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Short communication

Impact of lifestyle on cardiometabolic risk factors in overweight and obese women

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Introduction

In recent years, the epidemic of obesity has been a well-recognized public health problem. This problem is also present in most European countries, with the prevalence of overweight at more than 60% (Vardell et al., 2020). Obesity is usually diagnosed based on body mass measurement but it is not adequate to properly define or manage the cardio-metabolic risks associated with a higher level of fat tissue in adults (Songet al., 2015). However, it is well known that other indexes such as body fat mass, waist circumference, waist-to-hip ratio, and body fat distribution, often used infrequently, provide more correct predictions. In addition, they are more useful than a body mass index in defining the cardio-metabolic risks (Lampignano et al., 2020). The prevalence of obesity in Serbia (23.6%) is nearly two times higher compared with the prevalence of obesity in the world (12%), however prevalence of overweight (36.9%) has a similar trend (39%) (WHO, 2013). Obesity is confirmed to have an essential role in insulin resistance development and is associated with impaired glucose metabolism, hypertension, and dyslipidemia, the main risk factors for developing cardiovascular diseases (Lampignano et al., 2020). The ratios of lipoproteins are increasingly becoming favoured as a way for atherosclerosis and cardiovascular disease prediction. This study aimed to determine the impact of lifestyle in overweight and obese women of reproductive age on cardiometabolic risk factors.

Materials and methods

Participants

Fifty-seven healthy women were enrolled in this study, all between the ages of 21–50. All candidates participated in a voluntary basis. All participants received the recruitment material, which contained detailed information regarding the aim of the study, all procedures involved as well as the expectations and information about their rights. From all participants, written informed consent was obtained.

Study protocol

The dietary habits of each candidate were closely monitored by using the 3-day food intake records with the evaluation and the distribution of the energy intake levels, macro- and micronutrients. The systolic and diastolic blood pressure, and anthropometric parameters (height, body weight, waist, hip and chest circumference) were measured. Body composition (body fat mass, skeletal muscle mass, percent of body fat, waist-to-hip ratio) was carried out with the bioelectrical impedance analysis method, using InBody 270 body composition analyzer (InBody Co., Seoul, Korea).

Methods

Blood samples were collected following the EFLM-COLABIOCLI recommendation (Šimundić et al., 2018). Total cholesterol, high-density lipoprotein cholesterol (HDL-C), low density-lipoprotein cholesterol (LDL-C)

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and triglycerides were determined in serum using commercial reagents (Beckman Coulter, Hamburg, Germany and BioSystems, Barcelona, Spain) on the Olympus AU400 biochemical analyzer. Statistical program SPSS version 24 (SPSS Inc., USA) was used for data analysis. The distribution of continuous variables was examined using the Shapiro-Wilk test. The values of descriptive statistics for continuous variables with normal distribution were presented as mean ± standard deviation (SD), while non-normal variables were presented as median (25% percentile - 75% percentile). Spearman's correlation coefficient was used to measure of the correlation between different variants to determine the existence of a monotonic relationship. The significance threshold for *p*-values in all tests was 0.05.

Results and discussion

Fifty-seven apparently healthy overweight and obese women (aged 37.16 ± 7.27 years, body mass index = 29.72 ± 5.04 kg/m^2, % body fat = 39.06 ± 6.59%) were enrolled in this study.They were divided into two groups based on their body mass index (38 were overweight (25 ≤ body mass index < 30), while 19 were obese (body mass index ≥ 30). A comparison between the two groups was made, and the analysis of biochemical parameters showed significant differences in triglyceride values for overweight 0.64 [0.49–0.87] and obese 0.93 ± 0.44 (p = 0.045). Also, we noted that the levels of total cholesterol, and LDL were higher in the obese group, but it was not statistically significant (p = 0.058 and 0.559, respectively).

The mean value for Castelli's Risk Index I in obese subjects was 4.63 ± 1.4 which was significantly higher than the overweight group's value of 3.82 ± 0.94. The difference was highly significant (p= 0.013).

When diagnosing dyslipidemia, triglycerides, LDL-cholesterol, HDL-cholesterol, and total cholesterol are the lipid parameters that are mainly considered. However, using only LDL or HDL alone to measure and predict the risk of cardiovascular diseases is inadequate, especially in individuals with obesity (Superko and King, 2008). Studies have shown that in cases when the lipid parameters (HDL-cholesterol, LDL-cholesterol, triglycerides, and total cholesterol) remain seemingly normal, lipid ratios such as the Castelli's risk index I is an important diagnostic choice in predicting the risk for cardiovascular events (Olamoyegun et al., 2016). Recent studies suggest that lipid ratios (TC/HDL and TG/HDL), which include the proportion between the pro-atherogenic and anti-atherogenic fractions, are much more effective diagnosing tool in atherosclerosis, cardiovascular diseases, and insulin resistance detection compared to single measures of lipids fractions (Du et al., 2014).

Conclusion

Overweight/obesity was linked to a high Castelli's risk index I value in the current study, implying that these people are at a higher risk of having cardiovascular diseases in the future unless they take urgent measures to lose weight. These values, when combined with standard measures of adiposity may be beneficial for the development of personalized primary prevention strategies for obesity-related pathologies, in the first place cardiovascular diseases.

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