

Estimation of bisphenol A influence on obesity

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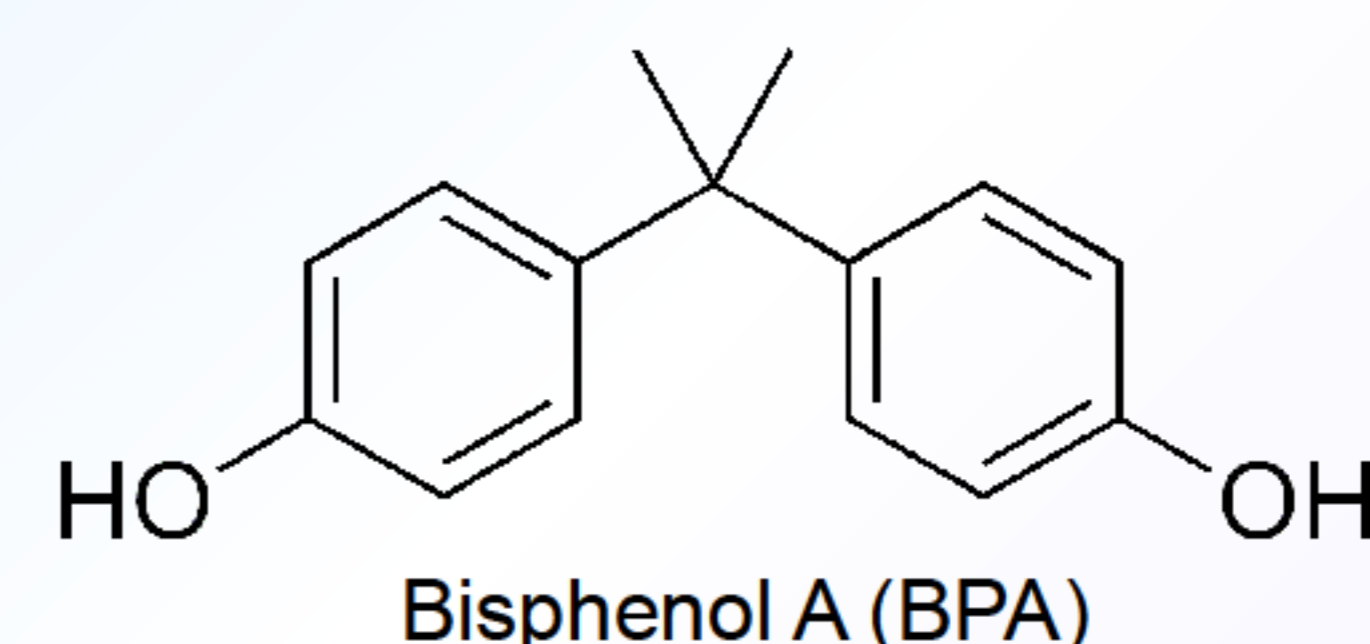
Introduction

Obesity is a global health problem. More than half (54%) of the adult population in Serbia and 58.5% of adult population in the north province, Vojvodina is obese or overweight [1]. Hence, it is urgent to identify environmental factors which may contribute obesity. Bisphenol A (BPA) is one of the most extensively used chemical in production of food and beverage containers, epoxy resins, polycarbonate plastics [2] and well known endocrine disruptor [3].

The aim of this study is to determine the prevalence of BPA in urine samples in women in Vojvodina and to determine the association between BPA and obesity in women.

Methods

In the study 103 women age between 18 and 55 were enrolled and in their urinary BPA was determined. Women were divided according to their body mass index (BMI) into two groups: N-normal weight (BMI<25 kg/m²) and O-obese group (BMI≥30 kg/m²).



