

# Sarcopenia in Japanese Elderly with Diabetes: Prevalence and characteristics



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## Background and Aims

Sarcopenia is a condition characterized by progressive and generalized loss of skeletal muscle mass and function; and causes serious health-related problems in the elderly with diabetes. However, prevalence of sarcopenia and pre-sarcopenia among the elderly with diabetes in Japan remains unknown. The present study is designed to examine prevalence of sarcopenia in elderly Japanese patients with diabetes; and to find possible associations with severity of sarcopenia with dietary intake.

## Methods and Subjects

**Design:** Cross sectional study in Kansai Electric Power Hospital (Osaka, Japan) from 2016 to 2017

**Participants:** 91 patients with type 2 diabetes, aged  $\geq 65$  (%male, 51.6 %; and age,  $72.7 \pm 5.5$  years) without overt chronic diabetic complications.

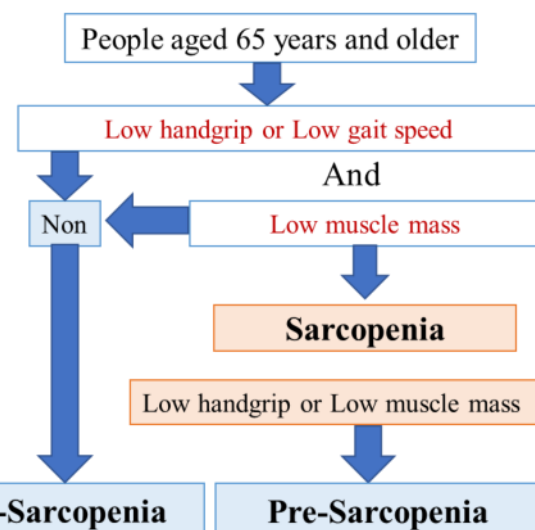
### Measurements:

- Grip strength and body composition (SMI; skeletal muscle index, PBF; percent body fat) were measured by the digital hand dynamometer and InBody s10.
- Participant characteristics (age, body weight, SMI, PBF), dietary intake, HbA1c, Creatinine, BUN, and eGFR.
- In the dietary intake survey using standard 3-day food records.

### Criteria of Sarcopenia:

Based on the diagnostic criteria reported by Chen LK *et al* (2014), subjects were divided into 4 groups;

- sarcopenia group (**Group S**, loss of SMI and grip strength)
- pre-sarcopenia A group (**Group PSa**, loss of SMI only)
- pre-sarcopenia B group (**Group PSb**, loss of grip strength only)
- non-sarcopenia group (**Group NS**, neither loss of SMI nor grip strength)



### Cut off value

- Handgrip**  
Male < 26.0 kg, Female < 18.0 kg
- Gait speed**  
 $\leq 0.8$  m/s
- Muscle mass**  
Male < 7.0 kg/m<sup>2</sup>, Female < 5.7 kg/m<sup>2</sup>

### Statistical analysis:

Data were expressed as mean  $\pm$  SD or number (percentage). Intergroup comparisons were performed with ANOVA for continuous variables, and by the residual analysis for qualitative variable. P value <0.05 was taken to indicate significant differences.

