

The effect of social isolation on sarcopenia: a longitudinal study among the middle-aged and older population in China

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Introduction

- Sarcopenia** is a common skeletal muscle disorder characterized by the progressive loss of muscle mass and strength that typically occurs from about age 40 and accelerates after age 70¹⁻³.
- The Asian Working Group for Sarcopenia 2019 introduced a simplified assessment of “**possible sarcopenia**” for the identification of people with, or at risk for, sarcopenia⁵.
- Social isolation** refers to an objective state marked by the absence of social relationships⁶, which is associated with premature death and certain diseases⁷⁻⁹, but evidence of its long-term effect on sarcopenia is scarce.

Objective

- To examine the effect of **social isolation** and **change in social isolation** on **possible sarcopenia** in a **longitudinal study** of middle-aged and older Chinese adults.

Methods

- Date sources**
 - CHARLS** China Health and Retirement Longitudinal Study
 - Data were extracted from the 2011 baseline and 2015 follow-up surveys
- Study participants**
 - Age ≥ 45 years
 - Free of possible sarcopenia at baseline
- Possible sarcopenia**



- Social isolation**
 - Assessment** — participants were assigned points if they:

Item	Value
1 Live alone	0 = live with others; 1 = live alone
2 Marriage	0 = married/cohabited 1 = never married / separated / divorced / widowed
3 Contact with adult children (monthly)	0 = yes; 1 = no
4 Contact with friends (monthly)	0 = yes; 1 = no
5 Social activity (monthly)	0 = yes; 1 = no

- Categories**
 - Baseline social isolation: **low** (score 0), **middle** (score 1), or **high** (score ≥2)
 - Change in social isolation from baseline to follow-up:
 - Stable** (low-low, middle-middle, high-high)
 - Progressive** (low-middle, low-high, middle-high)
 - Regressive** (middle-low, high-middle, high-low)

- Statistics analysis**
 - All analyses were conducted using R Statistical Software 4.1.0. A two-tailed P<0.05 was considered the level of significance
 - Frequency and percentage were reported for categorical variables
 - Mixed effect regression model** with the random intercept was employed for examining the association between **social isolation** and **change in social isolation** with **possible sarcopenia**.
 - Fixed effect: the participant
 - Random effect: the household nested within the community
 - In analyzing the effect of change in social isolation, stratified analyses was also performed according to baseline social isolation subgroups

Results

- A total of 5289 participants were included in the final analysis.
- After four years, possible sarcopenia was detected in 21.7% (1146/5289) of participants.

Results

Table 1. Baseline characteristics of the participants

	Total (n=5289) n (%)	Social Isolation		p value
		Low/middle (n=2310) n (%)	High (n=2979) n (%)	
Age, year				<0.001
<60	3470 (65.6)	1603 (69.4)	1867 (62.7)	
≥60	1819 (34.4)	707 (30.6)	1112 (37.3)	
Gender				0.116
Male	2685 (50.8)	1201 (52.0)	1484 (49.8)	
Female	2604 (49.2)	1109 (48.0)	1495 (50.2)	
Education level				<0.001
No schooling	2119 (40.1)	803 (34.8)	1316 (44.2)	
Elementary school or above	3170 (59.9)	1507 (65.2)	1663 (55.8)	
Residence				<0.001
Urban	1829 (34.6)	870 (37.7)	959 (32.2)	
Rural	3460 (65.4)	1440 (62.3)	2020 (67.8)	
BMI				<0.001
<18.5	260 (4.9)	77 (3.3)	183 (6.1)	
18.5~23.9	2846 (53.8)	1149 (49.7)	1697 (57.0)	
≥24	2183 (41.3)	1084 (46.9)	1099 (36.9)	
Loneliness				<0.001
Not lonely	3980 (75.3)	1832 (79.3)	2148 (72.1)	
Lonely	1309 (24.7)	478 (20.7)	831 (27.9)	

Bold indicates statistically significant values.

Table 2. The longitudinal association of baseline social isolation with follow-up possible sarcopenia

Social isolation	Total (n)	Possible sarcopenia (n)	Incidence (%)	Adjusted OR (95% CI) ^a	p value
Low	676	89	13.2	reference	
Middle	1634	346	21.2	1.54 (1.16,2.04)	0.003
High	2979	711	23.9	1.65 (1.25,2.18)	<0.001

Bold indicates statistically significant values

^aAdjusted for age, gender, BMI, education level, residence, drinking, smoking, ADL, chronic disease, and loneliness

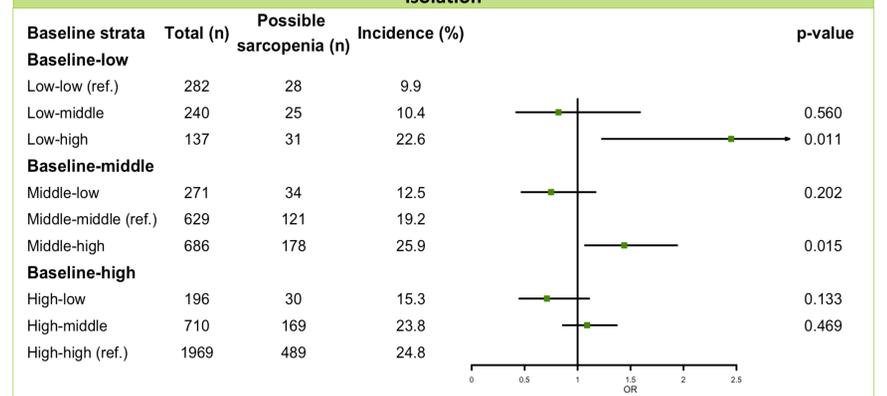
Table 3. The association of change in social isolation with possible sarcopenia

Change in social isolation	Total (n)	Possible sarcopenia (n)	Incidence (%)	Adjusted OR (95% CI) ^a	p value
Stable	2880	638	22.2	reference	
Regressive	1177	233	19.8	0.95 (0.78,1.15)	0.588
Progressive	1063	234	22.0	1.52 (1.18,1.95)	0.001

Bold indicates statistically significant values

^aAdjusted for **baseline social isolation**, age, gender, BMI, education level, residence, drinking, smoking, ADL, chronic disease, and loneliness

Figure 1. The association of change in social isolation with possible sarcopenia by baseline social isolation



Adjusted for age, gender, BMI, education level, residence, drinking, smoking, ADL, chronic disease, and loneliness

Conclusions

- Social isolation was associated with an increased risk of possible sarcopenia.**
- Progression to high social isolation elevated the risk of possible sarcopenia.**
- This study highlights the importance of social contact for sarcopenia and provides new directions for the prevention of sarcopenia.**
- Future studies are needed to elucidate the biological mechanisms of the observed associations.**

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