PREVALENCE OF ABDOMINAL OBESITY IN SLOVENE PRIMARY HEALTH CARE ATTENDEES – THE IDEA STUDY

PREVALENCA ABDOMINALNE DEBELOSTI PRI PACIENTIH NA PRIMARNEM NIVOJU ZDRAVSTVENE OSKRBE V SLOVENIJI – RAZISKAVA IDEA

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Abstract

Background: *Obesity is well recognized as a major risk factor for coronary heart disease, vascular mortality, diabetes and metabolic syndrome. However, evidence is accumulating that abdominal obesity is a stronger predictor for these disorders than generalized obesity, defined by elevated body mass index. Reliable estimates of the worldwide prevalence of abdominal obesity are needed to quantify the associated health risk.*
Methods: *The International Day for the Evaluation of Abdominal Obesity (IDEA) study is a large, international, epidemiological cross-sectional study designed to provide reliable data on the distribution of waist circumference according to region, gender, age and socio-economic background. Any non-pregnant patient aged 18-80 years who consulted one of the randomly selected primary care physicians on two pre-defined half days was eligible to participate in the study.*
Results: *In Slovenia, 1536 patients were enrolled in the study. The prevalence of abdominal obesity in Slovene primary health care (PHC) attendees was 33.5% for men and 50.0% for women. The prevalence of abdominal obesity is increasing with age and declining with higher level of education. Abdominal obesity is highly prevalent among unemployed women and former smokers. The prevalence of abdominal obesity is higher among patients with cardiovascular risk factors, including hypertension and type 2 diabetes, and among post-menopausal women, especially among those receiving no hormone replacement therapy.*
Conclusion: *Waist circumference is easy to measure and may serve as a single measure to assess the need for weight loss.*

Key words: abdominal obesity, prevalence, primary health care

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Izvleček

Namen dela: *Debelost velja za enega glavnih dejavnikov tveganja za koronarno srčno bolezen, sladkorno bolezen, žilne bolezni in metabolni sindrom. Vedno več je dokazov, da je abdominalna debelost močnejši napovedni dejavnik kot splošna debelost, ki se opredeljuje s povišanim indeksom telesne mase. Za kvantifikacijo zdravstvenega tveganja, povezanega z abdominalno debelostjo, so potrebne zanesljive globalne ocene prevalence abdominalne debelosti.*
Metode: *Raziskava IDEA oziroma mednarodni dan za oceno abdominalne debelosti je velikanska mednarodna epidemiološka presečna raziskava, ki je prinesla zanesljive podatke o porazdeljenosti obsega pasu glede na regijo, spol, starost in socialno ekonomske sloje po vsem svetu. Vsi bolniki, ki so bili stari med 18 in 80 leti, ženske pa niso bile noseče, ter so se oglasili pri naključno izbranem zdravniku na primarni ravni zdravstvene oskrbe v vnaprej določenih dveh polovicah dveh dnevov, so se lahko priključili raziskavi.*

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Rezultati: *V Sloveniji je v raziskavi sodelovalo 1536 ljudi. Prevalenca abdominalne debelosti med slovenskimi bolniki na primarni ravni zdravstvene oskrbe je bila 33,5 % pri moških in 50 % pri ženskah. Prevalenca abdominalne debelosti narašča s starostjo bolnikov in se zmanjšuje z višanjem njihove dosežene izobrazbe. Abdominalna debelost ima visoko prevalenco med nezaposlenimi ženskami in bivšimi kadilci. Abdominalna debelost je pogostejša med bolniki s srčno-žilnimi boleznimi, sladkorno boleznijo in z visokim tlakom. Prevalenca abdominalne debelosti je višja med ženskami po menopavzi, še posebej med tistimi, ki ne prejemajo nadomestnega hormonskega zdravljenja.*

Zaključek: *Merjenje obsega pasu je enostavna metoda, ki bi lahko pomagala pri oceni nujnosti zmanjšanja telesne teže.*

Ključne besede: abdominalna debelost, prevalenca, primarna raven zdravstvene oskrbe

Introduction

Sedentary lifestyles and energy-rich diets are driving an increasing prevalence of abdominal obesity, which is associated with an increased risk for cardiovascular disease (CVD). The beneficial impact on cardiovascular morbidity and mortality of favourable trends in population control of classic risk factors, such as smoking, hypercholesterolemia, and hypertension, may be reversed by the current epidemic of obesity (1). There is increasing evidence suggesting that abdominal obesity characterized by intra-abdominal adiposity and high waist circumference is even a stronger predictor of major coronary events, vascular mortality, diabetes, and metabolic syndrome than generalized obesity (defined by elevated body mass index - BMI) (2-4). Waist-hip ratio and waist circumference are independent risk factors for coronary heart disease also in women (5).

