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Regional Differences in Dietary Habits of Adult Croatian Population

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A B S T R A C T

The aim of this study was to investigate the dietary habits of the adult Croatian population according to geographical regions and gender. Date was obtained from the Croatian Adult Health Survey questionnaire, carried out in six regions of Republic of Croatia (Eastern, Northern, Central, City of Zagreb, Mountainous and Coastal), with a total of 9,070 responses. Results have shown that the highest prevalence of unhealthy dietary habits was recorded in Eastern and Central regions, while Coastal region and city of Zagreb had significantly lower prevalence of unhealthy dietary habits ($P<0.05$). Prevalence of unhealthy dietary habits was higher in men in all regions. Women had healthier dietary habits, what was strongly expressed in Coastal and Mountainous region. This study has shown that the unhealthy dietary habits were practiced by approximately one quarter of the adult population, regardless on the region in which they resided. Regional differences in dietary habits should be taken into account in any new public health studies and interventions.

Key words: *dietary habits, regional pattern, adult population, Croatian Adult Health Survey*

Introduction

Dietary habits as one of lifestyle factors play important role in the onset and progress of some chronic diseases[1]. Chronic diseases, such as cardiovascular diseases and cancer, have become major causes of death worldwide. Healthy and regular diet is a major factor in the promotion and maintenance of good health throughout entire life course[2].

Today's experience shows that education in health promotion mainly reaches the well-educated and already well-informed[3]. As the demand for directed efforts to promote health has increased due to inequality in health in the population, it is important to provide councel and guidance to people in their nutritional choices and the use of food. In order to achieve this, we must firstly understand why people choose certain food in a way they do and therefore basic research on dietary patterns is needed on both national and regional level.

Diets evolve over time, being influenced by many factors and complex interactions. Income, prices, individual preferences and beliefs, cultural traditions, as well as geographical, environmental, social and economic factors all interact in a complex manner to shape dietary consumption pattens. Data on the national availability of the main food commodities provide a valuable insight into diets and their evolution over time. Actual food availability may vary by region, socioeconomic level and season[4]. Increasing urbanization will also have an effect on the dietary patterns and lifestyles of individuals, not all of which are positive. Changes in diets, patterns of work and leisure are already contributing to the causal factors underlying no communicable diseases even in the poorest countries. Economic development is normally accompanied by improvements in a country's food supply and the gradual elimination of dietary deficiencies, thus improving the overall nutritional status of the country's population[4].

Geographical factors are usually considered as strong determinants of dietary patterns. The most obvious examples of that influences is the Mediterranean diet, adopted by the different populations around Mediterra-

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nean Sea[5–7]. Mediterranean diet is rich in fruit and vegetables, fish, olive oil and wine in moderate level. This dietary pattern is promoted for both its palatability and health benefits[8,9]. Its health-promoting benefits are demonstrated by the lower rates of circulatory disease[10] and diet-related cancers in Mediterranean countries, when compared to other European countries[11–13], and especially compared to Northern European region, where the traditional diet is characterized by high intakes of sausages and ham, butter, eggs, potatoes and beer. Also, regional differences in dietary habits have been shown in the French population survey[7]. People living in south part were accustomed to Mediterranean diet, whereas in the Northern region people were more inclined to the traditional type of diet. Some studies have suggested an attenuation of geographical differences in dietary behaviours[14], and the strong contribution of socio-economic factors[15] that may modify geographical differences. Geographical differences and time trends (1961–2001) in supply of the most important food components of traditional Mediterranean diet in Mediterranean area were also described by Garcia–Closas et al.[16]. The authors concluded that dietary supplies in the Mediterranean area were quite heterogeneous in the 1960s and have experienced a process of Westernization, especially in European Mediterranean countries.

Geographically, Croatia is divided in regions and there are remarkable diversities between these regions in several aspects: natural, historical, economical, and demographical and social[17,18]. These differences have impact on lifestyles and health of the population. In the continental parts of the country, such as Eastern and Northern regions, the common lifestyle mostly resembles that of Mid-European, while the coastal region and islands typically show lifestyle that is more similar to the Mediterranean regions.

Due to these complex differences, including varied cultural habits and norms, traditions, incomes and dietary habits and patterns, all of which are changing and evolving with the increasing economic development and globalization, we aimed to evaluate the dietary habits of adult population in Croatia according to geographical regions and gender.

