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Some Risk Factors for the Development of Type 2 Diabetes in Men and Women of Belgrade Population

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SUMMARY

Introduction In the last two decades there has been an increase in the prevalence of type 2 diabetes in both developed and in developing countries.

Objective To determine whether personal habits like smoking, alcohol and coffee consumption or physical inactivity are different between genders in patients with type 2 diabetes.

Methods The study was conducted in Belgrade, during the period 2007-2008, and included newly diagnosed patients with type 2 diabetes. We included 80 men and 99 women diagnosed with diabetes mellitus type 2, referred to the Primary Health Care Centre "Savski venac". A questionnaire was used to collect data on demographic and anthropometric characteristics, as well as data on healthy habits. The χ^2 test and two-tailed t-test were used for data analysis.

Results The men were significantly more engaged in industry and crafts, while the women worked significantly more frequently in administrative jobs. The men were married significantly more frequently than the women ($p<0.05$) and had a higher level of education ($p<0.05$). Regarding to the level of implementation of nutritional and physical activity, there were no significant differences between the genders ($p>0.05$). The women consumed coffee significantly more frequently than the men ($p<0.05$), but drank less alcohol ($p<0.05$). The men were former smokers significantly more frequently ($p<0.05$) than the women.

Conclusion These results indicate the role of certain personal habits in the development of type 2 diabetes.

Keywords: type 2 diabetes; gender; habits

INTRODUCTION

The prevalence of type 2 diabetes is increasing, not only in the developed countries, but also in the developing countries [1, 2, 3]. In 2000, in Serbia, without Kosovo, the prevalence was 4.5% in males and 4.8% in females [4].

Diabetes mellitus belongs to a group of metabolic diseases characterized by hyperglycaemia resulting from inappropriate insulin secretion, action, or both. According to the aetiology, diabetes mellitus can be divided into type 1 diabetes (insulin dependent diabetes mellitus-IDDM), type 2 diabetes (non-insulin dependent diabetes mellitus – NIDDM), as well as some other specific types of diabetes, such as gestational diabetes [5].

According to the data from the literature, genetic and environmental factors may have an important role in the development of type 2 diabetes [6, 7]. In several studies [8, 9], but not in all [10, 11, 12], alcohol is emphasized as a risk factor for the development of diabetes type 2. Many authors agree that the risk of type 2 diabetes increases with more frequent consumption of coffee, as well as consuming a higher number of cigarettes per day [8, 9].

OBJECTIVE

The aim of this research was to examine whether there are differences in habits (smoking, consumption of coffee and alcohol), obesity and physical activity between men and women suffering from type 2 diabetes.

METHODS

This study was conducted on the territory of Belgrade during the period 2007-2008. The examined group was constituted of 179 patients with newly diagnosed type 2 diabetes in the Primary Health Care Centre "Savski venac" in Belgrade. Type 2 diabetes was diagnosed by a physician who is a specialist of internal medicine, according to the National Guide Criteria for type 2 diabetes [5].

The targeted epidemiological questionnaire yielded numerous data presenting information on the demographic characteristics of respondents (age, sex, occupation, marital status, education, occupation, socioeconomic status), their anthropometric features and health habits (smoking, consumption of coffee, tea and alcohol, physical activity).

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The study was approved by the Ethics Committee of the School of Medicine in Belgrade.

In data analysis, χ^2-test and two-tailed t-test were used.

RESULTS

Table 1 presents the distribution of sociodemographic characteristics. The men were married more frequently than the women (χ^2=13.6; DF=3; p<0.05), and had a higher level of education (χ^2=13.4; DF=2; p<0.05). Among the men, there were significantly more individuals who worked as industrial and craft workers, as well as experts and artists, while the women were significantly more frequently engaged in administrative jobs and service activities (χ^2=27.5; DF=4; p<0.001). Statistically significant differences in socioeconomic status between the patients of both genders was not found (χ^2=0.8; DF=2; p>0.05).

Table 2 shows the distribution of men and women according to the anthropometric characteristics and physical activity. There was no significant difference between the level of nourishment, body mass index (BMI), and physical activity.

