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IS IT POSSIBLE TO DEFINE FRAILTY? WHICH CRITERIA IN 2012?

Matteo Cesari, MD, PhD[1,2,3]

1 Institut du Vieillissement, Université de Toulouse, Toulouse, France
2 Gérontopôle, Centre Hospitalier Universitaire de Toulouse, Toulouse, France
3 INSERM Unit 1027, Toulouse, France

Address for correspondence:
Matteo Cesari, MD, PhD
Institut du Vieillissement, Université de Toulouse; 37 Allées Jules Guesde, 31000 Toulouse, France; Phone: +33 (0)5 61145628, Fax: +33 (0)5 61145640
E-mail: macesari@gmail.com

The term “frailty” is generally adopted in older persons to indicate a state of increased vulnerability to endogenous and exogenous (even minimal) stressors with consequent higher risk of negative health-related outcomes (including falls, hospitalization, institutionalization, disability, mortality). Although the theoretical concept is quite straightforward, its translation into a well-established operative definition is still matter of discussion in the scientific community.

The lack of a unique operative definition may negatively affect the clinical relevance of frailty and limit its investigation. In fact, it is impossible accepting a specific condition without preliminarily determining specific thresholds to distinguish what is normality from what is not. Every pathophysiological mechanism exists as a continuum, and to be clinically appreciated it needs to be categorized. Only in this way, there will be a disease to treat or a specific condition to explore in research. The definition of these thresholds of risk is necessarily based on arbitrary assumptions because limited by the current (and dynamic) knowledge of the underlying mechanisms and the accuracy of available diagnostic instruments. The need of operationalize the definition of frailty is crucial both in geriatric medicine and research. In the clinical setting, the identification of frailty in an older subject is pivotal to put in place preventive programs at a very early (and still reversable) phase of the disabling cascade (primary outcome of interest in geriatrics). Differently, in research, frail subjects might represent the ideal candidates to be recruited in clinical trials aimed at testing the efficacy of interventions against negative health-related outcomes (in particular, disability).

There are multiple possible explanations at the basis of the difficulties of developing a unique assessment instrument of frailty in older subjects. The relatively novelty of this condition represents a first limit. In fact, it cannot be ignored that the preliminary phenotypic descriptions of frailty were proposed in literature only about 10-15 years ago(1, 2). Consequently, the understanding of the biological and clinical foundations of frailty is still at the beginning. For this reason, we should be cautious in drawing definitive conclusions in the evaluation of the topic because our limited current knowledge might easily be confuted in the very next future. In this context, it might be safer to adopt flexible and comprehensive approaches within the limits of scientific validity.

Another possible justification for which frailty is not yet adequately accepted as clinical entity might be due to its heterogeneous manifestation. In fact, frailty is commonly considered as a clinical syndrome(3). As such, its multiple clinically evident features (e.g., weakness, fatigue, weight loss, decreased balance, physical inactivity, slowed motor processing and performance, social withdrawal, mild cognitive changes, and increased vulnerability to stressors) occur in different combinations, with no single sign or symptom sufficient to identify the syndrome itself. Such heterogeneity does not surely help in characterizing frailty with a unique phenotype, limiting the clinical appreciation of this condition.

To capture the multidimensional nature of frailty, it has been suggested that the operational criteria to adopt should be based on the impairment of multiple domains, in particular mobility, strength, balance, motor processing, cognition, nutrition, endurance, and physical activity(4). Consistently, several operative definitions have been developed, all relying on the idea that frailty is determined by the simultaneous recognition of a "critical mass" of signs and symptoms. However, the available algorithms do not provide consistent results, mainly because each one captures different aspects of the syndrome. For example, if the Frailty Index proposed by Fried and colleagues(2) is particularly focused on the physical domain of this condition, the measure designed by Rockwood and colleagues(5) is more specifically aimed at estimating the accumulation of clinical deficits (i.e., symptoms, signs, functional impairments, altered laboratory values). And this example is only based on the two most commonly adopted algorithms! Many other tools (each one with its own peculiarities) exist to identify subjects at increased risk of negative health-related events.

A possible solution in the attempt of unifying the concept of frailty into a unique assessment tool (suitable for both clinical and research use) might be represented by the evaluation of physical performance, in particular mobility (a capacity shared by all living beings(6). It might be argued that physical function is only one of the multiple domains constituting the frailty syndrome, thus providing only a partial evaluation of its multidimensionality(7). Nevertheless, it is particularly interesting that measures of physical performance (such as gait speed) are not only predictive of lower extremities-related outcomes, as it might appear obvious. Gait speed has shown to predict all the major negative health-related events (including disability, hospitalization, institutionalization, falls…) in older persons. Just recently, Studenski and colleagues(8) demonstrated that by only measuring gait speed, it is possible to accurately predict the mean expected survival in a large sample of community-dwelling older persons. In other words, the amount of information provided by gait speed on expected survival was similar to that obtained from a more complex and time-consuming complete clinical evaluation. The capacity of physical performance measures to predict health-related negative events beyond their most immediate domain (i.e., function) is likely due to the multiple physiological mechanisms at the basis of mobility. In fact, mobility results from the proper coordination and function of a wide spectrum of systems, organs, and mechanisms. Physical performance have been associated with subclinical and clinical outcomes, and gait speed has been suggested as an additional vital sign(9, 10). If we consider all these data, taking also into account the consistency of these findings across different species(11), it becomes evident that physical performance measures (and, especially, gait speed) may indeed provide an exact estimate of the biological age.

Finally, the very simple nature of these tests makes them extremely clinical-friendly. It is extremely easy and time-saving the observation of a subject's walk for few second over a 4-meter track to determine the presence of an increased vulnerability to stressors. An example on how to operatively implement the concept of frailty in the daily practice is provided by the Gérontopôle of the University of Toulouse, (France). Since September 2011, the Gérontopôle of the University of Toulouse has begun to systematically screen all the older persons with gait speed assessment. Those resulting slower than 1.0 m/sec are then

forwarded to the geriatrician for a comprehensive geriatric assessment and the planification of an intervention specifically-tailored on the patient's needs(12). Otherwise, subjects with no evidence of relevant gait impairment are referred to their medical practitioner or to other specialists (if needed). This approach shares the very basic foundations of the frailty concept that are the identification subjects at increased risk of events to provide early clinical support. Moreover, frail subjects are offered the opportunity to be enrolled in the most innovative ongoing trials aimed at preventing disability.

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