Subjects and Methods

Data used in this study were collected in the Croatian Adult Health Survey (CAHS), between April and June 2003. CAHS encompassed the representative sample of the adult population of Croatia, selected on the basis of stratified random household selection, and random selection of one adult inhabitant within selected household. The questionnaire, participants and regional division are described in details elsewhere[17].

As part of the 2003 CAHS questionnaire, five questions concerning nutrition were used in this study (fha_02: Types of fat used in food preparation; fha_04: Fat in milk products; fha_12: Fruit eating habits; fha_19: Smoking meat eating habits and fha_21: Adding additional salt). Subjects are considered to have unhealthy diet if they have at least two of following conditions: a) use of butter, pork lard or any other kind of animal fat in food preparation; b) more then 3.2% fat in milk products c) eating smoked meat products every day; d) eating fruits from time to time or less; and e) adding additional salt without previous tasting. All analyses were made in SAS 8.02, with significance set at $P<0.05$.

Results

Results of the Croatian Adult Health Survey have shown that 15.9% of the adult population (20.2% men and 12.1% women) have reported having unhealthy dietary habits. Independently of gender, the highest prevalence of unhealthy dietary habits was recorded in the Eastern (23.8%) and Central regions (23.0%), while significantly lower prevalence of unhealthy diet have been observed in population Coastal region (8.6%) and City of Zagreb (8.9%) ($P<0.05$).

Higher prevalence of unhealthy dietary habits was observed among men, in all regions. The highest prevalence of unhealthy dietary habits was in recorded among men in Eastern and Central regions (29.08% and 28.37%,

Fig. 1. Prevalence of the unhealthy diet in men, based on the Croatian Adult Health Survey 2003 data; grey color denotes the gradient of unhealthy diet, from the least unhealthy (lightest grey) to the region with the highest prevalence of unhealthy diet (darkest grey).

TABLE 1
PREVALENCE OF UNHEALTHY DIETARY HABITS AMONG MEN ACCORDING TO REGIONS OF CROATIA

Region	Population sample	Prevalence (%)	CIL95	CIU95
Eastern	331547.85	29.08	24.67	33.50
Northern	133956.09	24.24	18.42	30.07
Central	323152.86	28.37	20.44	36.30
City of Zagreb	279533.15	11.36	7.81	14.91
Mountainous	103570.41	24.96	18.99	30.93
Coastal	468665.06	11.48	7.42	15.54

respectively), followed by the Northern and Mountainous regions (Table 1, Figure 1).

The lowest prevalence of unhealthy dietary pattern among women was recorded in the Coastal region (6.0%) and City of Zagreb (6.8%) (Table 2, Figure 2).

Fig. 2. Prevalence of the unhealthy diet in women, based on the Croatian Adult Health Survey 2003 data; grey color denotes the gradient of unhealthy diet, from the least unhealthy (lightest grey) to the region with the highest prevalence of unhealthy diet (darkest grey).

TABLE 2
PREVALENCE OF UNHEALTHY DIETARY HABITS AMONG WOMEN ACCORDING TO REGIONS OF CROATIA

Region	Population sample	Prevalence (%)	CIL95	CIU95
Eastern	367199.08	18.95	13.94	23.97
Northern	176366.95	16.53	12.89	20.17
Central	331938.40	17.76	12.88	22.64
City of Zagreb	337388.53	6.83	4.61	9.05
Mountainous	87568.91	10.98	3.72	18.24
Coastal	538701.10	6.03	3.94	8.13

Discussion

The present study shows differences in dietary habits in a large representative sample of Croatian population according to regional determinants and gender. Obtained data indicate significant differences in dietary habits of Croatian population at regional level. The higher prevalence of unhealthy dietary habits is observed in Eastern, Northern and Central regions with regardless gender. In contrast, population of Coastal region and the City of Zagreb had significantly healthier dietary habits ($P<0.05$). Our results are similar to previous study[19], where the estimated prevalence of main cardiovascular risk factors including unhealthy dietary habits was calculated for three Croatian areas: Continental (Eastern, Northern and central regions), Coastal and the City of Zagreb.

