

COMMENTARY

Combating frailty and sarcopenia in aging populations: Switching to a more positive paradigm

Jean Woo 

Department of Medicine & Therapeutics,
Faculty of Medicine, Chinese University of
Hong Kong, Shatin, Hong Kong SAR China

Correspondence

Jean Woo, Department of Medicine &
Therapeutics, Faculty of Medicine, Chinese
University of Hong Kong, Shatin, Hong Kong
SAR China.

Email: jeanwoowong@cuhk.edu.hk

Abstract

Frailty may be used as a public health indicator of aging well for projection of health and social care resource allocation. Frailty assessments have been adopted by various medical as well as surgical specialties as part of prognosis in influencing choice of therapy, although the assessment tools are even more heterogeneous than those in the gerontological fields. Recently, the World Health Organization called for a life course approach to healthy aging, placing the emphasis on function, expressed as intrinsic capacity, which would address concerns with the negative image of frailty and with the overemphasis on deficits. The impact of social and physical environments is taken into account in the concept of resilience. These are all related concepts that differ in the setting in which they are used. *Frailty* may be more useful in clinical management in hospitals and residential care homes, as well as in community models of care. *Intrinsic capacity* could be used for development of health-promotion policies and service models across the life course; mainly primary care with low resource needs, using a step-care approach. *Resilience* could be considered an overarching holistic concept covering physical, psychological, and environmental domains, which is still in the research arena.

1 | INTRODUCTION

Frailty is the essence of geriatric medicine that expresses needs in a concise, quantifiable, and measurable way that can be understood by clinicians, health managers, and policy-makers. It has an underlying pathophysiology representing multisystem dysregulation and homeostatic failure.¹ Although there is no consensus regarding a single instrument of assessment, there is universal agreement regarding its importance, judging by the increasing volume of research that has been published in the past 20 years, initially in the field of geriatrics and gerontology, and more recently in other clinical specialties. Whatever assessment tool is used, there is general agreement that it is a prevalent condition with increasing age, affecting approximately 20% of those aged 85 years and over. With population aging worldwide, the frailty phenotype is increasingly

relevant to the health and social care of older people.^{2,3} Frailty may also be assessed using the multiple-deficit approach promoted by Rockwood⁴ and operationalized in the hospital setting as the electronic Frailty Index.⁵ It has also been used as a public health indicator⁶ and in examination of social determinants of frailty.⁷ These two concepts are not necessarily the same, since the Fried frailty phenotype describes a physiological state that occurs before the onset of disability, while the deficit accumulation model includes diseases and disability. As for diseases, prevention, screening, diagnosis, prognosis, and treatment may be applied to this entity.⁸ It may: be used as a predictor of service utilization that would inform service provision needs⁶; be used as a public health indicator of aging well for projection of health and social care resource allocation⁹; and represent an important entity to inform social and health policies, including health promotion.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2019 The Authors. *Aging Medicine* published by Beijing Hospital and John Wiley & Sons Australia, Ltd.

Frailty research has also developed as for other chronic diseases in attempts to characterize the condition by studying underlying genomic, proteomic, and metabolomic factors (“frailomics”),^{10,11} as well as how the social and physical environment, such as urban design, may contribute to frailty.¹² As for other diseases, there are strong socioeconomic determinants⁷ and there is a close association with psychological well-being indicators.¹³

Frailty assessments have been adopted by various medical as well as surgical specialties as part of prognosis in influencing choice of therapy, although assessment tools are even more heterogeneous than those in the gerontological fields.^{14–22}

The importance of geriatric syndromes in addition to non-communicable diseases in public health necessitates a comprehensive response in aging populations to achieve healthy aging with an emphasis on function. This perspective is promoted in the World Health Organization's life course approach on healthy aging, which calls for measures at every life stage to maximize or preserve function at later ages.²³ Integral to achieving this goal is the provision of the Integrated Care for Older People (ICOPE) primary care model, which may be applied to middle- and low-income countries in addition to high-income countries. The ICOPE document calls for a step-care approach in screening for sensory impairment, undernutrition, mobility disability, cognition, and psychological states.²⁴ Tools for measurements in these domains are being developed and field-tested in some middle- and low-income countries. The term *intrinsic capacity* has been coined as a descriptor of an individual's capacity in these domains that may be applicable throughout the life course.^{25,26} *Frailty* may be regarded as the opposite of *intrinsic capacity* when applied to the phase of the declining trajectory of aging, before the onset of disability.