Table 3 presents the distribution of smoking status. The examined groups showed no significant difference in relation to current smoking status (χ^2=1.7; p>0.05), the number of smoked cigarettes per day (χ^2=0.8; p>0.05), and in duration of smoking (χ^2=0.1; p>0.05). The men were former smokers more frequently than the women (χ^2=14.0; p<0.05), but the difference between the examined groups according to the number of cigarettes per day (χ^2=1.0; p>0.05) and their period of smoking (χ^2=0.1; p>0.05) was not found.

Table 4 shows the characteristics of the examined groups according to the level of alcohol and coffee consumption. The men consumed alcohol more frequently than the women (χ^2=40.9; p<0.001). Significant difference between the examined groups in relation to the frequency (χ^2=3.6;

Table 1. Distribution of men and women with type 2 diabetes according to the sociodemographic characteristics

Characteristic		Men (n=80)	Women (n=99)	p*
Age (years)	<45	6 (7.5%)	5 (5.1%)	0.586
	45-54	33 (41.3%)	36 (36.4%)	
	55-64	21 (26.3%)	35 (35.4%)	
	>65	20 (25.0%)	23 (23.1%)	
Marrital status	Single	2 (2.5%)	8 (8.1%)	0.004
	Married	67 (83.8%)	58 (58.6%)	
	Divorced	5 (6.3%)	12 (12.1%)	
	Widower	6 (7.4%)	21 (21.2%)	
Education	Primary and uncompleted primary school	7 (8.8%)	24 (24.2%)	0.001
	Secondary school, qualified worker, expert	44 (55.0%)	59 (59.6%)	
	College and faculty	29 (36.3%)	16 (16.2%)	
Occupation	Industrial and handicraft worker	22 (27.5%)	12 (12.1%)	<0.001
	Worker in the service industry	17 (21.2%)	31 (31.3%)	
	Administration	7 (8.8%)	32 (32.3%)	
	Expert, artist	21 (26.3%)	8 (8.1%)	
	Other	13 (16.2%)	16 (16.2%)	
Socio-economic conditions	Poor	11 (13.8%)	17 (17.2%)	0.659
	Medium	58 (72.4%)	72 (72.7%)	
	Good	11 (13.8%)	10 (10.1%)	

* value for χ^2-test

Table 2. Anthropometric characteristics of men and women with type 2 diabetes and physical activity

Characteristic		Men	Women	p
Body weight (kg)		89.79±14.73	78.86±15.17	0.656**
Body height (cm)		176.04±6.39	163.13±7.28	0.161**
Body Mass Index (n)	<25.0 kg/m^2	11 (13.7%)	20 (20.2%)	0.257*
	≥25.0 kg/m^2	69 (86.3%)	79 (79.8%)	
Physical activity in leisure time (n)		24 (30.0%)	24 (24.2%)	0.387*
Earlier physical activities (n)		12 (15.0%)	12 (12.1%)	0.574*

* value for χ^2-test; ** value for t-test; n – number of patients

Table 4. Distribution of men and women with type 2 diabetes according to consumption of alcohol and coffee

Characteristic		Men	Women	p*
Alcohol consumption	Yes	35 (43.8%)	4 (4.0%)	<0.001
	No	45 (56.2%)	95 (96.0%)	
Number of socket alcohol drinks (per week)	≤2	5 (14.3%)	2 (50.0%)	0.162
	3-7	21 (60.0%)	1 (25.0%)	
	>7	9 (25.7%)	1 (25.0%)	
Duration of alcohol consumption (years)	≤10	3 (6.0%)	1 (25.0%)	0.316
	11-20	5 (14.7%)	1 (25.0%)	
	>20	27 (79.3%)	2 (50,0%)	
Coffee consumption	Yes	67 (83.8%)	96 (97.0%)	0.002
	No	13 (16.2%)	3 (3.0%)	
Number of cups of coffee (per day)	≤2	36 (53.7%)	38 (40.0%)	0.186
	3-7	29 (43.3%)	56 (58.0%)	
	>7	2 (3.0%)	2 (2.0%)	
Duration of coffee consumption (years)	≤20	7 (10.4%)	5 (5.3%)	0.408
	21-40	43 (64.2%)	62 (65.0%)	
	>40	17 (25.4%)	29 (29.7%)	

* value for χ^2-test

Table 3. Distribution of men and women with type 2 diabetes according to smoking status

