Community Frailty Screening

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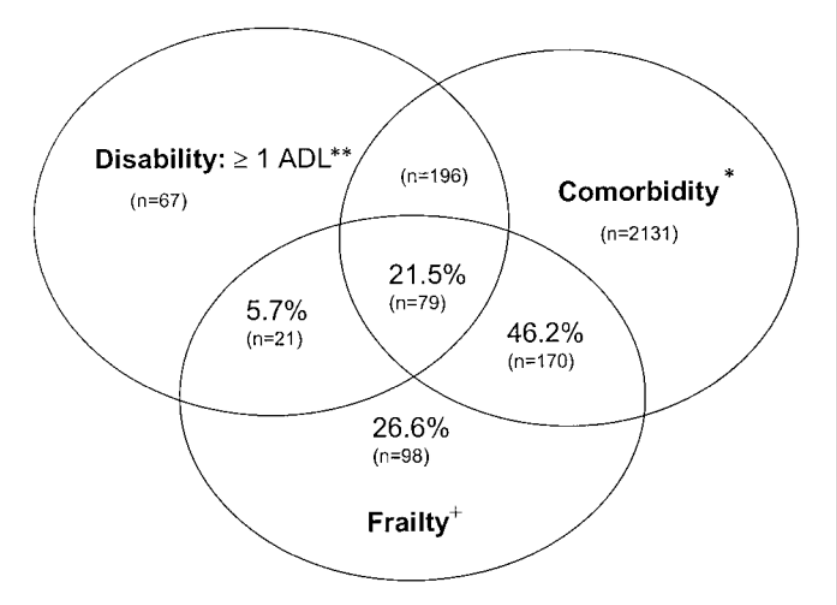
Outline

- What is frailty?
- Why is frailty important?
- How should frailty be recognized?
- How common is frailty?
- How should frailty be managed?

What is frailty

- Frailty is a clinically recognized state of increased vulnerability
- It results from ageing associated with a decline in the body's physical and psychological reserves
- Frailty ≠ Disability or Co-morbidity



Fried et al., 2001;56 J Gerontol A Biol Sci Med Sci (3):M146-56

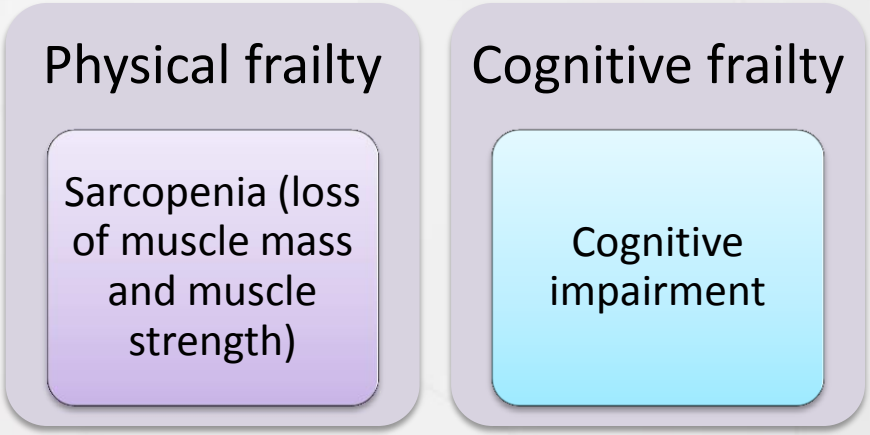
Why is frailty important

- Older people living with frailty are at risk of dramatic deterioration in their physical and mental wellbeing after an apparently small event which challenges their health (e.g., infection, new medication etc.)

- Frailty predicts adverse health outcomes, such as quality of life, use of hospital services, and mortality, independent of diseases and disability

Physical frailty vs. cognitive frailty

- Emerging evidence has suggested that cognitive impairment also contribute to frailty. Indicators of frailty (e.g., gait speed and grip strength) predict cognitive decline and incident dementia