2 | RELATIONSHIP BETWEEN FRAILTY, DISABILITY, SUCCESSFUL AGING, INTRINSIC CAPACITY, AND RESILIENCE

Historically, the field of aging has been dichotomized into medical (or health) and social perspectives, and it is only in recent years that there have been calls for a need to integrate these disciplines in order for a person-centered approach to be adopted in both research and service provision. Thus, inevitably there are overlaps in concepts represented by *frailty*, *successful aging*, *intrinsic capacity*, and *resilience*, with *successful aging* and *resilience* developing from the social science field, and *frailty* and *intrinsic capacity* developing from the health science field. Aging from a person-centered perspective necessitates a consideration of how these concepts are related. In recent years, various studies have examined the concept of *successful aging* and what it means to older people; its definition has changed from an absence of disease towards that emphasizing function. The indicators of function, and therefore successful aging, are similar to those used in frailty research, hence successful aging and frailty may be considered opposite sides of the same coin.²⁷ *Intrinsic capacity* is a descriptor that may be used throughout the life course,

but when applied to the pre-disability phase of declining age trajectory, may be regarded as the same as *frailty*. The World Health Organization has proposed indicators of intrinsic capacity under five domains, some of which overlap with some frailty indicators, such as walking speed.²⁶ Resilience may be regarded as made of up a personal characteristic (which may be biological or psychological) acting in concert with environmental factors (physical or social) that enables a person to overcome an adverse event.²⁸

These different terms may be used in different settings. *Frailty* and *sarcopenia* (which may be considered physical frailty) would be more useful in clinical management in hospitals and residential care homes, as well as in community models of care. *Intrinsic capacity* could be used for development of health-promotion policies and service models across the life course: mainly primary care with low resource needs, using step-care approaches rather than professionals at the initial steps. *Resilience* could be considered an overarching holistic concept covering physical, psychological, and environmental domains, which is still in the research arena, but addresses the concern with the negative image of aging and stigmatization.

3 | A MORE POSITIVE PARADIGM FOR AGING POPULATIONS

The above discussion provides a more positive paradigm for aging populations to show individuals as well as policy-makers how healthy aging may be achieved, and that this demographic change is not inevitably accompanied by dependency and increasing need for institutional care. The emphasis should be on primary care, being central to the prevention of increasing burden of geriatric syndromes, and hence increasing health and social service resources. A descriptor of aging that is not considered stigmatizing may stimulate changes towards more age-friendly physical and social environments. It may also be used to address various inequalities to be tackled as part of the United Nations Sustainable Development Goals. Geriatricians have a key input to all these initiatives as they function outside of the hospital paradigm.

4 | HONG KONG CASE STUDIES

Hong Kong currently has the longest life expectancy at birth for men and women in the world. It has well-established health and social services under separate administrations. Primary care is largely provided by the private sector. Health and social policies are still targeted towards prevention and treatment of chronic diseases in hospital settings, a model that is not sustainable. A recent review of elderly services concluded that the way forward is to develop community care with medico-social integration,²⁹ with the setting up of community health centers using a nurse-led approach.

The Hong Kong Jockey Club Charities Trust, a major philanthropic organization with a major theme in supporting projects relating to the older population, is supporting two initiatives that explore

newer models of service delivery, emphasizing empowerment, self-management, behavior change, and use of technology.

4.1 | Tai Po Cadenza Hub

The Tai Po Cadenza Hub was first developed as an experimental model of community care to respond to the multiple needs of older adults, covering functional, psychological, and social care needs in addition to existing models of care for individual diseases. It represents a medico-social model to support frail older people with multimorbidity to remain in the community using a case management approach, covering health promotion for healthy aging, maintenance of health and function, as well as day care service. A frailty-prevention program targeting physical and cognitive frailty has been provided in recent years, and has proved very popular, with long waiting lists. Key features include a 12-week program in groups according to frailty levels that emphasizes strength, fitness, and balance training, as well as cognitive training activities (either computer games or board games) in an enjoyable social atmosphere. Objective improvements in physical and cognitive function measures have been documented, while many users have responded that they feel better and are motivated to continue the program on an ongoing basis. This shows that behavior change has occurred. Continuing development of the Hub includes the possibility of placing this model as the first step of a step-care nurse-led medico-social integrated community model for older people's primary care. This is currently being trialed over many community centers in Hong Kong as the E Health Project.

