

The frailty syndrome

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Abstract

Frailty is an important geriatric syndrome with a high prevalence in the community population. It can be seen as a state of extreme vulnerability and loss of resistance to external stressors resulting in an increased risk of several adverse outcomes. Although linked with ageing, disability and co-morbidity, many consider frailty as a distinct clinical and pathophysiological entity. A problem with this concept is the search for a suitable operational definition that can be used in clinical practice. Many definitions exist in literature, but there is no agreement on the best measure. The more popular of these definitions include Fried's model of frailty and the Frailty Index. Identification of frailty is recommended to target interventions and help improve outcomes.

Keywords Comprehensive geriatric assessment; frail older people; frailty; frailty assessment; frailty-rating scale; frailty syndrome; older people

Introduction

The size of the older population in the world is increasing, with the global population of those aged ≥ 65 years set to double by 2050 from 901 million to 2.1 billion. In the UK, 18% of the total UK population are currently aged ≥ 65 years, a proportion set to rise to 23% by 2035. Although this is a testament to the progress seen in society in general, and healthcare in particular, it creates additional challenges for health and social care systems. It is important that strategies are put into place for the care of the older population, to ensure that those who are most at risk are able to receive the necessary help. However, the primary challenge to healthcare systems is not ageing per se but the association between ageing and frailty. Why are some very old people able to run marathons, whereas others, even without major comorbidities, have marked functional decline? This article tackles the issue of frailty and the problems that are faced within this growing area of geriatric medicine.

What is frailty?

Frailty is a multidimensional geriatric syndrome with important implications for the care of the older population. Exactly why

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Key points

- The number of the older population in the UK is increasing, and frailty may play a role in identifying those at risk of adverse outcomes
- Key domains of frailty include physical function, nutritional status, mental health and cognition
- Lifestyle interventions can delay the progression of frailty in the community setting
- It is important to identify frailty in all healthcare settings to help improve patient trajectories
- Comprehensive geriatric assessment is likely to improve outcomes for older people with frailty and urgent care needs

some people develop frailty whereas others do not is unknown, but frailty can be thought of as a dynamic state of increased vulnerability and loss of resistance to external stressors, resulting in an increased risk of adverse outcomes.

Although it is associated with age, disability and co-morbidity, most would agree that frailty is a distinct entity as they are not synonymous. Disability is concerned with the difficulty a patient faces in carrying out activities of daily living (ADLs), and co-morbidity is the presence of two or more diseases. Not all of the oldest old are frail, and not all frail people are aged. There is a stereotypical image of an older person with frailty being of low weight, but frailty is associated with both low weight and obesity. Frailty can play an important role in planning resources in the future, although there is still contention over the optimal way to assess and identify it.

Definitions of frailty

There are two general schools of thought on how best to define frailty: rule-based definitions and a frailty index (FI).

Rule-based definitions: these include a pre-set list of components designed to assess individual patients. The best known is the definition proposed by Fried et al., which consists of five criteria based on hypothesized signs and symptoms of frailty:

- shrinkage (loss of height or weight)
- weakness
- exhaustion
- slowness
- low activity.

The proposed measures to quantify each component are shown in [Table 1](#). A person is graded as frail if they score positive in three or more of these criteria, and frailty defined by this means has been shown to be associated with numerous long-term adverse outcomes (see [Table 4](#) below). *Pre-frail* is defined as scoring one or two out of five criteria.

This is, however, by no means a 'gold standard' definition, and it has come under criticism as it may not reflect a fully multidimensional definition of frailty; for example, it excludes

Domains and criteria for the Fried model of frailty

Characteristic of frailty	Measure proposed by Fried et al.
Shrinking	Unintentional weight loss of >4.5 kg (>10 lb) in the previous year
Weakness	Grip strength in the lowest 20% of the population
Exhaustion	Self-reported exhaustion, according to the Center of Epidemiological Studies – depression scale
Slowness	A 15-foot (4.6-m) gait speed falling in the slowest 20% of the population
Low activity	Values for kcal/week burned in the lowest 20% of the population

Table 1

measures of cognition and mental health, which are putatively important additional markers in frailty. In addition, the complexity of the measurement criteria may also limit the scale's suitability, as an understanding and definition of the baseline level for the local population are needed before the scale can be successfully used.

Subsequent research has improved the scale's predictive validity by the addition of the domain of cognitive decline. In addition, another scale, developed from data obtained in the Study of Osteoporotic Fractures (SOF), has attempted to simplify the definition of frailty and is more suited to busy clinical settings. This is comparable to Fried's model of frailty in terms of its predictive properties; the list of criteria and their measurements can be seen in [Table 2](#).

Frailty index: this is a frailty-rating scale based on the principles of an accumulation of deficits and their association with frailty. The frailty status is constructed by counting the number of defined deficits per person – the more deficits a person has, the more likely that person is to be frail. In this operational definition, the level of frailty is reported as the ratio of deficits present to the total number of potential deficits. An advantage of this approach is the flexibility of the deficits that can be included, which can be signs and symptoms of disease, disability or biochemical abnormalities. There are no set deficits or components that should be measured in an FI, and scales can be constructed as long as they satisfy the criteria shown in [Table 3](#).

Criteria for the SOF model of frailty

Characteristic of frailty	Measure proposed by Ensrud et al.
Shrinking	Weight loss of $\geq 5\%$ between examinations
Exhaustion	Self-reported exhaustion according to the Geriatric Depression scale
Physical function	Inability to rise from chair five times without using the arms

Table 2

Guidelines for deficit selection and construction of an FI

- Variables must be deficits associated with health status
- Deficits must generally increase with age
- Chosen deficits must not saturate too early with age (e.g. presbyopia has a ceiling effect as it is nearly universal by age 55 years)
- The deficits that make up the FI must cover a range of systems
- On serial use on the same people, the items in the FI must be the same. This does not apply when comparing samples rated by the FI

Table 3

Despite this scale satisfying the concepts of what frailty is, it is still debatable whether it is suitable in clinical settings, where time pressures may lead to less acceptability among clinicians and patients. In addition, the weighting of a variable may also need to be considered, as certain deficits may be more associated with adverse outcomes than others.

Electronic forms of the FI have been developed that can be automatically populated from clinical data, reducing the resources required to complete the index.

Consequences of frailty

Frail people are at risk of numerous adverse outcomes, both short-term and long-term, that are thought to be related to a lack of physiological reserve (or 'allostatic' load). With the onset of a physical or emotional injury or challenge, a frail person is more likely to lack the ability to cope, leading to a decline in health and function, with implications for health services and the person's welfare. Frailty, defined by either of the broad methods described above, is associated with poor outcomes, including mortality and worsening of dependence in ADLs. The impact of frailty on some common adverse outcomes is shown in [Table 4](#). It is suggested that targeting frailty screening on those who suffer from such outcomes may be a clinically useful approach.

Attitudes and misconceptions

In 2015, a report was published into patient, public and health professionals' attitudes and perceptions towards frailty.¹ Older people do not tend to identify with being labelled as 'frail' but

Three-year incidence outcomes and hazard ratios for frail patients

Outcome	Incidence % (3 years)	Hazard ratio 3 years adjusted for co-variables	95% confidence interval
First fall	28	1.29	1.00–1.34
Worsening ADLs	39	1.67	1.41–1.99
First hospitalization	59	1.13	1.03–1.25
Mortality	18	1.49	1.11–1.99
Worsening mobility	51	1.58	1.41–1.76

Table 4

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