



An executive summary on the Global conceptual definition of Sarcopenia

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Objective

To address a significant gap in research and clinical practice by developing the global conceptual definition of Sarcopenia.

Methodology

Study design

Two-phase Delphi study with participants from leading international musculoskeletal organisations and sarcopenia societies [1]. A steering committee was formed of representatives from each continent/region (Asia, Europe, North America, South America, New Zealand/Australia). The steering committee then developed a glossary of research terms on sarcopenia [2]. Following this, a list of statements on critical aspects of sarcopenia was developed and finalised.

Participants

Invitations to complete an online survey were sent to international experts from academic, industry, and healthcare professions. All participants including steering committee members completed a declaration of interest form prior to participation.

Statistical analysis

Prespecified criteria were set by the steering committee including a two-phase study design and an acceptable threshold of > 80% for accepted statements [1].

Findings

Participants

107 participants (64% men) from 29 countries and across 7 continents/regions completed the Delphi. The majority were residing in Europe (40%), Asia (22%) and North America (19%). Participants reported their primary role as academic professionals (76 [71%]), health professional (23 [22%]), industry professionals (3 [2%]), or other-mixed (5 [5%]).

Accepted and rejected statements

Across the three facets of sarcopenia; ‘general aspects’, ‘components’ and ‘outcomes’, 20 statements were accepted with strong agreement and 4 rejected with low agreement.

Figure 1 shows the list of accepted and rejected statements

Key points

General aspects

Sarcopenia is a disease of skeletal muscle; the definition will be the same for research and clinical practice; the definition will not depend on age, setting of care or clinical condition.

The list of societies and organisations taking part in the GLIS initiative are mentioned in Acknowledgements.

Extended author information available on the last page of the article

Statements from round 1	Agreement (mean ± SD)	Agreement (%)	Outcome
Sarcopenia is a generalised disease of skeletal muscle	8.1 ± 2.3	85.4%	Accepted
The prevalence of sarcopenia increases with age	9.7 ± 0.6	98.3%	Accepted
The conceptual definition of sarcopenia should not vary by setting of care (e.g., inpatient vs. outpatient)	8.8 ± 1.7	91.2%	Accepted
The conceptual definition of sarcopenia should not vary by age or condition (e.g., heart failure, kidney disease, cancer etc.)	7.8 ± 2.7	83.2%	Accepted
The conceptual definition of sarcopenia should be the same for clinical practice and research	8.9 ± 1.6	92.0%	Accepted
Muscle mass should be part of the conceptual definition of sarcopenia	8.5 ± 2.0	89.4%	Accepted
Morphological characteristics of muscle tissue (e.g., muscle fat infiltration, muscle density or texture) should be part of the conceptual definition of sarcopenia	6.2 ± 2.8	69.9%	Rejected
Muscle strength should be a part of the conceptual definition of sarcopenia	9.1 ± 1.9	93.1%	Accepted
Muscle power should be part of the conceptual definition of sarcopenia	6.1 ± 2.5	68.4%	Rejected
Sarcopenia increases the risk of impaired physical performance	9.6 ± 0.8	97.9%	Accepted
Sarcopenia increases the risk of mobility (walking) limitations	9.4 ± 1.1	96.1%	Accepted
Sarcopenia increases the risk of mobility (transfer from chair or bed to rising) limitations	9.3 ± 1.1	95.0%	Accepted
Sarcopenia increases the risk of falls	9.2 ± 1.2	94.6%	Accepted
Sarcopenia increases the risk of fractures	8.5 ± 1.7	89.4%	Accepted
Sarcopenia increases the risk of inability to perform instrumental ADLs	8.6 ± 1.8	88.6%	Accepted
Sarcopenia increases the risk of inability to perform basic (self-care) ADLs	8.8 ± 1.7	90.7%	Accepted
Sarcopenia increases the risk of hospitalizations	8.7 ± 1.4	91.0%	Accepted
Sarcopenia increases the risk of new admission to care (nursing) homes	8.6 ± 1.7	89.5%	Accepted
Sarcopenia increases the risk of poor quality of life	8.9 ± 1.5	91.8%	Accepted
Sarcopenia increases the risk of mortality	8.9 ± 1.4	91.6%	Accepted

Statements from round 2	Agreement (mean ± SD)	Agreement (%)	Outcome
Muscle specific strength (e.g., muscle strength/muscle size) should be part of the conceptual definition of sarcopenia	7.5 ± 2.7	80.8%	Accepted
Physical performance should be part of the conceptual definition of sarcopenia	7.5 ± 2.6	79.8%	Rejected
The conceptual definition of sarcopenia should be a potentially reversible disease	7.9 ± 2.3	84.1%	Accepted
The conceptual definition of sarcopenia should include levels of severity of the disease	7.1 ± 2.7	77.0%	Rejected

