

Frailty: help or hindrance?

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J R Soc Med 1997;90(Suppl. 32):23-26

SECTION OF GERIATRICS & GERONTOLOGY, 29 FEBRUARY 1996

INTRODUCTION

About 15% of the over 65s are frail—something which is readily recognized but rarely defined. After considering helpful and unhelpful definitions, the concept of frailty as an easily perturbed dynamic balance between assets and deficits is explored. This notion refutes the perverse dichotomy between 'social' and 'medical' models. Arising from this, the following questions are asked and, to some extent, answered: is frailty measurable?; is frailty predictable?; is frailty preventable?; is frailty reversible?; is frailty researchable?

SOME DEFINITIONS

To distinguish between the very well and the very ill is not difficult for either the lay person or the medically sophisticated, but it is less clear what is meant by the term frailty or indeed whether the concept has any value at all. Is it merely a surrogate for diminished physiological reserve or inability to undertake independently the activities of daily living?

Brown *et al.*¹ draw attention to two related meanings of frail. Frail, as a property, denotes someone who is weak, feeble, ailing, sickly, infirm; it implies that the person needs treatment. Frail, as a predicament, indicates that the person is fragile, flimsy, easily broken or destroyed; it implies that the person needs protection. None of us wants to be described as frail and it readily becomes a pejorative term leading to rejection of 'the frail'. Alternatively, the definition that the frail are those who particularly benefit from geriatric activity begs the question of what about those who do *not* benefit. One group² termed these the 'severely impaired' or 'too sick' and thereafter concentrated on the less ill.

An early definition: 'elderly people with multiple problems . . .'³ paints a melancholic picture of irrevocable distress and irreversible decline. In a fee-for-service Diseases Related Groups environment, they are also 'revenue losers' as far as hospitals are concerned. Gerety *et al.*⁴ ruefully comment: 'nursing homes without an emphasis on rehabilitation may perpetuate the poor functional level that exists on hospital discharge': McFall and Miller⁵ highlight the disability and chronicity facets of

frailty which they define as: 'inability to perform at least one activity of personal care or management of daily affairs for at least 3 months'. Weiner *et al.*⁶ in a biological definition, recognize the component of diminished capacity, particularly of physiological reserve, with: ' . . . the result of accumulated losses within physiological systems resulting in reduced function and intolerance to challenge'. Thompson *et al.*⁷ studying subjects in respite programmes defined the frail as: 'older people unable to provide for themselves', emphasizing the dependence of frail people on formal and informal supporters. O'Connor⁸ reporting on social welfare recipients (and excluding the 'confused'), captures the threatened element in being frail with: 'elderly people living alone and in many ways in a socially vulnerable position'. In 1995 *Medline* produced a MeSH definition which certainly aids searching the literature: 'older adults or aged individuals who are lacking in general strength and are unusually susceptible to disease or other infirmity'. This term produced 563 articles (from 1992 to January 1996) of which I deemed 164 to be 'relevant' (giving a search of 35% precision)⁹. Of these, 76 had 'frail' in their titles but only 20 had a definition of frail or frailty in the text.

Speechley and Tinetti¹⁰ sought to operationalize frailty by studying 336 community-dwelling subjects randomly selected from an epidemiological population. They looked for both frailty and for vigour, its antonym, semantic and somatic. Subjecting their findings to principal components analysis, they derived the following characteristics of being frail: 80 ≤ years, depressed, sedentary, loss of near vision, taking sedatives, balance and gait problems, diminished shoulder/knee strength and lower extremity disability; and of being vigorous; <80 years, absence of cognitive impairment, frequent exercise and good near vision. They defined frailty as the presence of four or more frail characteristics and less than two vigour characteristics: vigour was defined as having less than three frail characteristics and at least three vigour characteristics. Their study population comprised 26% vigorous subjects, 20% frail subjects with 54% being 'transitional'.

The semantic approach (property: frail/strong; predicament: frail/robust) acknowledges the continuum between extremes and guards against an all-or-none categorization of frailty. The spectrum also reminds us that although many subjects decline from strong/robust to frail, some reverse the trend, and hence allows, for the reversibility of frailty.

Is frailty a synonym for disability? Many are disabled¹¹ but not frail, although disability may lead to frailty. All frail subjects are disabled to some degree. To describe frailty solely in terms of disability is inadequate and therefore misleading. Similarly, frailty is inversely related to function but is not its direct reciprocal. A related idea is that frailty can be considered as the product of excess demand imposed upon reduced capacity. This safeguards the notion of age-related diminishing physiological reserve.