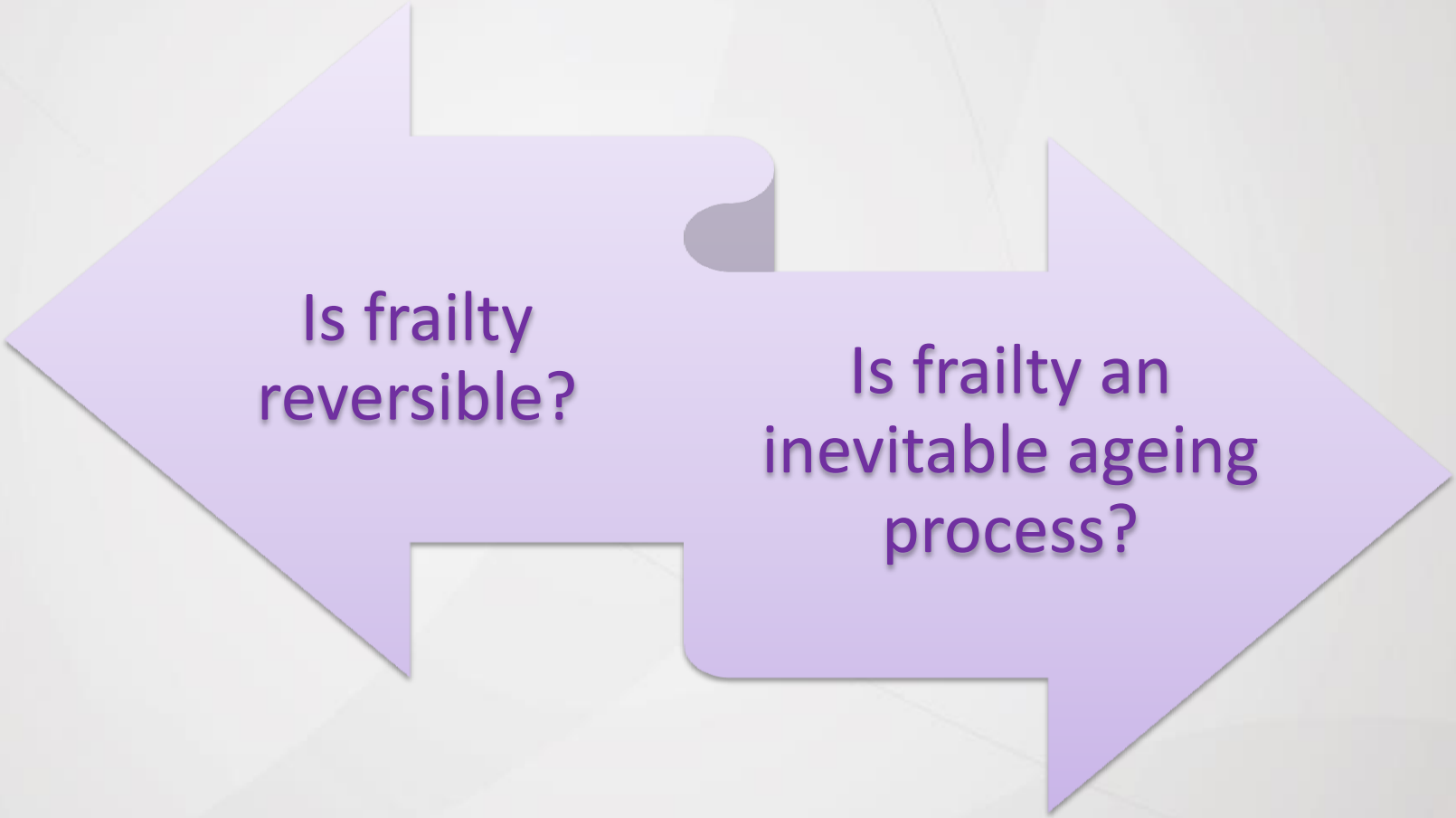
Cognitive frailty: rational and definition from an (I.A.N.A./I.A.G.G.) international consensus group

Kelaiditi E, Cesari M, Canevelli M, *et al.*

J Nutr Health Aging 2013;17:726-34

Publication date: November 1, 2013

Is frailty treatable?



