Sarcopenia, muscle mass, strength, and physical performance in urban and rural elderly; KURE study

연세대학교 의과대학 내과학교실

황윤정, 김창오, 김광준, 문성우

Background/Aims: Sarcopenia prevalence in urban and rural population has have not been consistent among studies. Current diagnostic criteria for sarcopenia includes loss of muscle mass, strength, and impaired physical performance. The consequences of low muscle mass, strength and impaired physical performance are not equal. This study aimed to assess the difference in sarcopenia, muscle mass, strength, and physical performance between urban and rural population in community-based cohort data.

Methods: A total of 2,353 subjects aged ≥ 69 years (mean 75.1 ± 4.3) were recruited from three urban districts and one rural district in Korea. Sarcopenia was defined as low muscle mass plus low muscle strength and/or impaired physical performance. Low muscle mass was defined as appendicular lean mass (ALM)/height²< 5.7 kg/m²in female and < 7 kg/m²in male using bioelectrical impedance analysis. Low muscle strength was defined as handgrip strength < 18kg in female and < 26kg in male measured by manual digital dynamometer. Impaired physical performance was defined as > 12 seconds in 5-chair stand test.

Results: The prevalence of sarcopenia, low muscle mass, low strength, and impaired physical performance was 15.7%, 23.9%, 21.7%, 43.7% in urban elderly and 23.5%, 28.8%, 33.9%, and 63.6% in rural elderly. In multivariate logistic regression model, rural residence was associated with low muscle strength (OR 1.445; 95% CI 1.034-2.020, P=0.031) and impaired physical performance (OR 1.861; 95% CI 1.364-2.539, P<0.001). Rural residence was not associated with sarcopenia (OR 0.890; 95% CI 0.589-1.345, P=0.580) nor low muscle mass (OR 0.716; 95% CI 0.473-1.083, P=0.113).

Conclusions: Comparing rural and urban elderly, sarcopenia and low muscle mass were not significantly related with rural residence. On the other hand, low muscle strength and impaired physical performance is related with rural residence. Our study suggests that the choice of sarcopenia screening tests and interventions need to be tailored for the rural and urban populations.

Table 3. Multivariate logistic regression analysis for variables related to sarcopenia

Variables	Sarcopenia	
	Odds ratio	*p*-value
Rural residence	0.890 (0.589-1.345)	0.580
Age, years	1.139 (1.103-1.176)	< 0.001
Sex, Female	1.710 (1.053-2.778)	0.030
Body mass index (kg/m^2)	0.639 (0.603-0.677)	< 0.001
Marital status, married	1.133 (0.818-1.568)	0.452
Education level		
Elemantary school or below	Reference	-.
Middle school	0.720 (0.494-1.048)	0.086
High school or above	0.578 (0.410-0.814)	0.002
Income (1,000,000 Korean won/month)	0.891 (0.795-1.000)	0.049
Smoking status		
Current Smoker	Reference	-.
Ex-smoker	1.229 (0.628-2.404)	0.547
Never smoker	0.880 (0.438-1.768)	0.720
Hypertension	1.080 (0.815-1.431)	0.593
Diabetes	1.287 (0.953-1.739)	0.100
Dyslipidemia	0.897 (0.678-1.186)	0.444
Arthritis	1.310 (0.963-1.783)	0.086
Cerebrovascular accident	1.503 (0.925-2.441)	0.100
Angina or Myocardial infarction	1.251 (0.910-1.721)	0.168
Malignancy	0.903 (0.595-1.371)	0.632
Regular Exercise	0.586 (0.445-0.771)	< 0.001

List of Abbreviations: OR, odds ratio; 95% CI, 95% confidence interval

Table 4. Multivariate logistic regression analysis for variables related to low muscle mass, strength, and physical performance

Variables	Low muscle mass†		low muscle strength‡		Low physical performance§	
	Odds ratio	*p*-value	OR (95% CI)	*p*-value	Odds ratio	*p*-value
Rural residence	0.716 (0.473-1.083)	0.113	1.445 (1.034-2.020)	0.031	1.861 (1.364-2.539)	< 0.001
Age, years	1.136 (1.102-1.171)	0.000	1.121 (1.092-1.151)	< 0.001	1.074 (1.050-1.098)	< 0.001
Sex, Female	1.395 (0.903-2.155)	0.134	3.471 (2.239-5.379)	< 0.001	1.354 (0.987-1.858)	0.060
Body mass index (kg/m^2)	0.547 (0.514-0.581)	0.000	0.951 (0.917-0.987)	0.007	1.006 (0.975-1.037)	0.714
Marital status, married	0.969 (0.715-1.311)	0.836	0.939 (0.738-1.210)	0.627	0.783 (0.625-0.982)	0.034
Education level						
Elemantary school or below	Reference	-.	Reference	-.	Reference	-.
Middle school	0.884 (0.627-1.246)	0.482	0.908 (0.675-1.220)	0.521	0.699 (0.546-0.895)	0.005
High school or above	0.700 (0.514-0.954)	0.024	0.648 (0.487-0.862)	0.003	0.613 (0.490-0.766)	< 0.001
Income (1,000,000 Korean won/month)	0.969 (0.888-1.057)	0.480	0.920 (0.839-1.008)	0.074	0.927 (0.869-0.989)	0.021
Smoking status						
Current Smoker	Reference	-.	Reference	-.	Reference	-.
Ex-smoker	0.749 (0.400-1.402)	0.366	1.141 (0.585-2.223)	0.699	0.943 (0.581-1.530)	0.812
Never smoker	0.622 (0.323-1.197)	0.155	0.892 (0.455-1.747)	0.738	0.772 (0.469-1.272)	0.310
Hypertension	0.993 (0.767-1.285)	0.955	0.999 (0.791-1.262)	0.993	0.827 (0.682-1.003)	0.053
Diabetes	1.045 (0.785-1.392)	0.763	1.217 (0.946-1.566)	0.126	1.409 (1.138-1.744)	0.002
Dyslipidemia	1.023 (0.791-1.324)	0.861	0.867 (0.691-1.088)	0.219	0.847 (0.701-1.023)	0.085
Arthritis	1.310 (0.982-1.747)	0.067	1.323 (1.039-1.685)	0.023	1.423 (1.152-1.758)	0.001
Cerebrovascular accident	1.416 (0.886-2.264)	0.146	1.354 (0.890-2.059)	0.157	1.405 (0.974-2.027)	0.069
Angina or Myocardial infarction	1.208 (0.896-1.629)	0.215	1.063 (0.820-1.377)	0.645	1.097 (0.881-1.366)	0.406
Malignancy	0.700 (0.468-1.046)	0.082	0.815 (0.572-1.162)	0.258	1.135 (0.857-1.504)	0.377
Regular Exercise	0.749 (0.579-0.968)	0.027	0.636 (0.509-0.795)	< 0.001	0.719 (0.597-0.867)	0.001