Results

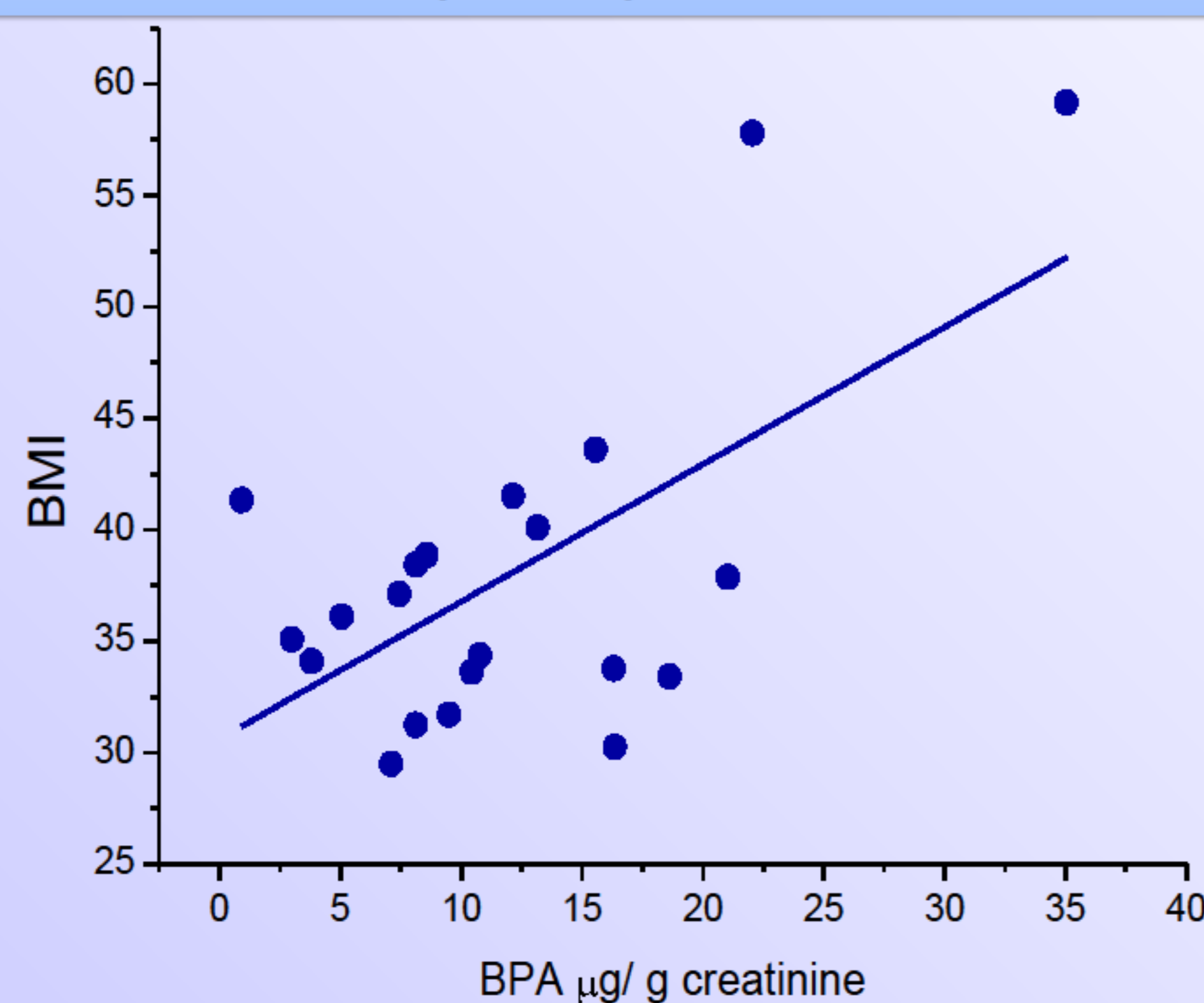
BPA was detected in 36% (37/103) women, 31% (16/52) in the N-group and 41% (21/51) in the O-group. No statistical difference, odds ratio 1.57 (95%CI 0.70-3.54, p=0.27) was determined in the number of women exposed to BPA according to their BMI. The average concentration of BPA was 12.24 10.55 µg/g creatinine. The groups were additionally divided into two subgroups: BPA positive (BPA+) and BPA negative (BPA-). There was statistically significant linear correlation between BPA concentration in the urine sample and BMI (r=0.59, p=0.003) as well as between waist circumference and BMI (r=0.45, p=0.02) in the O-group. However, no statistical difference was found between BMI, waist circumference, or lipid status: HDL, LDL and total cholesterol among BPA+ and BPA- subgroups in both N- and O-group. The highest BPA concentrations were detected in younger women with highest BMI (r²=0.37 p=0.006).

