

# Associations Between Body Composition Subtypes and Cardiovascular Disease Risk among Middle-aged and Older Chinese Adults

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## Introduction

Body composition heterogeneity has been reported, and a combined anthropometric index performs better in cardiovascular disease (CVD) risk prediction than a single one. This study aimed to identify body composition subtypes based on anthropometric indices and explore their association with CVD risk.



## Methods

This study used longitudinal data from the Chinese Health and Nutrition Survey from 2009 to 2015. Latent profile analysis was used to identify body composition subtypes based on the body mass index (BMI), waist-to-height ratio (WHtR), visceral index (VAI), and mid-arm muscle mass (MUAMC). Multinomial and binomial logistic regression models were performed.



## Results

We included 3,556 participants with a mean age of 57.91 (8.76) years. Four distinct body composition subtypes were identified: lower-normal fat and muscle (16.03%), normal fat and muscle (37.57%), moderate fat and muscle (33.58%), and high fat and muscle (12.82%). Compared to the lower fat and muscle group, the other three groups were associated with higher Framingham risk score (Table 2). No significant associations between all-cause mortality and body composition subtypes were found. Additionally, participants with higher fat and muscle were more likely to be older and female, live in a deprived place, have a higher income, and have worsened blood pressure, lipid and glucose profiles. Former smokers were more likely to have lower fat and muscle mass than non-smokers.

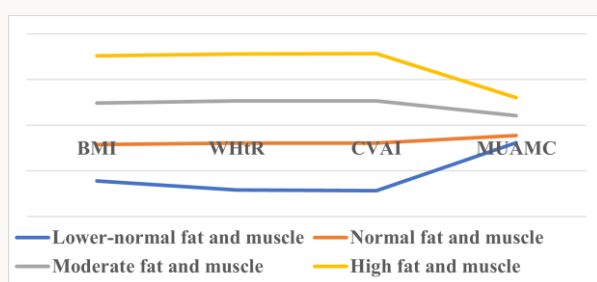


Table 1 Means of obesity indices in each class

Class	BMI	WHtR	VAI	MUAMC
Lower-normal fat and muscle	19.540	0.440	36.449	20.927
Normal fat and muscle	22.182	0.502	77.733	21.404
Moderate fat and muscle	25.164	0.558	113.831	22.914
High fat and muscle	28.915	0.626	156.113	24.127

Table 2 Associations between body composition subtypes and CVD risk

	Unadjusted model		Adjusted model	
	Middle CVD risk OR (95%CI)	High CVD risk OR (95%CI)	Middle CVD risk OR (95%CI)	High CVD risk OR (95%CI)
Lower-normal fat and muscle	Ref	Ref	Ref	Ref
Normal fat and muscle	1.520 (1.183 - 1.954)	1.159 (0.825 - 1.629)	2.944 (1.690 - 5.131)	2.946 (1.505 - 5.675)
Moderate fat and muscle	2.424 (1.885 - 3.118)	2.439 (1.757 - 3.386)	3.841 (1.819 - 8.109)	6.165 (3.358 - 11.321)
High fat and muscle	3.773 (2.771 - 5.137)	6.548 (4.548 - 9.428)	9.127 (3.240 - 25.708)	34.374 (17.161 - 68.850)

Adjusted for age, sex, residence, education level, marital status, household income, occupation, smoking status, drinking frequency, tea consumption, hypertension, diabetes, blood pressure, BMI, WHtR, MUAMC, VAI, lipid profiles, carbohydrate consumption, physical activity, and sleep duration.



## Conclusions

This study revealed heterogeneity in body composition among middle-aged and older adults. Adults with higher fat and muscle mass had a greater CVD risk. Sociodemographic characteristics were related to body composition subtypes.