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Dietary Intake, Dietary Protein Source, and Metabolic Syndrome Risk in Division III Offseason Female Athletes

Christopher J. Kotarsky, Marissa L. Frenett, William F. Hoerle, Margaret McQueston.
Skidmore College, Saratoga Springs, NY

Metabolic syndrome (MetS), identified by blood pressure, waist circumference, blood glucose, triglycerides, and high-density lipoprotein, can increase risk for morbidity and mortality. College athletes are often overlooked for MetS as their increased physical activity and exercise is assumed to reduce disease risk. However, over- or underconsumption of energy intake, including macronutrient balance, based on body mass, age, and sex has been shown to increase risk. As not all athletes have access to a sports nutritionist, a need exists for more research into athlete nutrition and cardiometabolic health, especially in females where a knowledge gap exists. **PURPOSE:** To determine the relationship of dietary intake and protein source, animal- (ABP) and plant-based (PBP), with MetS as estimated by Simple Method for Quantifying Metabolic Syndrome (siMS) score and risk score in Division III female athletes. **METHODS:** Waist circumference was measured with a spring-loaded measurement tape. Blood pressure was assessed supine after a five-minute rest. Dietary intakes were estimated with three-day logs and ESHA software. Blood samples were collected via fingertip capillary drops with a single-use cassette and Cholestech LDX System. Stepwise linear regression models determined whether dietary intake and protein source were associated with siMS score and risk score. Age (yr), body mass (kg), body mass index (kgm^2), ABP (g/d), PBP (g/d), ABP:PBP, and energy (kcal/d), protein (g/d), carbohydrate (g/d), and fat intake (g/d) were included in each regression. **RESULTS:** A total of 13 athletes (mean ± SD; age 19.7 ± 1.4; body mass 66.4 ± 8.4; BMI 23.1 ± 2.1; ABP 75.9 ± 28.2; PBP 29.2 ± 12.2) were included in the analyses. Only PBP, not ABP, was predictive of siMS score and risk score. For every 1 g increase in PBP, siMS score was lowered by 0.029 and risk score by 0.013. The siMS score regression model explained 31.5% of the variance ($F_{1, 11} = 5.052$, $R^2 = 0.315$, adjusted $R^2 = 0.252$, $p = 0.046$) and the regression model for siMS risk score explained 36.9% of the variance ($F_{1, 11} = 6.438$, $R^2 = 0.369$, adjusted $R^2 = 0.312$, $p = 0.028$). **CONCLUSION:** PBP was associated with a lower risk of MetS via siMS score and risk score in Division III female athletes, while ABP was unrelated. **SIGNIFICANCE/NOVELTY:** The health benefits of plant-based (PB) diets appear to be due to the increased nutritional quality of PB foods and simultaneous removal of animal-based (AB) products, specifically red and processed meat. However, removing AB foods may make it more difficult for athletes to meet energy and protein requirements needed to support muscle hypertrophy and strength due to the digestible indispensable amino acid score differentiation of PBP compared to ABP. Our findings show that increasing PBP intake may help reduce MetS risk in female athletes without needing to remove ABP from their diet.

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