Characteristics of the N-normal weight group

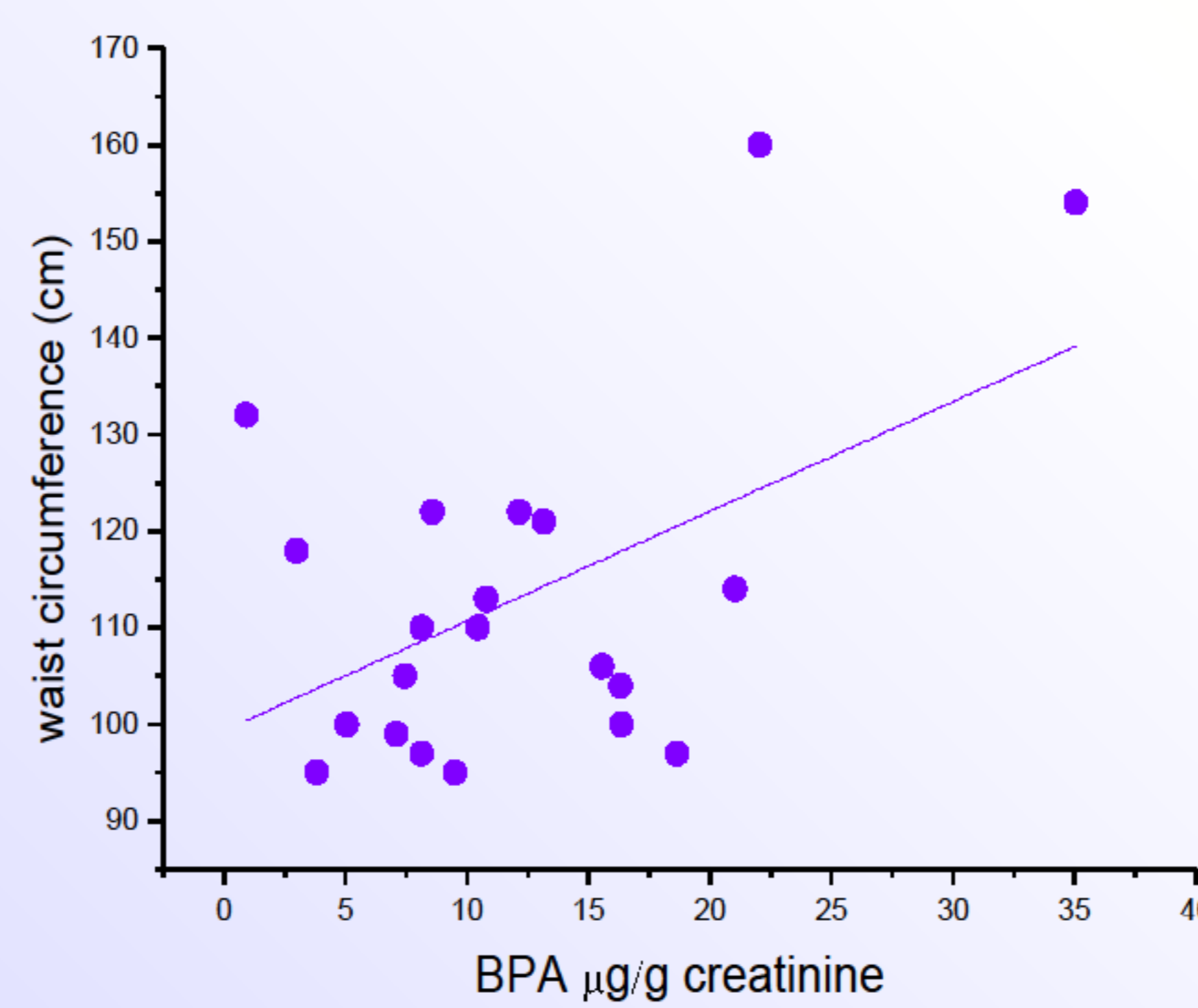
	Normal weight BPA- (n=36)	Normal weight BPA+ (n=16)	p
Age	35.78±7.73	37.38 ± 6.78	0.49
BMI (kg/m ²)	21.67±2.01	21.65±1.98	0.97
Waist circumference(cm)	73.19±6.35	75.12±5.20	0.29
Total cholesterol(mmol/l)	5.05±0.81	4.99±0.64	0.79
HDL cholesterol (mmol/l)	1.52±0.37	1.60±0.26	0.39
LDL cholesterol (mmol/l)	3.11±0.69	2.92±0.61	0.34