Transitions in frailty states

Table 2
Status at Follow-Up, Including Deaths and No Follow-Up

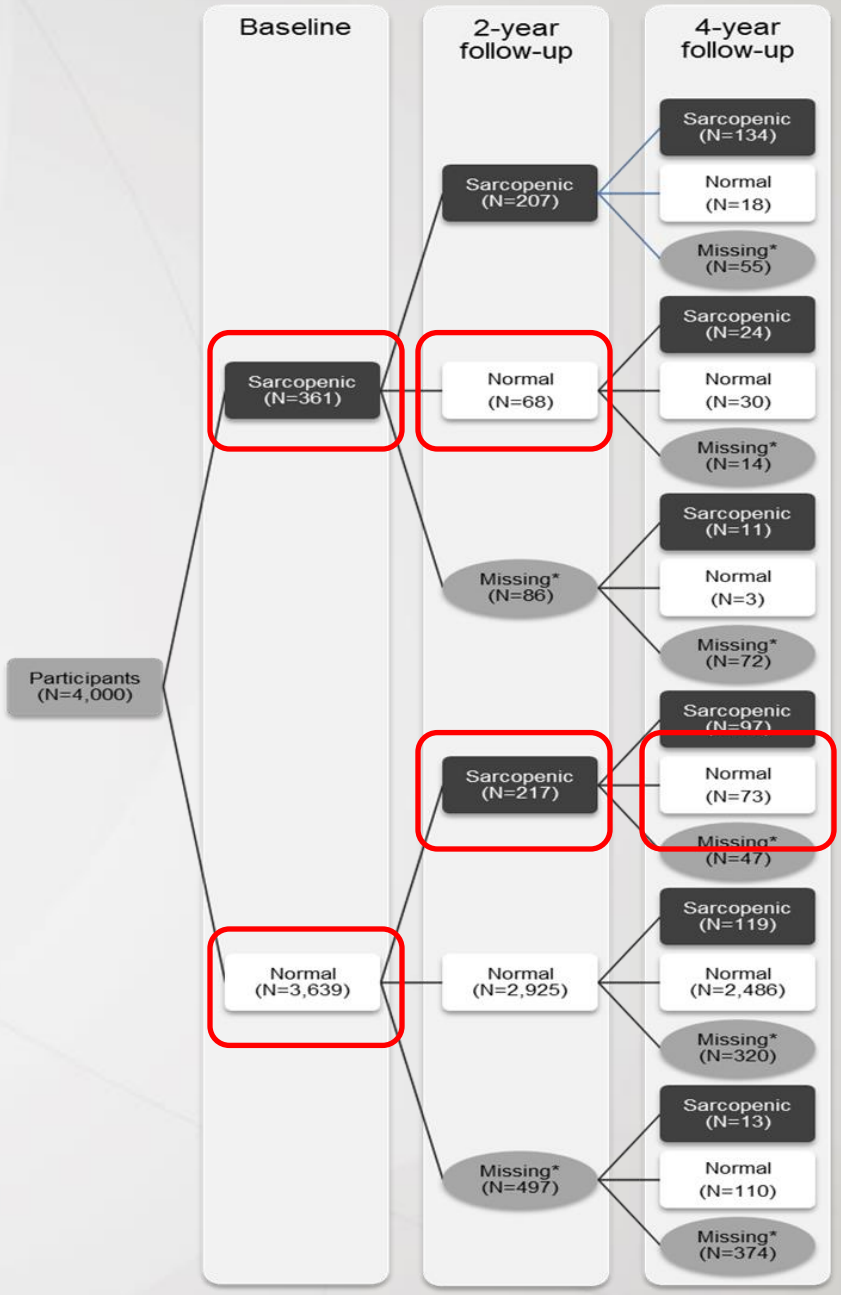
Frailty Status—Baseline	Status—Follow-Up at 2 y, n (%)					
	Robust	Prefrail	Frail	Deceased	Defaulted	Total
Male	657	727	135	66	160	1745
Robust	456 (57.8)	266 (33.7)	14 (1.8)	12 (1.5)	41 (5.2)	789
Prefrail	199 (23.4)	426 (50.1)	94 (11.1)	38 (4.5)	93 (10.9)	850
Frail	2 (1.9)	35 (33.0)	27 (25.5)	16 (15.1)	26 (24.5)	106
Female	622	773	104	20	163	1682
Robust	381 (60.2)	199 (31.4)	6 (1.0)	2 (0.3)	45 (7.1)	633
Prefrail	235 (26.6)	496 (56.1)	58 (6.6)	11 (1.2)	84 (9.5)	884
Frail	6 (3.6)	78 (47.3)	40 (24.2)	7 (4.2)	34 (20.6)	165

P value: male: <.0001, female: <.0001.

Lee J et al. J Am Med Dir Assoc 2014;15(4):281-6

Reversibility of sarcopenia

- At baseline, of the 4,000 participants, 361 (9.0%) had sarcopenia
- Between baseline and 2-year follow up , 6.0% of the participants without sarcopenia at baseline had developed sarcopenia, and 18.8% of the initially sarcopenic participants had reverted to normal
- Between 2-year follow-up and 4-year follow up , about 1/3 of the sarcopenic participants had reverted to normal



Dynamic flow of sarcopenic subjects by time of observation

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Yu et al. Geriatr Gerontol Int 2014; Supp 1: 15-28

Early identification of frailty

- Calls for incorporating frailty assessment into the primary care setting, enabling early identification and intervention to retard decline

The King's Fund

How should frailty be recognised?