Characteristic		Current smokers			Former smokers		
		Men	Women	p*	Men	Women	p*
Smoker	Yes	21 (26.3%)	35 (35.4%)	0.192	25 (42.4%)	8 (12.5%)	<0.001
	No	59 (73.8%)	64 (64.6%)		34 (57.6%)	56 (87.5%)	
Number of smoked cigarettes per day	≤20	13 (61.9%)	27 (77.1%)	0.361	13 (52.0%)	6 (75.0%)	0.605
	>20	8 (38.1%)	8 (22.9%)		12 (48.0%)	2 (25.0%)	
Duration of smoking (years)	≤10	2 (9.5%)	3 (8.6%)	0.900	4 (16.0%)	2 (25.0%)	0.736
	>10	19 (90.5%)	32 (91.4%)		21 (84.0%)	6 (75.0%)	

* value for χ^2-test

DF=2; p>0.05) and years of alcohol consumption (χ^2=2.3; DF=2; p>0.05) was not found. The men drank coffee significantly less frequently in comparison to the women (χ^2=9.5; p<0.05). Significant differences between the examined groups were not found in relation to the frequency (χ^2=3.4, DF=2, p>0.05) and length of coffee consumption (χ^2=1, 8, DF=2; p>0.05).

DISCUSSION

In our country there have not been a great number of studies examining the influence of personal habits on the development of type 2 diabetes. In the studies published so far, it has been noted that the change of jobs, as well as hard work and long working hours represent statistically very important risk factors concerning the development of type 2 diabetes in middle aged people [13, 14]. Some studies suggest that better socioeconomic conditions reduce the frequency of type 2 diabetes due to the fact that such persons more easily accept and implement recommendations on the prevention of this disease [15]. Socioeconomic status is an important indicator for the risk of cardiovascular disease and for the development of type 2 diabetes [16].

According to the results of our study on the demographic characteristics of male subjects, the men had a significantly higher level of education and were married more frequently than the women. In addition, the men were significantly more often employed as industrial and craft workers, experts and artists. Numerous studies have shown a positive relationship between BMI and type 2 diabetes in both sexes, yet in the FINMARK study increased BMI effect was more prominent in men as a risk factor for type 2 diabetes [17, 18, 19]. In a multicentric study that included 294 patients of both sexes, the authors concluded that obese people had 2.2 times higher risk for developing type 2 diabetes than those who were non-obese [20]. In our study, there was no significant difference in obesity between men and women.

It is known that physical inactivity is a risk factor for the development of type 2 diabetes [17, 21]. In the MONICA study the physical activity during the leisure time was associated with 80% increased risk for type 2 diabetes only in women [17], while in the study that included respondents aged 30-55 years the authors concluded that moderate physical activity could play a protective role in the development of type 2 diabetes in both sexes [21]. In a 12-year study, tracking 34.257 women, the authors concluded that the risk of development of diabetes type 2 and cardiovascular disease was lower in women who were engaged in physical activity [22]. In our study, practicing any kind of physical activity was not associated with a significant difference between the examined groups.

Smoking is one of harmful health habits, i.e. the factor that can be modified. The relation between smoking and the incidence of diabetes has been shown in the study by Zutphen [23], as well as in the study which included 41,810 men who were followed for 6 years, and discovered 509 new cases of diabetes type 2, so the conclusion was that smoking was an independent risk factor for diabetes type 2 [9]. Moreover, in the study of 2,333 women who were diagnosed with type 2 diabetes, the authors concluded that smoking was an independent risk factor for type 2 diabetes [24].

Furthermore, in the study, which comprised 5,312 subjects, the authors concluded that men respondents smoke significantly more often, and that the effects of smoking as risk factors for type 2 diabetes so often mentioned in the study were expressed in males [17]. It is interesting that in this study 60% of respondents expressed the will to stop smoking. In our study, there was no difference between genders in relation to smoking, and in a study by Finmark, which involved 11654 respondents of both sexes, smoking was not even identified as a risk factor for diabetes type 2 [19]. In the IRAC study [25], the authors suggested that in addition to smokers, former smokers had also a significantly higher risk of developing diabetes type 2.