Characteristics of the O-obese group

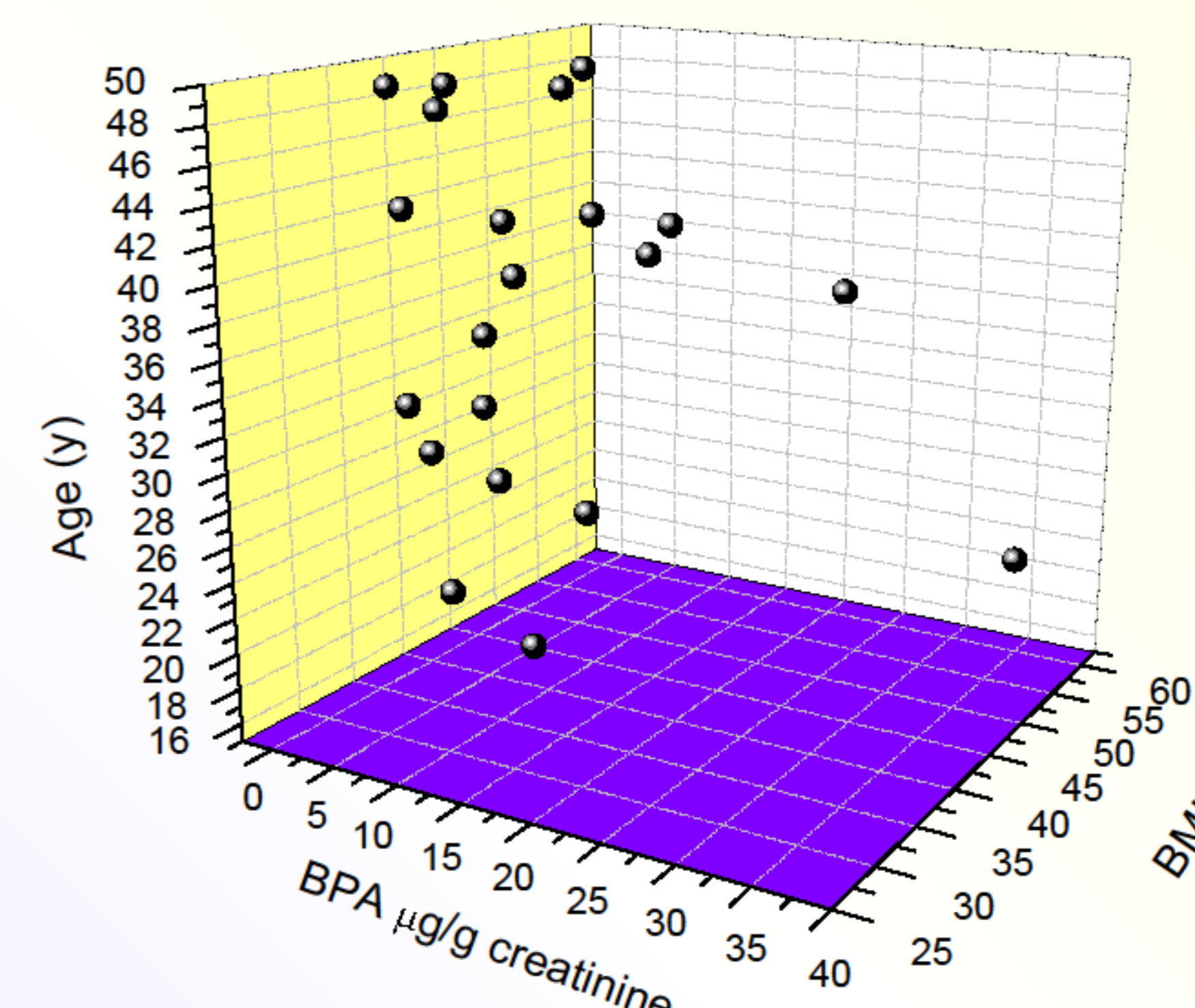
	Obese BPA- (n=30)	Obese BPA+ (n=21)	p
Age	40.77±9.02	37.33±10.08	0.21
BMI (kg/m ²)	35.36±5.85	38.03±7.80	0.17
Waist circumference(cm)	106.37±11.84	113.05±17.90	0.11
Total cholesterol(mmol/l)	5.25±0.89	5.27±1.48	0.96
HDL cholesterol (mmol/l)	1.29±0.35	1.19±0.37	0.34
LDL cholesterol (mmol/l)	3.29±0.73	3.39±1.17	0.70



Correlation between urinary BPA and BMI of the obese group



Correlation between urinary BPA and waist circumference of the obese group



Multiple linear regression of BMI with urinary BPA and age of the obese subjects

Conclusion

BPA is one of the most important factors which may contribute the increment of BMI and waist circumference, while HDL, LDL and total cholesterol may be associate factors which additionally influence obesity.

References

1. Serbian National guidelines for obesity (2004) Ministry of Health, Republic of Serbia.
2. Vom Saal FS, Nagel SC, Coe BL, Angle BM, Taylor JA (2012) The estrogenic endocrine disrupting chemical bisphenol A (BPA) and obesity. *Mol Cell Endocrinol* 354:74-84.
3. Huang YQ, Wong CK, Zheng JS, Bouwman H, Barra R, Wahlström B, Neretin L, Wong MH (2012) Bisphenol A (BPA) in China: a review of sources, environmental levels, and potential human health impacts. *Environ Int* 42:91-99.

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