Multiple deficit approach

- Frailty Index
  - The deficits present in an individual as a proportion of all potential deficits across multiple domains
  - 30 or more deficits are considered
  - An included deficit can be any symptom, sign, disease, disability, or abnormality associated with age and adverse outcomes

Mitnitski et al., Scientific World J 2001;1:323-326.

Searle et al., BMC Geriatr 2008;8:24.

The Frailty Index and the phenotypic definition are moderately correlated with each other (R = 0.65)

Rockwood et al. JGMS 2007;7:738-745

Clinical phenotype approach

- CHS Frailty phenotype
  - ➢ Slow mobility
  - ➢ Weakness
  - ➢ Weight loss
  - ➢ Decreased activities
  - ➢ Exhaustion
  - Individuals with two deficits are considered pre-frail, and those with three or more are considered frail

Fried et al., 2001;56 J Gerontol A Biol Sci Med Sci (3):M146-56.

Comparisons between frailty phenotype and multiple deficit models

- In predicting mortality and physical limitations
  - The Frailty Index has marginally higher predictive
  - Simple frailty scores (CHS, CSHA Clinical Frailty Scale and FRAIL scale) are comparable with the Frailty Index
  - The FRAIL scale is also comparable with other existing short screening tools

Woo et al., J Am Geriatr Soc 2012; 60(8):1478-1486.

Prevalence of frailty

- The overall prevalence of frailty in the community-dwelling population has been reported to be around 10% using different definitions of frailty

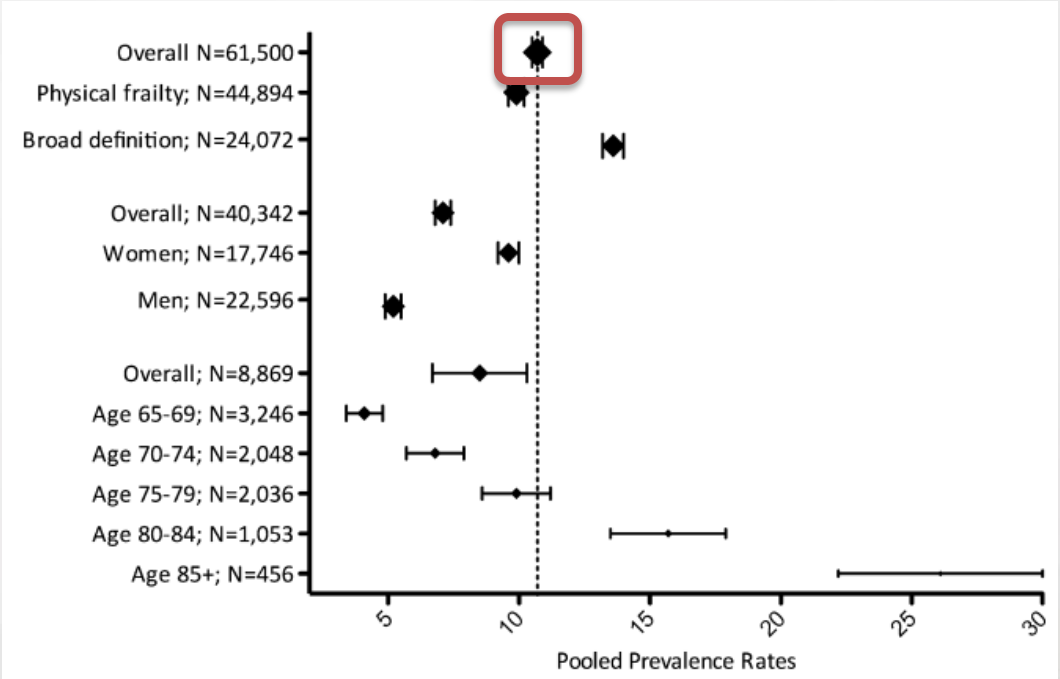


Figure 1. Prevalence of frailty and 95% confidence intervals.