N.B. An 11-point Likert scale ranging from strongly disagree (0) to strongly agree (10) accompanied each statement	Weighted-scales calculation		
Statements with strong agreement (>80% respondents scoring ≥7) accepted	Response	Weight	Interpretation
Statements with low agreement (<70% respondents scoring ≥7) rejected	9, 10	100%	Strongly agree
	7, 8	80%	Agree
	4, 5, 6	60%	Neither agree nor disagree
	2, 3	40%	Disagree
	0, 1	20%	Strongly disagree

Fig. 1 The list of accepted and rejected statements from the Delphi study (n = 107 participants). Sourced from Kirk et al. [1]

Components

The definition will comprise of both reduced muscle mass and strength, as well as muscle-specific strength. Physical performance will not be considered as a component of sarcopenia but instead as an outcome.

Outcomes

Sarcopenia increases a host of adverse health outcomes (e.g. fragility fractures, disability, poor quality of life), nursing home admissions and premature mortality. Impaired

physical performance will be considered a measurable outcome of sarcopenia.

Figure 2 shows the global conceptual definition of sarcopenia that will be used to develop an operationalized definition

Summary

The global conceptual definition of sarcopenia has been developed using an International Delphi Study including academic, industry and healthcare professionals from

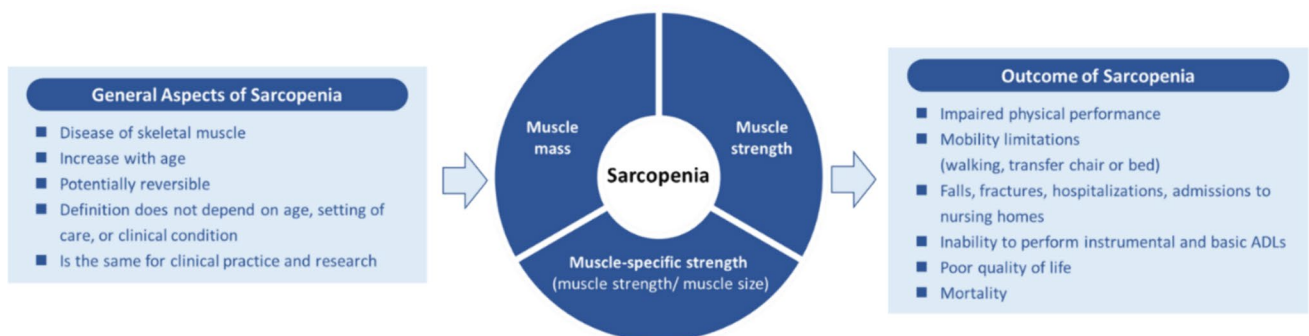


Fig. 2 The global conceptual definition of Sarcopenia. Sourced from Kirk et al. [1]

leading musculoskeletal organisations and sarcopenia societies. This inclusive approach will serve as a strong backbone to develop an operational definition of sarcopenia for research and clinical settings.

Future directions

Three working groups are currently underway to develop an operational definition of sarcopenia. These working groups, comprising of experts on specific sarcopenia topics including components and outcomes of the disease, are expected to finalise the operational definition in the coming year(s).

The Global Leadership Initiative in Sarcopenia (GLIS) represents a significant advancement in the field to improve the prevention, diagnosis and treatment of this muscle disease.

Acknowledgements The list of societies and organisations taking part in the GLIS initiative Aging in Motion (AIM) coalition/Alliance for Aging Research (AAR). American Geriatrics Society (AGS). American Society for Bone and Mineral Research (ASBMR). Asian Association for Frailty and Sarcopenia (AAFS). Australian and New Zealand Society for Sarcopenia and Frailty Research (ANZSSFR). European Association for the Study of Obesity (EASO). European Geriatric Medicine Society (EuGMS). European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO). European Society for Clinical Nutrition and Metabolism (ESPEN)/ Global Leadership Initiative on Malnutrition (GLIM). Gerontological Society of America (GSA). International Association of Gerontology and Geriatrics (IAGG). International Conference on Frailty and Sarcopenia Research (ICFSR). International Osteoporosis Foundation (IOF). Society on Sarcopenia, Cachexia and Wasting Disorders (SCWD).

Author contributions All authors contributed to the original manuscript

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Data Availability No datasets were generated or analysed during the current study.

Declarations

Conflict of interest All authors declarations of conflicts of interests and declarations of sources of funding can be read here: https://www.eugms.org/fileadmin/images/news/2022/GLIS_Steering_Committee_Rev3.pdf

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