Likewise, the First Croatian Health survey, conducted 1995–1997, has shown the regional differences in dietary habits of Croatian population[20]. The differences were noted in more frequently consuming dried meat, red meat, lard and bacon, in Eastern region, than in Coastal region[20]. This dietary habit, often called Western diet or the meat-sweet diet, are chosen by many people in developed countries, and increasingly in developing countries[21]. Regional influence on dietary habits was also observed in other countries[5,7]. The observed characteristics are considered risk factors for development of cardiovascular diseases and other chronic non-communicable diseases[22].

According to gender, our results show lower prevalence of unhealthy dietary habits in City of Zagreb and Coastal region than in other regions, except for Mountainous region. Men had higher prevalence of unhealthy dietary habits than women in all regions. Our findings are in accordance with the results of Kaic-Rak et al.[23], where dietary patterns differed between genders, but also within the same sex at county level. Also, the French study indicated large regional and socio-economic differences in dietary pattern of investigated French men population[7]. Generally, women in our study had healthier dietary habits in all regions than men, especially in Coastal region and City of Zagreb. The highest prevalence of unhealthy dietary habits in both genders was recorded in Eastern, Central and Northern region.

Diet in Coastal part of Croatia traditionally has the characteristics of Mediterranean diet, mainly characterized by a large intake of fruits and vegetables, fish and olive oil. Likewise, other surveys in Croatian population[20,23,24], shown dietary habits Coastal population still retain elements of the traditional Mediterranean diet, but there are indications that dietary habits being changing, moving away from this pattern to continental type of diet. This changes dietary pattern is observed in isolated Adriatic island populations of Croatia, too[25]. Besides, dietary habits are changing in other Mediterranean countries also, towards an unhealthy type of diet [26–28]. Inhabitants in City of Zagreb, although live in continental part of Croatia have relatively healthy eating habits. This could be due to the better socio-economic status and education.

On the basis of the above-mentioned surveys we can conclude that the changes in the structure of diet and dietary habits occurred over time in continental and coastal area as well. To briefly describe dietary changes, it could be concluded that slow but present changes of Mediterranean diet are observed through resemblance of typical standard continental diet pattern which is connected to multi factorial etiology such as personal attitudes, changes in cultural habits and norms, economic power influence, wider market food choices versus and private individual food production[20,24].

Rapid changes in diet and lifestyles resulting from industrialization, urbanization, economic development and market globalization are having a significant impact on the nutritional status of populations. While results often include improved standards of living and greater access

to services, there have also been significant negative consequences in terms of inappropriate dietary patterns and decreased physical activities, and corresponding increase in nutritional and diet-related diseases[4].

According to the results of this study, the prevalence of unhealthy diet reached one quarter of the adult inhabitants of Croatia, regardless on the region in which they resided. This finding has important implications, especially in planning and delivery of various health promotions and dietary pattern awareness interventions. To achieve better nutritional status people have to make changes in the choice and use of food according to the nutrition recommendations. That requires knowledge about food itself and the effects it can have on individual's health. Therefore, it is important to point out a need for broader education of general public regarding the impact of diet on health, principles of healthy nutrition, and promotion of Mediterranean diet as a prototype of healthier nutrition.

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REGIONALNE RAZLIKE U PREHRAMBENIM NAVIKAMA U ODRASLOJ POPULACIJI HRVATSKE

SAŽETAK

Cilj ove studije bio je istražiti prehrambene navike odraslog stanovništva Hrvatske prema geografskim regijama i spolu. Podaci su prikupljeni ispitivanjem odraslog stanovništva u sklopu Hrvatske zdravstvene ankete i to u šest regija Republike Hrvatske (istočna, sjeverna, središnja, grad Zagreb, gorska i priobalna). Rezultati pokazuju najvišu prevalenciju loših prehrambenih navika među stanovništvom istočne i središnje Hrvatske, dok je značajno manja prevalencija nezdravih prehrambwnih navika zabilježena među ispitanicima iz priobalne regije i grada Zagreba. Viša prevalencija nezdravih prehrambenih navika uočena je među muškim ispitanicima svih regija. Općenito govoreći, žene imaju zdravije prehrambene navike u svim regijama u usporedbi s muškarcima, a posebice to vrijedi za žene priobalne i gorske regije. Ovo istraživanje pokazalo je da gotovo četvrtina odraslog stanovništva Hrvatske prakticira nezdrave prehrambene navike, bez obzira na regiju koju nastanjuju. Važno je, stoga, razmotriti novi javnozdravstveni pristup temeljen na edukaciji koja će uključiti i regionalne različitosti.