A BALANCE MODEL

The above definitions have come a long way from the ‘confused, restless, incontinent old patients’ of 1968¹² but are they sufficiently precise and comprehensive? Rockwood *et al.*¹³ have perceptively captured the essence of frailty and added the important controlling principle of precarious balance easily perturbed (see Figure 1). When assets clearly outweigh deficits, the patient is not frail and in the absence of serious acute illness would be expected to live independently in the community. Conversely, where deficits obviously outweigh assets then the patient is more likely to be in institutional long-term care or, at least, require substantial community long-term care. The balance notion identifies subjects whose balance is easily upset by a relatively minor reduction in assets (e.g. a son-in-law’s myocardial infarction reduces a daughter’s support for a frail mother) or an apparently minor increase in deficits (e.g. a Colles’ fracture on the non-hemiplegic side dramatically induces acute disability). The perturbation of balance precipitates the patient into hospital or other institutional care with its consequent dangers. This balance model, developed from an idea of John Brocklehurst¹⁴ and elaborated by Duncan Robertson, insists that multiple interacting factors are present together with complex relationships both within assets and deficits and between them. It refutes that perverse dichotomy between ‘social’ and ‘medical’ models which has stifled debate, constrained thought and divided colleagues. It

clearly demands interdisciplinary assessment and definition of solutions. The model recognizes the contribution of all, viz. the patient, informal carer, formal carer and health care systems. It insists that *all* contributing factors to the maintenance of the balance be assessed and, preferably, measured.

Validation of the balance model requires that it predict relevant and non-arbitrary outcomes. The adverse outcomes customarily considered as dependent variables are: mortality; use of acute care services; use of community long-term care; and the need for permanent institutional care. Illness (and its approximate reciprocal, health) is a predictor of these adverse outcomes but the model encompasses more predictors than mere diagnostic labels (even if tempered with an estimate of disease severity). Similarly, health practices are reliable predictors of the above outcomes.

One of the most reliable predictors of adverse outcomes taps the patient’s inner response to adversity. Mossey and Shapiro (1982)¹⁵ showed many years ago, in an epidemiological sample, that a positive response to the question: ‘For your age would you say, in general, your health is excellent, good, fair, poor or bad?’ was a more reliable predictor of adverse outcomes than that afforded by only considering medical and psychiatric diagnoses. A comparable question has been used in various populations of old people (the healthy old¹⁶, those with impaired activities of daily life (ADL) function¹⁷, and epidemiological sample¹⁸) and its reliability as a predictor been confirmed. By resources, one does not only mean financial but resources include groups of people (e.g. churches, Alzheimer Society branches) and individuals, particularly confidantes¹⁹. The greatest antidote to ill-health is the abolition of poverty²⁰ but no government acknowledges the implications of this.

By carer one typically means the spouse or a middle-aged woman (daughter or daughter-in-law). The ‘childless widow, living alone’ often heralds limited informal personal care. The overwhelming evidence is not that ‘families don’t care’ but rather that a family is just not available either because there is no family or that geographical mobility has removed the family from the needy old person²¹.

In considering deficits, geriatricians challenge the traditional parsimonious approach to the diagnostic process, but rather seek multiple interacting pathologies. Dementia has long been recognized as an important predictor of adverse outcomes whereas delirium was thought to be usually reversible. It is increasingly clear that much delirium is, in fact, superimposed on an underlying dementing process (acute-on-chronic brain failure²²) and, of itself, carries a gloomy prognosis²³.

The relation between *disability* and *frailty* has already been discussed. Dependence on others is a consistent

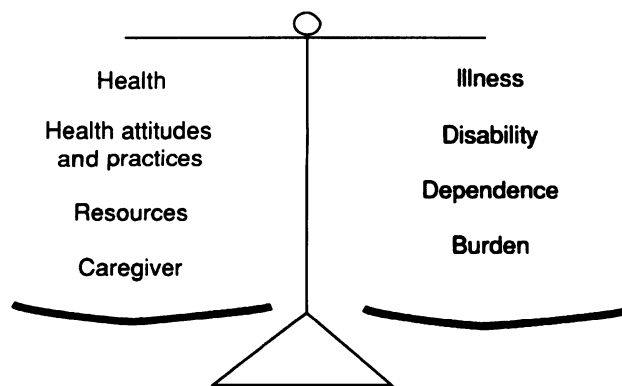


Figure 1 Factors supporting and threatening an elderly person’s maintenance in the community

predictor of use of home care programmes, institutionalization, prolonged stay in hospital and mortality. Carer burden is reviewed by McFall and Miller⁵. It is often the 'last straw' precipitating institutional admission as was shown many years ago²⁴. Detection and reduction of carer burden are major activities of geriatric and psychogeriatric services.

Is frailty measurable?

One challenge to the balance model is whether the individual components can be measured validly, reliably and 'sensibly'²⁵. A detailed response to this is beyond the scope of this paper but as an example, MacKnight and Rockwood²⁶ carefully analysed the available measures of balance, gait and mobility, and showed that these facets of frailty are measurable.