Abdominal obesity has become an increasingly topical health issue worldwide. Reliable estimates of abdominal obesity prevalence, especially in primary health care (PHC) settings, are available only for few countries.

Abdominal obesity is highly prevalent in western populations and is still increasing. Trends towards urbanization of the developing world are driving increased obesity rates also in these countries. The prevalence of abdominal obesity (waist circumference in men > 102 cm and waist circumference in women > 88 cm) in the U.S.A. and several European countries is presented in Table 1.

Even higher rates of abdominal obesity were found in PHC populations. In the DETECT study including 55 518 German PHC attendees, the prevalence rate of abdominal obesity was 43% for men and 53% for women (waist circumference: men > 102 cm; women> 88 cm) (11).

Table 1. *Percent prevalence of abdominal adiposity (waist circumference : men > 102 cm; women > 88 cm) in different countries (6-10).*

Country / region	Percent prevalence of abdominal adiposity	
	Men (> 102 cm)	Women (> 88 cm)
USA (1999-2000)	36	52
USA (1988-1994)	30	46
Greenland	16	58
Denmark	8	18
Belgium	21	24
France	8	13
Spain	23	65
Turkey	18	39

A large-scale epidemiological cross-sectional study on risk factors for noncommunicable diseases was designed and conducted in Slovenia in 2001(12). Self-report questionnaires were sent to more than 9000 study participants. From the self-report data on height and weight provided by the respondents, BMI-defined obesity prevalence rates were calculated: 39.6% of the participants had a BMI of 25.0 – 29.9 (women 30.9%; men 50%),15.0% had BMI ≥ 30.0 (women 13.8%; men 16.5%). Data on waist circumference were not collected.

The International Day for Evaluation of Abdominal Obesity (IDEA) study was carried out to provide global and region-specific estimates of the prevalence of abdominal obesity in PHC populations. The IDEA study used consistently the applied methods and criteria in order to get reliable data. Slovenia was one of the 63 countries participating in the IDEA study.

The primary objective of the study was to determine the prevalence of abdominal obesity in an unselected population of consecutive patients who consulted a randomly selected sample of primary care physicians on two pre-specified half-days. The secondary objectives were to estimate the prevalence of cardiovascular risk factors and to determine the association between these risk factors and abdominal obesity.

Methods

The design of the IDEA study is more thoroughly presented elsewhere (2).The steering committee of international experts in cardiovascular and metabolic care overseeing the study had the following responsibilities: designing the data collection form, designing appropriate methodology to ensure a representative sample of primary care physicians and their patients, formulating operational guidelines for communication with physicians and patients, and assessing data quality. National coordinators who administered the study in individual countries were responsible for interaction with individual physicians. In order to ensure recruitment of a representative patient sample, a random sample of primary care physicians from all geographic areas in each participating country was recruited. In most countries, an exhaustive list of all actively practicing primary care physicians was compiled. In most countries, including Slovenia, randomization of physicians was conducted by experienced specialist commercial research organization. A sample size of > 1100 patients per country enabled the frequency of abdominal obesity to be estimated to within 3% with 95% confidence.

All patients aged 18 to 80 years who consulted their primary care physician on the pre-specified two half-days of 25 and 26 May 2005 were asked to give informed consent to participate in the study, irrespective of the reason for consultation. Women with known pregnancy were excluded.Waist circumference and body height and weight were determined and demographic data, including gender, year of birth, educational level and profession were recorded. Smoking status, the presence/absence of known CVD (coronary heart disease, stroke or revascularization) and known diabetes mellitus (type 1 or type 2) were also recorded. Women were asked if they were post-menopausal and if so whether they were on hormone replacement therapy. A standardized data collection form was used.

All statistical analyses used SAS statistical software (version 8.2)

Results

Of the total number of 6 407 participating physicians and 177 345 PHC attendees, in Slovenia 50 physicians of the 165 contacted and 1536 attendees accepted to participate. Only 19 patients declined to take part in the study. In total, data for 509 patients were analysed. Subjects with missing key data (i.e. age, gender, height, weight and waist ircumference) were excluded from further analysis. We analyzed data for 665 men and 844 women, of whom 267 rural practice and 1242 urban practice attendees. Their mean age was 49.7 years.

The mean BMI was 27.7 kg/m^2 [i] for men and 27.6 kg/m^2 for women.

Overall, 35.6% of patients had a BMI of 25.0 - 29.9 and 29.6% of >30.0.

The mean waist circumference was 97.4 cm for men and 89.5 cm for women . The prevalence of abdominal obesity for men and women was 33.5% and 50.0% respectively (NCEP/ATP III* criteria for abdominal obesity) (13).

The prevalence of abdominal obesity by age groups is shown in Table 2. The prevalence of abdominal obesity is increasing with age, with the exception of somewhat lower figures for men older than 70 years.