4.2 | E Health Project

The E Health Project uses technology to capture the unmet needs of 10 000 older people, half of whom also have blood pressure captured twice weekly and relayed to a central server for further action. Older people are based in 80 centers covering all 18 districts of Hong Kong. Advice is provided by telephone following abnormal readings in real time and response to unmet needs are then provided by telephone and also by project staff. The response is guided by an algorithm, so there is huge potential for this process to be automated after detailed evaluation. The categories of unmet needs are similar to those described in the ICOPE program, covering sensory impairments, chewing difficulties, frailty, sarcopenia, memory problems, difficulties with basic and instrumental activities of daily living (IADL), incontinence, polypharmacy, psychological well-being, and financial problems. Substantial unmet needs have been documented so far in many areas: subjective memory impairment (74%), pre-frail and frail conditions (63%), chewing difficulties (38%), incontinence 33%, IADL problems, polypharmacy, low subjective well-being, and insufficient income (all between 20% and 22%), sarcopenia (13%), and poor self-rated health (12%). A detailed description of this initiative is provided elsewhere.³⁰ Evaluation after 1 year showed that those who were frail had increased use of health services.³¹ For those who had blood pressure measured, there was an overall mean reduction of 5.1 mm Hg

in systolic blood pressure and 2 mm Hg in diastolic blood pressure. Overall there was a 50% improvement in subjective well-being, with district variation, so that districts with older people with lower disposable income and education level improved the most after 1 year of the program. Greater variation in repeated blood pressure measurement values was associated with frailty and increased use of hospital services.³²

5 | CONCLUSION

It can be seen that by adopting a life course approach emphasizing healthy aging as a goal, a more positive paradigm may be developed that should guide health and social care policies in response to population aging, using the concept of frailty as a cornerstone of health and social care systems.³³ Community primary care for older people targeting prevention of functional decline and preservation of function, in addition to the usual chronic disease-management approach, can be developed that incorporates empowerment, self-management, and step-care models aided by use of technology.³⁴ Such an approach may reduce the magnitude of the downstream service requirements for an increasingly growing population with dependency.

CONFLICT OF INTEREST

The author declares that she has no competing interests.

ORCID

Jean Woo  <https://orcid.org/0000-0001-7593-3081>

REFERENCES

1. Fried LP. Interventions for human frailty: physical activity as a model. *Cold Spring Harb Perspect Med* 2016;6(6):a025916.
2. Fougère B . Linda Fried ICFSR life achievement award: the 12 major advances in the field of frailty [Press release]. Miami, FL: International Conference on Frailty & Sarcopenia Research; 2018. <http://www.aging-news.net/wp-content/uploads/2018/03/Press-release-ICFSR-2018-n°-2.pdf>
3. Cheung JTK, Yu R, Wu Z, Wong SYS, Woo J. Geriatric syndromes, multimorbidity, and disability overlap and increase healthcare use among older Chinese. *BMC Geriatr* 2018;18(1):147.
4. Rockwood K, Mitnitski A, Song X, Steen B, Skoog I. Long-term risks of death and institutionalization of elderly people in relation to deficit accumulation at age 70. *J Am Geriatr Soc* 2006;54(6):975-979.
5. Clegg A, Bates C, Young J, et al. Development and validation of an electronic frailty index using routine primary care electronic health record data. *Age Ageing* 2016;45(3):353-360.
6. Woo J, Goggins W, Sham A, Ho SC. Public health significance of the frailty index. *Disabil Rehabil* 2006;28(8):515-521.
7. Woo J, Goggins W, Sham A, Ho SC. Social determinants of frailty. *Gerontology* 2005;51(6):402-408.
8. Dent E, Lien C, Lim WS, et al. The Asia-Pacific Clinical Practice Guidelines for the management of frailty. *J Am Med Dir Assoc* 2017;18(7):564-575.