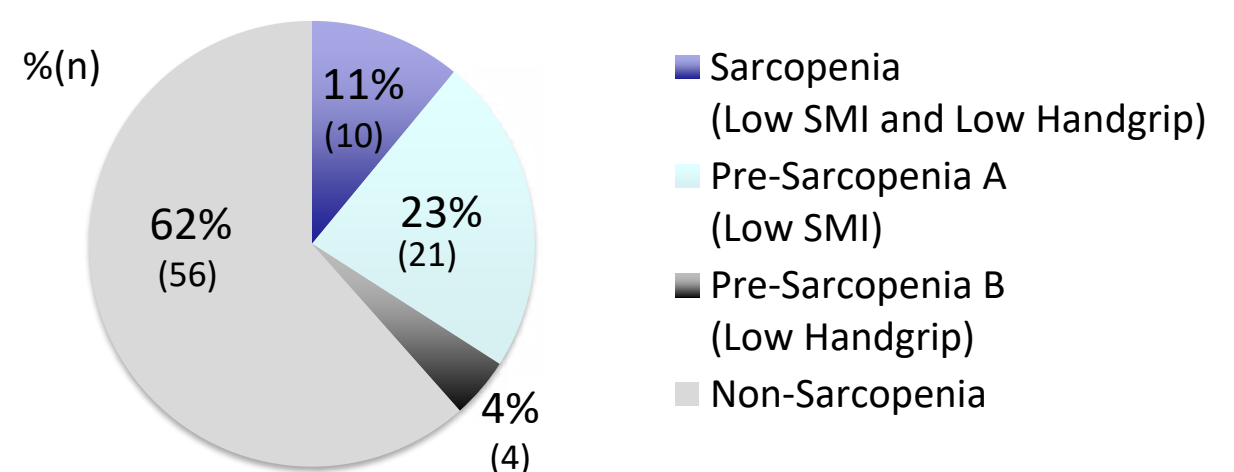
## Conclusion:

The prevalence of sarcopenia was approximately 11 %, which is lower than those reported previously presumably. We also found that the half of sarcopenia patients were sarcopenia obesity. Finally, the current study revealed that those consume more SFA and less PUFA, vitamin A, vitamin K, Fe, and fiber tend to have sarcopenia.

These findings might be informative to establish medical nutritional therapies to prevent sarcopenia and sarcopenia obesity among the Japanese elderly with diabetes.

## Results:

**Figure 1. The prevalence of sarcopenia**



**Table 1. Baseline characteristics of subjects**

	Group S	Group PSa	Group PSb	Group NS
n (%; male)	10 (60.0)	21 (42.9)	4 (25.0)	56 (55.4)
Age (y.)	74.6 $\pm$ 6.9	75.7 $\pm$ 5.2**	74.3 $\pm$ 4.2	71.2 $\pm$ 4.9
BMI (kg/m <sup>2</sup> )	20.1 $\pm$ 3.3***	20.9 $\pm$ 2.5***	25.5 $\pm$ 3.3	23.6 $\pm$ 3.0
PBF (%) males	28.0 $\pm$ 10.2	24.4 $\pm$ 5.9	29.1	24.8 $\pm$ 7.0
" females	28.2 $\pm$ 7.6	33.0 $\pm$ 6.8	39.8 $\pm$ 5.6	34.6 $\pm$ 9.2
SMI (kg/m <sup>2</sup> ) males	5.6 $\pm$ 0.5***	6.4 $\pm$ 0.3**	7.9	7.5 $\pm$ 0.4
" females	4.9 $\pm$ 0.3***	5.3 $\pm$ 0.3**	5.9 $\pm$ 0.3	6.4 $\pm$ 0.5
Handgrip (kg) males	21.4 $\pm$ 3.3***	30.3 $\pm$ 2.1**	25.6	34.6 $\pm$ 3.8
" females	15.2 $\pm$ 0.5***	21.0 $\pm$ 2.1	17.1 $\pm$ 0.7**	22.2 $\pm$ 2.5
HbA1c (%)	7.8 $\pm$ 1.2	7.5 $\pm$ 1.0	6.4 $\pm$ 0.7	7.3 $\pm$ 1.1
Cre (mg/dl)	0.7 $\pm$ 0.2	0.7 $\pm$ 0.2	0.8 $\pm$ 0.2	0.8 $\pm$ 0.2
BUN (mg/dl)	19.1 $\pm$ 6.3	16.0 $\pm$ 4.1	20.6 $\pm$ 2.3	15.9 $\pm$ 3.3
eGFR (ml/min/1.73m <sup>2</sup> )	72.5 $\pm$ 14.1	69.8 $\pm$ 14.5	63.1 $\pm$ 12.5	70.7 $\pm$ 13.7

