Effects of Smoking on Body Composition and Fat Distribution in a Bulgarian Population

Yavor Assyov [1]; Kamelia Stanoeva [1], Zhivka Boneva [2]

[1] Medical University - Sofia; Department of Endocrinology, Medical Institute - Ministry of Interior, Sofia, Bulgaria

Summary

The aim of this cross-sectional study was to evaluate the relationship between smoking habits and body composition, fat distribution and metabolic pro file in a Bulgarian population sample.
100 overweight and obesity grade I subjects participated in this study (BMI 25-35 kg/m2): 50 female /18 smokers and 32 nonsmokers/ and 50 male/24 smokers and 26 nonsmokers/. The mean age of the subjects was 59±8 years (range 52 to 69 years).

Methodology

Patients and methods: Exclusion Criteria:

- High degree of obesity - BMI > 35kg/m2
- Symptomatic/secondary/obesity-Cushing's syndrome, diagnosed Hypothalamic Disease, uncompensated hypothyroidism
- Congenital monogamous syndromes, accompanied by obesity
- Hepatic and renal failure
- Cancer
- Acute metabolic complications of diabetes mellitus at least 3 months before the present lab and clinical tests
- Diseases influencing lipid metabolism and body weight-hyperthyroidism, pheochromocytoma, uncompensated diabetes mellitus

Methods:

- We assessed abdominal adipose tissue with anthropometry- a measurement of waist circumference.
- Body composition (body fat %) was determined by bioelectrical impedance analysis (Tanita TBF-215; Tanita Corporation, Tokyo, Japan). Height (centimeters), weight (kilog rams) were measured and BMI was calculated.
- Fasting plasma glucose, blood lipids, and immunoreactive insulin were determined.
- Statistical analysis was accomplished with SPSS 12.0.1. Level of significance was determined as $p < 0.05$.

Results

Table 1: Influence of smoking on body composition and fat distribution parameters.

	Smoking						
Group		**No**			**Yes**		
	N		**SD**	**N**		**SD**	
Weight (kg)	**58**	88.40	**11.04**	**42**	84.57	**10.74**	**n.s.**
Fat mass (%)	**58**	32.66	**6.96**	**42**	36.62	**8.46**	**0.012**
BMI (kg/m^2)	**58**	31.28	**2.42**	**42**	29.93	**2.68**	**0.010**
waist (cm)	**58**	99.73	**9.65**	**42**	105.5	**7.84**	**0.01**
W/H	**58**	0.99	**0.08**	**42**	0.93	**0.08**	**0.002**

Table 2: Influence of smoking on body composition and fat distribution parameters, men

	Smoking						
Group		No			**Yes**		
	N		**SD**	N		SD	
Weight (kg)	26	96,00	8,39	24	87,59	11,14	0,006
Fat mass (%)	26	29,84	5,31	24	27,33	3,81	n.s.
BMI (kg/m^2)	26	30,81	2,02	24	28,73	2,16	0,001
Waist (cm)	26	102,54	6,02	24	108,29	7,68	0.01
W/H	26	0,95	0,03	24	0,97	0,05	n.s.

(W/H - waist to hip ratio; BMI-body mass index)

Table 3: Influence of smoking on body composition and fat distribution parameters, Women

		nonsmokers			smokers		
Parameter	N		SD	N		SD	P
Chol	58	5,27	0,61	42	5,84	0,74	<0,001
TG	58	1,89	0,63	42	2,11	0,86	n.s.
HDL-C	58	1,28	0,18	42	1,28	0,32	n.s.
LDL-C	58	3,19	0,48	42	3,63	0,56	<0,001
FPG	58	5,93	1,23	42	6,29	1,15	n.s.
FI	58	18,23	8,22	42	23,17	10,01	0,010

Table 4: Influence of smoking on metabolic lab parameters

	Smoking						
Group		No			**Yes**		
	N		**SD**	**N**		SD	
weight (kg)	32	83,96	9,99	18	87,53	10,32	n.s.
fat mass (%)	32	40,58	4,20	18	43,33	3,47	0,035
BMI (kg/m^2)	32	31,56	2,61	18	32,34	1,89	n.s.
waist (cm)	32	95,20	8,53	18	100,64	8,08	0,046
W/H	32	0,83	0,07	18	0,85	0,06	n.s.

Table 5: Influence of smoking on metabolic lab parameters, men

	Nonsmokers			Smokers			
Parameter	N		SD	N		SD	P
Chol	26	5,41	0,50	24	5,78	0,70	0,019
TG	26	1,96	0,59	24	2,24	0,82	n.s.
HDL-C	26	1,15	0,17	24	1,22	0,18	n.s.
LDL-C	26	3,33	0,47	24	3,58	0,55	n.s.
FPG	26	6,48	1,26	24	6,72	1,03	n.s.
FI	26	18,53	6,86	24	20,49	8,18	n.s.

(chol - total cholesterol; TG - triglycerides; HDL-C - high density cholesterol; LDL-C - low density cholesterol; FPG - fasting plasma glucose; FI -fasting insulin)

Table 6: Influence of smoking on metabolic lab parameters, women

	Nonsmokers			Smokers			
Parameter	N		SD	N		SD	P
Chol	32	5.18	0.66	18	5.97	0.83	0.001
TG	32	1.85	0.66	18	1.87	0.93	n.s.
HDL-C	32	1,35	0,15	18	1,40	0,48	n.s.
LDL-C	32	3,12	0,48	18	3,73	0,59	<0,001
FPG	32	5,61	1,10	18	5,44	0,91	n.s.
FI	32	18,05	9,00	18	28,51	11,42	0,003

Conclusions

- Our results, which are the same as the literature data, show that smokers have a lower body weight compared to non-smokers. The body fat mass was higher in smokers compared to non-smokers, but the differences were significant only in the group as a whole, and in the women group.
- Independently from the lower weight, we registered a higher abdominal adipose tissue in smokers, measured by waist circumference. The differences are statistically significant in the group as a whole and in both the women and men groups. It is a proven fact that not the total fat mass of the body, but its deposition in the visceral adipose region bears a health risk.

- The lab results show a worse metabolic profile of smokers compared to non-smokers. This fact is manifested even more regarding the cholesterol levels, LDL-C and IRI for the examined group as a whole and in the women group, while the differences in the men group were statistically significant only for the levels of the total cholesterol.

- Our cross-sectional data supports the hypothesis that, although smokers have lower mean BMI compared to non-smokers, they have a more metabolically adverse fat distribution profile, with higher central adiposity

Reference

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