A further challenge to the balance model is whether the interactions between the components can be followed over time. Here our group offers goal attainment scaling (GAS) as a means of identifying interactions and interventions together with predicting achievement, recording progress and measuring the degree of ultimate success or failure²⁷⁻²⁹. We discuss with patients and carers the GAS process so that all agree upon specific goals of physical and mental restoration.

Is frailty predictable?

Frailty is age-related not age-caused. Age *per se* is a principal predictor of frailty so that the frail comprise a majority of the over 85s³⁰. Sudden catastrophic illness which the patient survives is also a strong predictor of frailty as assets are abruptly outweighed by an overwhelming deficit. As the balance model predicts, enough changes in the components will induce the precarious balance which we regard as the essence of frailty in the non-institutionalized. Lower extremity function is a predictor of disability and potentially of frailty too³¹.

Is frailty preventable and reversible?

Although a whole issue of the *Journal of Gerontology* was devoted to this topic³², I specifically refer to deconditioning³³ which is essentially a retrospective diagnosis, i.e. it is what one had before its features were eliminated. Deconditioning is the functional loss attributable to disuse consequent upon bedrest and immobility. It is additional to the original diagnoses and is preventable and reversible. In considering possible prevention, one must first define the risk factors for deconditioning which are: (a) acute illness managed with bedrest; (b) acute loss of mobility; (c) chronic disease with gradual loss of mobility; (d) the imposition of chemical and physical restraints³⁴; (e) the presence of depression or grief; and (f) any cause of sustained fatigue

and dependence³⁵. Removal or attenuation of these factors will prevent or reduce deconditioning and thus prevent or reduce the associated frailty. Fiatarone *et al.*³⁶ courageously and conclusively showed that even in the very frail (viz. long-stay patients in nursing homes of whom half had evidence of cognitive impairment and 38% were aged over 90 years), appropriate muscle-strengthening exercise resulted in gains in mobility, balance and independence. They conclude: 'high-intensity resistance exercise training is a feasible and effective means of counteracting muscle weakness and physical frailty in very elderly people' (whereas non-specific physiotherapy provided only 'modest benefits'³⁷). This work powerfully adds to the evidence that exercise in old age is beneficial and protective and can reverse frailty.

Is frailty 'researchable'?

The usual answer is 'no', for diverse, if not contrary, reasons. First, frailty is considered as too complex and difficult an entity to study, thereby, in Roy Fox's evocative phrase, 'failing to embrace the complexity' of the concept. Contrariwise, frailty is regarded merely as a synonym for the number and severity of diseases thus missing the diversity and subtlety of the balance model. Nevertheless, we contend frailty is researchable. Two studies confirm the 'testability' of frailty: the first from a clinical population; the second from an epidemiological sample.

Jarrett *et al.*³⁸ studied 193 consecutive patients (aged over 64 years) admitted through emergency to the medical firms of a teaching hospital. They accurately ascertained the patients' ADL function 2 weeks before admission, on admission and on discharge. They categorized the clinical features of the presenting illness as typical, atypical or mixed. For example, delirium as a presentation of meningitis was 'typical' whereas delirium as a presentation of respiratory infection was deemed 'atypical'. They determined the outcomes of: mortality, admission to long-term institutional care, failure to regain pre-morbid function and length of stay over 30 days. Using a Barthel index score of 95 to dichotomize the subjects into 'frail' and 'non-frail', they found that 59% of frail patients' clinical presentations were atypical, whereas only 25% of non-frail patients had an atypical presentation ($P < 0.001$). Patients with an atypical presentation were more likely to receive sedatives, be physically restrained, develop pressure ulcers and undergo fewer complex investigations than those with typical presentations. Clearly, it pays the old to study medical textbooks before presenting their problems to doctors. Pre-morbid Barthel scores, atypical presentation and functional decline on admission all independently predicted adverse outcomes [odds ratios (95% confidence limits) were: 2.48 (1.17 < 5.22), 2.37 (1.2 < 4.67), 5.64

(2.37 < 13.44), respectively]. Age and severity of disease were not predictive of adverse outcomes and notwithstanding the Danish prince's admonition³⁹ nor was gender.

Using the Canadian Study of Health and Aging database and accepting that institutional admission for long term care is a powerful marker of frailty (the balance has clearly been tipped by overwhelming deficits), Rockwood *et al.*¹⁸ showed that 'frailty is best understood as a multifactorial construct which, while highly associated with functional independence, [reflects] a complex interplay of biological, medical, social and psychological factors'. They warn 'against over-reliance on single constructs (such as death or functional capacity) in the evaluation of specialized geriatric interventions'.

Not only are frail old people challenging to assess and rewarding to care for, frailty too is challenging to explore and rewarding to pursue.

Acknowledgments I am indebted to the work of the Frailty Interest Group of the Division of Geriatric Medicine, Dalhousie University (Ken Rockwood, Roy Fox, Paul Stolee, Karen Stadnyk, Dan Carver).

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