Table 3 indicates abdominal obesity prevalence rates by educational level. In general the prevalence of abdominal obesity is decreasing with higher educational level, especially for a combination if

university and post-graduate levels. Note that the number of patients with post-graduate education level is relatively small.

Differences between prevalence rates of abdominal obesity according to profession are presented in Table 4. Abdominal obesity is mostly prevalent among retired patients. Note the small number of patients incapacitated for work.

* National Cholesterol Education Program/Adult Treatment Panel III

Table 2. *Percent prevalence of abdominal obesity by age groups (%) (waist circumference: men > 102 cm; women > 88 cm).*

Age groups	<30 (n=166)	30-40 (n=238)	40-50 (n=335)	50-60 (n=360)	60-70 (n=236)	>70 (n=174)	Overall (n=1 509)	p (Chi-square)
Male	11.2	22.5	31.3	44.0	44.9	43.1	33.5	<0.0001
Female	20.8	31.5	37.8	58.3	69.6	75.2	50.0	<0.0001
Overall	15.7	27.3	35.2	51.7	59.3	63.2	42.7	

Table 3. *Percent prevalence of abdominal obesity by educational level (%) (waist circumference: men > 102 cm; women > 88 cm).*

Level of education	Less than high school (n=703)	High school (n=616)	College, university (n=172)	Post-graduate (n=12)	Overall (n=1 503)	p
Male	39.7	31.4	19.4	0 (0 out of 4)	33.6	Fisher exact test p=0.0019
Female	64,5	40.5	23.0	37.5 (3 out of 8)	50.0	Fisher exact test p<0.0001
Overall	54.1	36.2	21.5	25	42.8	Chi-square p<0.0001

Table 4. *Percent prevalence of abdominal obesity by profession (%) (waist circumference: men >102 cm; women > 88 cm).*

Profession	Employed (n=800)	Unemployed (n=182)	Retired (n=486)	Incapacitated for work (n=19)	Overall (n=1 487)	p
Male	27.2	29.2	47.3	37.5	33.2	Fisher exact test p<0.0001
Female	36.0	51.3	67.7	54.5	49.8	Chi-square p<0.0001
Overall	31.6	43.4	59.9	47.4	42.5	Chi-square p<0.0001

Very interesting are the differences between groups of smokers, non-smokers and former smokers, who quitted smoking more than 12 months before. The highest prevalence of abdominal obesity was found among former smokers and the lowest among current smokers. Those differences are significant for the male group but not for the female group. Interestingly, there is hardly any difference in the prevalence of abdominal obesity between current male smokers and never-smokers. The prevalence rates are presented in Table 5.

Table 6 shows abdominal obesity prevalence rates by menopausal status. Higher prevalence of abdominal obesity was established in post-menopausal women (n=392; 64.3%), particularly in those receiving no hormone replacement therapy.

Table 7 indicates abdominal obesity prevalence rates according to the area of physician's practice (rural/urban). There were no significant differences in prevalence rates by the area of practice.

Table 8 shows abdominal obesity prevalence rates by the presence of different diseases and disorders, including CVD, hypertension and diabetes. In all four groups, the prevalence of abdominal obesity was significantly higher in patients with a disease or disorder, and lower in subjects without them.

Table 5. *Percent prevalence of abdominal obesity by smoking status (%) (waist circumference: men > 102 cm ; women > 88 cm). Former smoker is a person not smoking for at least 12 months. Absolute frequencies are in parentheses.*

Smoking status	Never (n=806)	Former (n=344)	Current (n=348)	Overall (n=1 498)	p Chi-square test
Male	28.7 (75)	44.3 (94)	28.5 (53)	33.7 (222)	<0.001
Female	49.5 (270)	56.8 (75)	45.1 (73)	49.8 (418)	p=0.13
Overall	42.8 (345)	49.1 (169)	36.2 (126)	42.7 (640)	<0.01

Table 6. *Percent prevalence of female abdominal obesity by menopausal status (%) (waist circumference: > 88 cm).*

Menopausal status	Non postmenopausal (n=385)	Postmenopausal		Overall (n=777)	p Chi-square test
		No hormone replacement therapy (n=353)	Hormone replacement therapy (n=39)		
Female	32.5	66	48.7	48.5	<0.0001

Table 7. *Percent prevalence of abdominal obesity according to the area of physician's practice (rural /urban) (waist circumference:men > 102 cm ; women > 88 cm).*

Area of physician's practice	Rural (n=267)	Urban (n=1242)	Overall (n=1 509)	p Chi-square test
Male	37.0	32.8	33.5	p=0.38
Female	53.4	49.3	50.0	p=0.37
Overall	46.1	42.0	42.7	p=0.23