Data on the correlation between alcohol consumption and diabetes type 2 diabetes are contradictory. A number of researchers have emphasized that there is no correlation between alcohol consumption and type 2 diabetes [26], while others emphasize that a moderate consumption of alcohol can even have a protective effect [27-30]. In lean persons, moderate alcohol consumption is found to increases the risk for type 2 diabetes [31]. In the ARIC study performed on 12,261 subjects, the authors found that consuming alcohol increased the risk for type 2 diabetes more frequently in men than in women, which was associated with the fact that men drank more frequently than women [32]. Similar results were obtained in our study, which was expected, bearing in mind the cultural differences in the examined population.

In the meta analysis that included 15 studies with 11,959 patients diagnosed with type 2 diabetes and 369,862 subjects who did not have the disease and the average observation period of 12 years, the authors concluded that in subjects who consumed alcohol at a moderate level the risk of diabetes type 2 was about 30% lower, and that in subjects who consumed more than 48 g/day the risk was increased manifold in both sexes [29]. The researchers frequently have a problem with the validity of data on the consumption of alcohol, comparing them by sex, because in most studies, there is a small number of women who are heavy drinkers in contrast to men, and that is one of the reasons why such data must be accepted with caution, and, as done by a large number of studies published up to now, should be certainly classified as research limitations.

Coffee is the drink that is very often consumed in all parts of the world. The effect of coffee on health, disease and the type 2 diabetes began to attract serious scientific attention only 1-2 decades ago [33]. The relationship between coffee consumption and type 2 diabetes mellitus is not completely clear, but some authors found that subjects who regularly consumed coffee had less risk of developing diabetes mellitus type 2 [33]. It is known that coffee stimulates insulin secretion; furthermore, coffee can affect through its ingredients the processes that have a significant role in the development of diabetes type 2.

In a study performed in Finland, the authors emphasize that Finland is a country with the highest coffee consumption per capita and that the link between coffee consump-

tion and type 2 diabetes is inverse, but that the mechanism is still unclear [34]. However, the authors in the United States and Japan believe that a long-term coffee consumption is associated with a reduced risk for type 2 diabetes [35, 36]. According to the results of our study women consumed significantly more coffee than men, which could be explained by cultural differences.

CONCLUSION

Detailed investigations of potential risk factors for the development of type 2 diabetes reported by other studies with a higher number of respondents, certainly could suggest potential risk factors for the development of diabetes type 2. This is important regarding the goal to change life habits that lead to the development of this disease, i.e. the need to implement adequate primary and secondary preventive measures against diabetes type 2.

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Неки фактори ризика за настанак дијабетес мелитуса тип 2 код мушкараца и жена у Београду

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КРАТАК САДРЖАЈ

Увод У свету је у последње две деценије дошло до повећања преваленције дијабетес мелитуса тип 2 (ДМ тип 2) како у развијеним, тако и у земљама у развоју.

Циљ рада Циљ рада је био да се испитају разлике у навикама (пушењу дувана, конзумирању кафе и алкохола), гојазности и физичкој активности између мушкараца и жена оболелих од ДМ тип 2.

Методе рада Истраживање је изведено на територији Београда током 2007. и 2008. године. Оно је обухватило 80 мушкараца и 99 жена оболелих од ДМ тип 2 код којих је ово обољење први пут дијагностиковано (у Дому здравља „Савски венац"). Подаци о демографским и антропометријским одликама испитаника, као и о њиховим навикама, прикупљени су епидемиолошким упитником. У статистичкој обради података коришћени су χ^2-тест и Студентов *t*-тест.

Резултати Мушкарци су значајно чешће били индустријски и занатски радници, као и стручњаци и уметници, док су жене чешће обављале административне и услужне послове. Мушкарци су такође значајно чешће били у браку ($p<0,05$) и имали виши степен образовања ($p<0,05$). Значајне разлике по полу када су у питању степен ухрањености и физичка активност није било ($p>0,05$). Жене су, за разлику од мушкараца, значајно чешће конзумирале кафу ($p<0,05$), а ређе алкохол ($p<0,05$). Мушкарци су значајно чешће пушили цигарете ($p<0,05$).

Закључак Добијени резултати указују на значај здравствених навика у настанку ДМ тип 2.

Кључне речи: дијабетес мелитус тип 2; пол; навике

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