

Association between serum retinol, α -tocopherol and metabolic syndrome in Korean General population

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Background/Aims: The present study aimed to evaluate the association between serum retinol and α -tocopherol levels and metabolic syndrome (MetS) using Korea National Health and Nutrition Examination Survey.

Methods: Of total 24,269 individuals, 5,885 adults (2,672 men and 3,213 women) were included. Prevalence of MetS and its components according to quartiles of serum retinol and α -tocopherol levels were calculated. Multivariable linear regression model was used to calculate the numbers of metabolic components according serum vitamin levels. Multivariable logistic regression model was used to evaluate the association between serum vitamin levels and MetS with its components.

Results: The prevalence of MetS was highest among Q4 and lowest among Q1 in both vitamins, regardless of gender. Dose-dependent association between serum retinol and α -Tocopherol and MetS was found. After adjustment for covariates, the odds ratio (OR) for MetS in Q4 compared to Q1 was 2.351 (95% CI: 1.748-3.163, P trend <0.001) in retinol and 2.559 (95% CI: 1.953-3.353, P trend <0.001) in α -tocopherol. Among metabolic components, hypertriglyceridemia, high fasting glucose, and high blood pressure was positively associated with serum retinol and α -tocopherol, in both genders.

Conclusions: serum retinol and α -tocopherol levels were associated with increased risk of MetS. Further longitudinal studies are needed to clarify the effect of these vitamins on the risk of MetS.

Figure 1. Odds ratios (ORs) with 95% confidence interval (CI) for metabolic syndrome according to quartiles of serum retinol and α -tocopherol levels: multivariate-adjusted model with body mass index in retinol (A) and α -tocopherol (B).

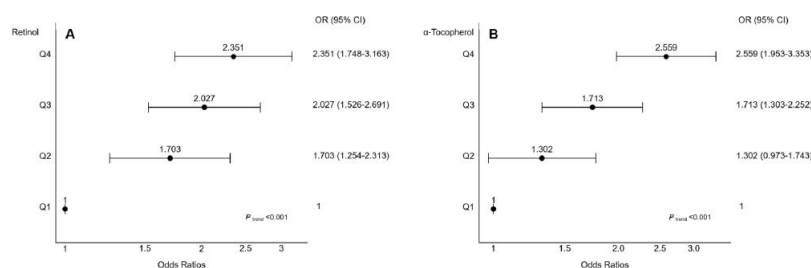


Table 1. Prevalence and risk for metabolic syndrome according to serum retinol and α -tocopherol level

	Prevalence % (SE)	Unadjusted		Age and sex adjusted		Multivariate-adjusted			
		OR (95% CI)	P trend	OR (95% CI)	P trend	BMI unadjusted OR (95% CI)	P trend	BMI adjusted OR (95% CI)	P trend
Retinol			<0.001		<0.001		<0.001		<0.001
Q1	12.1 (1.1)	1		1		1		1	
Q2	20.9 (1.4)	1.912 (1.468-2.491)		1.672 (1.280-2.184)		1.802 (1.368-2.374)		1.703 (1.254-2.313)	
Q3	25.9 (1.5)	2.526 (1.962-3.253)		2.032 (1.561-2.645)		2.243 (1.717-2.931)		2.027 (1.526-2.691)	
Q4	33.5 (1.5)	3.649 (2.868-4.642)		2.651 (2.054-3.423)		2.795 (2.129-3.670)		2.351 (1.748-3.163)	
α -Tocopherol			<0.001		<0.001		<0.001		<0.001
Q1	14.5 (1.3)	1		1		1		1	
Q2	18.6 (1.2)	1.338 (1.039-1.723)		1.260 (0.969-1.639)		1.280 (0.977-1.678)		1.302 (0.973-1.743)	
Q3	26.5 (1.5)	2.113 (1.650-2.706)		1.848 (1.436-2.377)		1.910 (1.479-2.466)		1.713 (1.303-2.252)	
Q4	34.9 (1.6)	3.154 (2.503-3.974)		2.643 (2.074-3.368)		2.690 (2.098-3.449)		2.559 (1.953-3.353)	

Serum retinol and α -tocopherol levels were categorized into quartiles: Q1 (lowest), Q2 (lower middle), Q3 (higher middle), and Q4 (highest).

P for trend was calculated using linear regression model considering serum vitamin levels as continuous variables.

SE, standard error; BMI, body mass index; OR, odds ratio; CI, confidence interval.