9. Yu R, Wong M, Chong KC, et al. Trajectories of frailty among Chinese older people in Hong Kong between 2001 and 2012: an age-period-cohort analysis. *Age Ageing* 2018;47(2):254-261.
10. Verdi S, Cheesman R, Bowyer RCE, Mangino M, Spector TD, Steves CJ. A genome wide association study identifying a genetic variant for frailty using the TWINsUK cohort. *Age Ageing* 2018;47:ii15-ii18.
11. Rodriguez-Manas L. Contribution of the frailomic initiative to the biological understanding of frailty and resilience. *Innov Aging* 2017;1(S1):665.
12. Yu R, Wang D, Leung J, Lau K, Kwok T, Woo J. Is neighborhood green space associated with less frailty? Evidence from the Mr. and Ms. Os (Hong Kong) Study *J Am Med Dir Assoc*. 2018;19(6):528-534.
13. Coelho T, Paul C, Fernandes L. Physical, psychological and social frailty in prediction of disability and quality of life. *Eur Psychiatry* 2015;30(suppl 1):447.
14. Tse G, Gong M, Nunez J, et al. Frailty and mortality outcomes after percutaneous coronary intervention: a systematic review and meta-analysis. *J Am Med Dir Assoc* 2017;18(12):1097e1-1097e10.
15. Tse G, Gong M, Wong SH, et al. Frailty and clinical outcomes in advanced heart failure patients undergoing left ventricular assist device implantation: a systematic review and meta-analysis. *J Am Med Dir Assoc* 2018;19(3):255-261.
16. Woo J, Yang X, Liu LT, et al. Utility of the FRAIL questionnaire in detecting heart failure with preserved ejection fraction. *J Nutr Health Aging* 2019. In press.
17. Forman DE, Alexander KP. Frailty: a vital sign for older adults with cardiovascular disease. *Canad J Cardiol* 2016;32(9):1082-1087.
18. Afilalo J, Alexander KP, Mack MJ, et al. Frailty assessment in the cardiovascular care of older adults. *J Am Coll Cardiol* 2014;63(8):747-762.
19. Rajabali N, Rolfson D, Bagshaw SM. Assessment and utility of frailty measures in critical illness, cardiology, and cardiac surgery. *Canad J Cardiol* 2016;32(9):1157-1165.
20. Leibowitz D, Jacobs JM, Gilon D, Lande-Stessman I, Ein-Mor E, Stessman J. Cardiac structure and function and frailty in subjects aged 85 and 86 years. *Am J Cardiol* 2016;118(5):760-764.
21. Keller KM, Howlett SE. Sex differences in the biology and pathology of the aging heart. *Canad J Cardiol* 2016;32(9):1065-1073.
22. Collamati A, Marzetti E, Calvani R, et al. Sarcopenia in heart failure: mechanisms and therapeutic strategies. *J Geriatr Cardiol* 2016;13(7):615-624.
23. World Health Organization. Global strategy and action plan on aging and health (2016-2020). <http://www.who.int/ageing/global-strategy>. Published 2016. Accessed December 28, 2018.
24. World Health Organization. Integrated care for older people. Guidelines on community-level interventions to manage declines in intrinsic capacity. <http://www.who.int/ageing/health-systems/icope/evidence-centre/en/>. Published 2018. Accessed December 28, 2018.
25. W. H. O. (World Health Organization) program on maintaining intrinsic capacities with ageing. *Aging News*. <http://www.aging-news.net/w-h-o-world-health-organization-program-on-maintaining-intrinsic-capacities-with-aging/>. Published 2018. Accessed December 28, 2018.
26. Cesari M, Araujo de Carvalho I, Amuthavalli Thiyagarajan J, et al. Evidence for the domains supporting the construct of intrinsic capacity. *J Gerontol A Biol Sci Med Sci* 2018;73(12):1653-1660.
27. Woo J, Leung J, Zhang T. Successful aging and frailty: opposite sides of the same coin? *J Am Med Dir Assoc* 2016;17(9):797-801.
28. Woo J. Frailty, successful ageing, resilience, and intrinsic capacity: a cross-disciplinary discourse of the ageing process. *Curr Geriatr Rep* 2019. In press.
29. Yeoh EK, Lai AHY. An investment for the celebration of aging. Our Hong Kong Foundation website. https://www.ourhkfoundation.org.hk/sites/default/files/media/pdf/OHKF_20161206_Aging_eng.pdf. Published 2016. Accessed December 28, 2018.
30. Woo J, Tong C, Yu R. Chewing difficulty should be included as a geriatric syndrome. *Nutrients*. 2018;10(12): E1997.
31. Yu R, Woo J. The impact of frailty and pre-frailty on healthcare utilization in Hong Kong. Paper presented at: 15th World Congress on Long Term Care in Chinese Communities; December 1, 2018; Hong Kong, China.
32. Woo J, Yu R, Tsoi K, Meng H. Variability in repeated blood pressure measurements as a marker of frailty. *J Nutr Health Aging* 2018;22(9):1122-1127.
33. Woo J. Challenges of population ageing: putting frailty as a cornerstone of health and social care systems. *Eur Geriatr Med* 2018;9(3): 273-276.
34. Morley JE, Arai H, Cao L, et al. Integrated care: enhancing the role of the primary health care professional in preventing functional decline: a systematic review. *J Am Med Dir Assoc* 2017;18(6):489-494.

How to cite this article: Woo J. Combating frailty and sarcopenia in aging populations: Switching to a more positive paradigm. *Aging Med*. 2019;2:7-10. <https://doi.org/10.1002/agm2.12052>