

Prevalence of overlap between frailty, comorbidity, disability, and poor self-rated health amongst community-dwelling near-centenarians and centenarians

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Author's contributions

BHPL conducted the data analysis and wrote the manuscript. JK offered expert advices and commented on the manuscript. KSLC is the principal investigator of the study and commented the manuscript.

1 **Prevalence of overlap between frailty, comorbidity, disability, and poor self-rated health**
2 **amongst community-dwelling near-centenarians and centenarians**

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4 *To the Editor:*

5 Frailty refers to systematic vulnerability to poor adjustment (e.g., mortality, hospitalization)
6 to a stressor event (e.g., a fall accident), and prevails at the extreme of longevity.¹ In the
7 Oporto Centenarian Study, 36.0% of their centenarian participants were pre-frail, whereas
8 60.0% were frail, based on the Fried et al's scale.² In the Hong Kong Centenarian Study,
9 based on a 32-item frailty index, we found that 16% of the participants were non-frail, 59%
10 were pre-frail, and 25% were frail.³

11

12 Near-centenarians and centenarians are generally regarded as the sickest and frailest in the
13 society, yet few centenarian studies have explored the relationship between frailty and its
14 health consequences. Since frailty can be screened and managed by multicomponent
15 interventions,^{1,4} a deeper understanding of the overlap between frailty and multidimensional
16 health outcomes may help clinicians and policy makers appreciate the importance of frailty
17 on the well-being of these exceptional survivors. Frailty, comorbidity, and disability correlate
18 strongly amongst each other in older people.⁵ However, their interaction with self-rated
19 health (SRH), a robust proxy of physical health and health behaviors, amongst

20 near-centenarians and centenarians remains unclear.⁶

21

22 We therefore performed a cross-sectional data analysis on 121 community-dwelling Chinese

23 near-centenarians and centenarians (mean age: 97.7 ± 2.3 , range = 95 to 108; female =

24 74.2%) to examine the prevalence of overlap between frailty, comorbidity, disability, and

25 poor SRH. Frailty was defined as scoring more than 2 out of 5 on the FRAIL scale.⁵

26 Disability was indicated by having 1 or more dependent instrumental activities of daily living

27 (IADL: shopping, preparing meals, laundry, public transport, telephoning, and managing

28 finances). Comorbidity was defined as scoring over 0 on the Charlson Comorbidity Index.⁷

29 Participants who responded to the single-item question “How do you rate your current health”

30 with “very poor” or “poor” were regarded as having poor SRH. This study was approved by

31 the institutional review board of University of Hong Kong. Informed consent was obtained

32 prior to the study.

33

34 Based on the FRAIL scale, 20% of our participants were regarded as non-frail (scoring 0),

35 56% were pre-frail (scoring 1 to 2), and 24% were frail (scoring more than 2). Figure 1

36 illustrates the prevalence of overlap amongst frailty, disability, comorbidity and poor SRH.

37 Every frail participant had at least one of comorbidity, disability, or poor SRH. The

38 percentages of co-occurrence of frailty with poor SRH, disability, and comorbidity were

39 32.4% (24 participants out of 74), 31.4% (22 out of 70), and 26.0% (19 out of 73)
40 respectively. 71.0% of the participants exhibited either poor SRH, disability, comorbidity or a
41 combination of them, but were not frail. Among all possible combinations, the most populous
42 combination was having all four symptoms (frailty, poor SRH, disability, and comorbidity; n
43 = 17; 14.0%). 11 (9.1%) participants could be regarded as “robust” as they did not possess
44 any of the four parameters.

45

46 Thus, frailty significantly overlaps with adverse functional (IADL dependency), medical
47 (comorbidity), and subjective (poor SRH) health outcomes. Every frail participant possesses
48 at least one adverse outcome. However, exhibiting one of these adverse outcomes does not
49 necessarily confer frailty, even amongst these extremely old adults. Furthermore, 90.9% of
50 our participants were non-frail, pre-frail or having just one or a combination of comorbidity,
51 disability, or poor SRH. Thus, we suggest that there is much heterogeneity in the frailty
52 statuses among near-centenarians and centenarians. Our findings underscore the importance
53 of frailty screening for these exceptional survivors, as their frailty status may lead healthcare
54 professionals to discover multiple underlying health and psychosocial issues.

55

56 The progression of frailty can potentially be slowed down or even reversed by interventions
57 such as resistance and aerobic exercises, caloric and protein support, dietary supplementation,

58 and reduction of polypharmacy.^{1,4} Programs based on the principles of Traditional Chinese
59 Medicine, such as Qigong and Tai Chi, have also attained preliminary successes in improving
60 disability, mobility, handgrip strength, and reducing falls.^{8,9} Multi-dimensional programs
61 knitting exercises, dietary supplementation, and psychosocial intervention together may
62 ultimately help promote autonomy and participation in family and social roles, hence adding
63 life to years.¹⁰

64

65 This is the first study to report the prevalence of overlap among frailty, comorbidity, disability,
66 and poor SRH in community-dwelling near-centenarians and centenarians. Our findings show
67 that frailty status may indicate deficits in multiple dimensions of health amongst these very
68 old adults. We also found a significant proportion of community-dwelling near-centenarians
69 and centenarians who are not frail, suggesting that frailty could be avoided, or even reversed,
70 despite being at the tenth decade of life.

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Elements of Financial/Personal Conflicts	BHPL		JK		KSLC	
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Employment or Affiliation		✓		✓		✓
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Stocks		✓		✓		✓
Royalties		✓		✓		✓

Expert Testimony		✓		✓		✓
Board Member		✓		✓		✓
Patents		✓		✓		✓
Personal Relationship		✓		✓		✓

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Figure 1. Prevalence of overlap among frailty, disability, comorbidity, and poor SRH. SRH = self-rated health.

Figure 1.