Table 8. *Percent prevalence of abdominal obesity by the presence of CVD, hypertension and diabetes (waist circumference: men > 102 cm; women > 88 cm).*

Chronic diseases	Men		Women		Overall	
	With disease	Without disease	With disease	Without disease	With disease	Without disease
CVD (n=1 506)	50.6	31.1	79.8	46.7	65.6	39.9
Hypertension (n=1 506)	51.7	21.3	70.7	36.8	62.2	30.0
Diabetes (n=1 506)	53.6	30.0	73.7	47.7	62.4	40.1

Discussion

The prevalence of abdominal obesity in the sample of Slovene PHC attendees was 33.5% for men and 50.0% for women. The figures are slightly lower than those for the US general population. Similarly, the prevalence of abdominal obesity in German female PHC attendees is very close to the Slovene figures, whilst the male prevalence is by10% higher.

Not surprisingly, the prevalence of abdominal obesity is increasing with age and declining with higher educational level. The highest obesity prevalence rates found in retired patients are not very informative given the older age of the retirees compared to working patients. More striking is the difference between employed and unemployed patients, especially women. But even here we can speculate that unemployed women are likely to be older than employed ones. Yet, the effects of unemployment are clearly more prominent for women than for men.

Gender differences are also reflected in the prevalence rates of abdominal obesity according to the smoking status. In men, no substantial differences were found in the abdominal obesity prevalence between current smokers and never-smokers. The prevalence of abdominal obesity, however, is very high among former smokers. Mean weight gain at one year after cessation of smoking is approx.4 kg for male and 3.5 kg for female former smokers (14).

There were no significant differences in the prevalence of obesity between patients coming from rural areas compared to those from urban areas. This observation is a little surprising considering that women from rural areas had significantly higher weight and BMI than women living in urban areas. No significant differences in waist circumference were found between the two female populations. It should be pointed out, however, that the number of rural residents included in the study was low. Recruiting more patients from rural areas would probably clarify the differences.

Abdominal obesity is more prevalent among patients with cardiovascular risk factors (hypertension, diabetes) and patients with a history of cardiovascular event.

In a large epidemological cross-sectional study on risk factors for noncommunicable diseases conducted in Slovenia in 2001, the estimated prevalence rates of hypertension, type 2 diabetes and CVD were 18.8%, 4.3% and 6.4% respectively. (12) In the IDEA study, the prevalence rates of hypertension, type 2 diabetes and CVD in Slovenia were 39.4%, 11.5% and 10.8% respectively.

In the IDEA study, the prevalence of abdominal obesity in the Slovene population is very close to the rate for Eastern Europe (men: 33.3%; women: 51.9%) It differs from the figures for North-Western Europe (men:33.3% ; women:45.4%) and even more from prevalence rates in Southern Europe (men;38.0%;women:55.2%) (14,15). The IDEA study showed that the Eastern Europe prevalence rates of type 2 diabetes and CVD were 12.4% for men and 10.7% for women, and 31.1% for men and 27.4% for women, respectively (14,15).

The IDEA results show that the prevalence rates of abdominal obesity and type 2 diabetes in Slovenia are closest to those for Eastern Europe. Yet, there are striking differences between the two as concerns the prevalence of CVD. In Slovenia it is much lower than in Eastern Europe, and even lower than in

North-Western and Southern Europe. We can only speculate on the causes of low CVD prevalence in Slovenia showed by the IDEA study.

It is difficult to compare the IDEA study results of BMI distribution and the Slovene data for 2001 because of essential differences in the design of the studies. In the 2001 study, the participants were recruited from the general population and they provided self-report data on their height, weight and presence of certain medical disorders, such as coronary heart disease, type 2 diabetes and hypertension.It is interesting to note, however, that the proportion of PHC patients with BMI > 30.0 was twice as high in the 2005 IDEA study than in the general population cross-sectional study conducted in Slovenia in 2001. There were more than twice as many patients with type 2 diabetes, and nearly twice as many CVD patients in the IDEA study.

A random selection of primary care physicians is a major strength of the study. Also, the participants' response rate was very high. On the other hand, low physician participation rate may have affected the reported frequencies and associations.

Conclusion

Although waist-hip ratio and waist circumference are imperfect proxies for visceral adipose tissue accumulation, these measures are relatively easy to obtain, and appear to provide clinically useful information on one's risk for CVD. Waist circumference is easy to measure and as it reflects both total adiposity and central fat deposition it has been advocated as a single measure to assess the need for weight loss. Routine measurement of waist circumference provides a clinical marker for risk of CVD and diabetes mellitus. The rise in adiposity worldwide is likely to contribute to major increases in morbidity and mortality from diabetes mellitus and CVD unless it is adequately addressed by public health programmes.

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