly people in Bulgaria have a worse health status, as they more often claim **(Figure 2 and Table 6)**: 1) a disease or condition due to which there is a change in the amount and type of food usually taken (F=14.25; p<0.05); 2) dental or oral problems that make eating difficult (F=4.09; p<0.05); and 3) taking more than 3 medications daily (F=12.11; p<0.05).

Table 6. *Influence of nationality on subjective ratings of healthy eating factors*

Dependent variables	**F**	**p**	**Independent variable**	
			Nationality	
			Mean BG	**Mean F**
Place of residence	57,38	0,00	1,51	2,07
Illness or condition due to which there is a change in the amount and type of food normally taken	14,25	0,00	1,55	1,34
Alcohol consumption almost every day (more than 3 glasses of beer or other alcohol)	246,08	0,00	1,13	1,77
Restrictions in the intake of vegetables, fruits, dairy foods	51,24	0,00	1,57	1,18
Dental or oral problems that make eating difficult	4,09	0,04	1,66	1,55
Availability of enough money for the necessary food	39,84	0,00	1,61	1,28
Often eats alone	42,82	0,00	1,61	1,26
Taking more than 3 medications daily	12,11	0,00	1,50	1,30
Have lost money in the last 6 months	209,33	0,00	1,18	1,82

The dispersion analysis also shows that the elderly in Bulgaria are statistically significantly more often in a state of social isolation and eat alone ($F=42.82$; $p<0.05$, **Table 6**), which leads to a deterioration in the quality of life of the elderly.

The elderly people from France were statistically significantly more likely to report a need for domestic care and hot meals than the Bulgarians ($F=8.59$; $p<0.05$, **Table 7**). This statistically significant difference is probably due to the quality of the service, the types of social services for the elderly offered in the two countries, and also to national psychology.

Table 7. *Influence of nationality on home patronage needs for groups formed by nationality*

Dependent variable	F	P	Independent variable	
			Nationality	
			Mean bg	Mean fr
Need for home patronage	8,59	0,00	1,40	1,57

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1. The average age of French seniors is statistically significantly higher than that of Bulgarians, which is relevant to the average life expectancy.
2. French adults are statistically significantly more likely to state that they consume fruit, vegetables, meat (including fish), and milk and dairy products on a weekly basis than Bulgarians.
3. For the elderly in Bulgaria, a statistically significant difference was observed only in milk consumption according to their place of residence. Elderly Bulgarians living in rural areas are significantly less likely to consume milk and dairy products.
4. Elderly people in France who inhabit senior homes are less likely to consume meat and milk compared to the French seniors living in their own homes.
5. Nationality also influences subjective assessments of several factors related to the healthy diet. The study shows that the French consume statistically significantly more unhealthy amounts of alcohol than the Bulgarians.
6. A much larger proportion of French respondents claim to be losing money and are more critical of their financial status than Bulgarians.
7. The elderly people in Bulgaria are statistically significantly more likely to be socially isolated and to eat alone, and the elderly people in France are statistically significantly more likely to report a need for domestic care and warm meals than the Bulgarians.

CONCLUSION

The elderly people in France eat healthier but are relatively less satisfied with their financial status. Different lifestyles lead to differences in people's subjective assessments of the factors that form a healthy eating style. The elderly people in Bulgaria are more likely to restrict their consumption of healthy foods due to lack of money, are more likely to live in social isolation and eat alone, have poorer oral health status, are more likely to report illnesses that change the amount and type of food they usually eat, and also take more medication daily compared to the elderly people in France.

Empirical findings such as this one are a starting point for recommendations to health and social services in villages and cities, especially in Bulgaria, to support the elderly people in the design and organization of diets and in the regular provision of healthy foods to them.

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