\*P<0.05, \*\*P<0.01(vs. Group NS); †P<0.05, †† P<0.01 (vs. Group PSa)

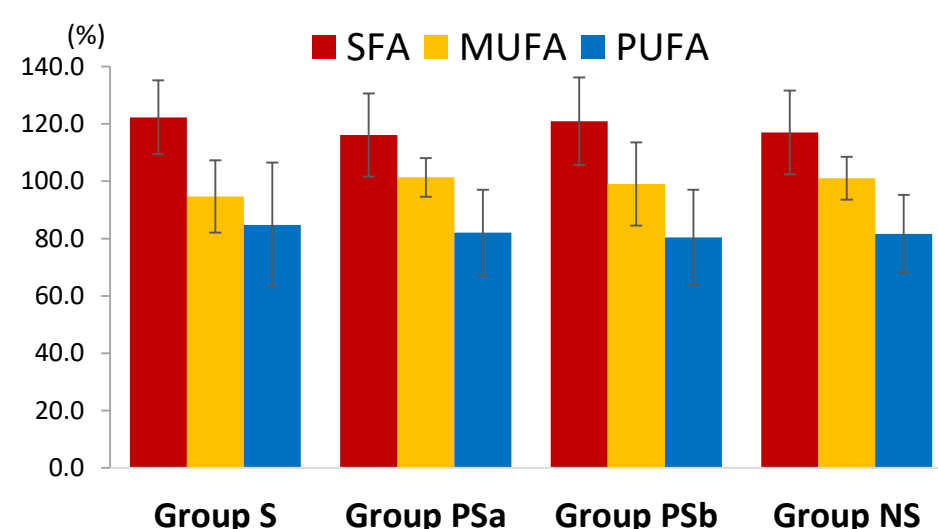
When compared with the standard values of PBF (male<20%, female<28%), 50.0% in Group S, 81.0% in Group PSa, and 100% in Group PSb exceeded the standard values.

**Table 2. Dietary intake of total energy and macronutrients**

	Group S	Group PSa	Group PSb	Group NS
Energy (kcal/kgBW)	33.0 $\pm$ 5.1	30.5 $\pm$ 4.3	23.5 $\pm$ 3.7	30.0 $\pm$ 4.6
Protein (g/kgBW)	1.5 $\pm$ 0.4	1.3 $\pm$ 0.3	1.0 $\pm$ 0.1	1.2 $\pm$ 0.3
Fat (%)	28.2 $\pm$ 4.2	28.2 $\pm$ 3.8	27.6 $\pm$ 4.4	28.6 $\pm$ 5.5
Carbohydrate (%)	52.7 $\pm$ 6.8	52.7 $\pm$ 4.8	50.2 $\pm$ 2.2	51.4 $\pm$ 6.2

The amount of vegetable intakes in Group S was the lowest among the groups, and intakes of micronutrients (vitamin A, vitamin K, Fe) tended to be lower in Group S.

**Figure 2. Consumption of saturated, monounsaturated, and polyunsaturated fatty acids**



## COI

A position of a board member or advisor: None

Honoraria for lectures: AstraZeneca K.K., ARKRAY, Inc., Kao Corporation, Sanofi K.K., Taisho Toyama Pharmaceutical Co., Ltd., Takeda Pharmaceutical Company Limited., Novo Nordisk Pharma Ltd., MSD K.K.

Clinical commissioned / joint research grant: Boehringer Ingelheim Japan, Inc., Eli Lilly and Company, MSD K.K., Taisho Toyama Pharmaceutical Co., TERUMO CORPORATION

Scholarship grant: ARKRAY, Inc., ONO PHARMACEUTICAL CO., LTD., Taisho Toyama Pharmaceutical Co., Ltd., Takeda Pharmaceutical Company Limited., Novo Nordisk Pharma Ltd.