Collard et al. JAGS 2012;60:1487-1492

Frailty screening in the community
“抗衰老、齊起動”計劃

- Aims:
  目的:
  - To examine the prevalence of frailty
    調查社區衰老狀況
  - To investigate the associated factors of frailty in community-dwelling older adults
    調查衰老狀況的相關因素
  - To raise public awareness in the understanding of frailty
    提升公眾人士對衰老的認識
  - To launch the intervention program on bone & muscle health, brain health, diet & healthy lifestyle
    推廣強健骨骼 、 肌肉、腦筋、營養飲食及健康的生活模式的訓練計劃

Frailty screening and intervention programme “抗衰老、齊起動” 計劃

- Over 20 talks
  超過20次講座
- Approximately 1500 participants
  約1500位參加者

Health talks
健康講座
2014 Apr – Jul (四-七月)

Phase 1 assessment (Screening) 第一階段評估(篩查)
2014 Apr – Jul (四-七月)

- Basic demographics
  基本人口統計資料
- Frailty status
  衰老狀況
- Sarcopenia
  缺肌症
- Mild cognitive impairment
  輕度認知障礙症

- Comprehensive geriatric assessment
  全面性老年健康評估
- Medical consultation
  醫療諮詢
- Referrals
  轉介

Phase 2 assessment
第二階段評估
2014 Jul – Oct (七-十月)

12-week comprehensive training program for frailty prevention
12週全方位抗衰老訓練

- Bone and muscle strengthening exercises
  骨骼及肌肉訓練運動
- Brain Training
  腦力訓練

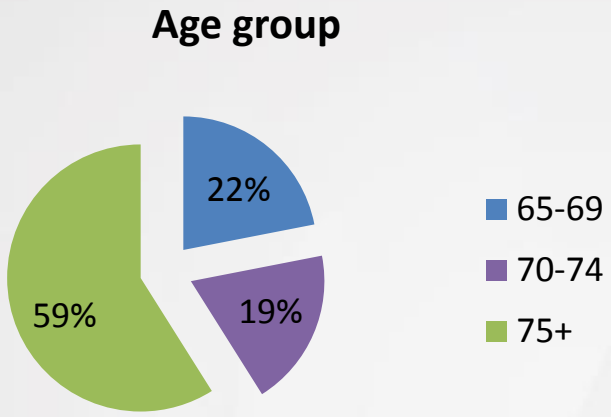
FRAIL scale

	Yes	No
1. Fatigue Tired all or most of the time during the past four weeks?	☐	☐
2. Resistance Difficulty walking up 10 steps without resting or aids?	☐	☐
3. Ambulation Difficulty walking several hundred yards alone without aids (500-600 meters)?	☐	☐
4. Illnesses 5 or more illnesses?	☐	☐
5. Loss of weight Weight loss > 5% within the past month?	☐	☐

Robust=0; Pre-frail=1-2; Frail=3

Morley et al. J Nutr Health Aging 2012;16(7):601-8

Characteristics of participants
參加者的特徵



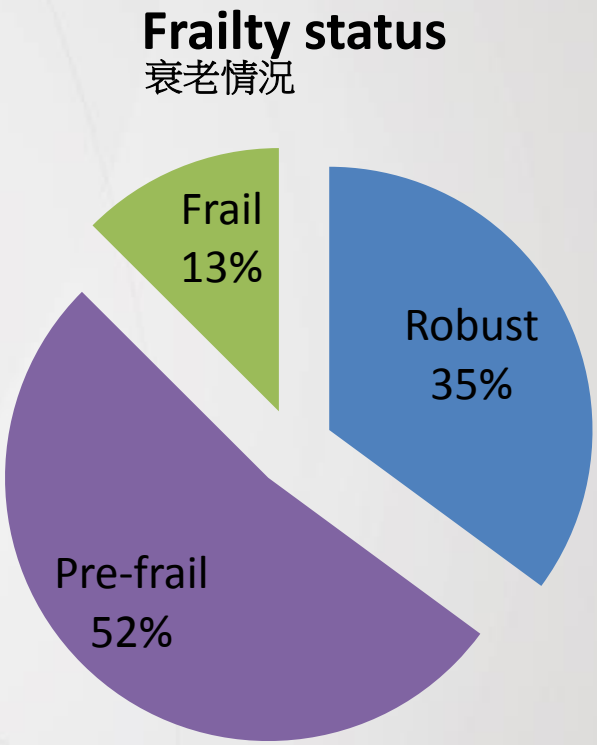
- Aged 65+ (N = 816)
- M 男性: 119 (14.6%)
- F 女性: 697 (85.4%)

Phase 1 assessment
第一階段評估

Prevalence of frailty among those aged 65+
65歲或以上的社區人口衰老狀況

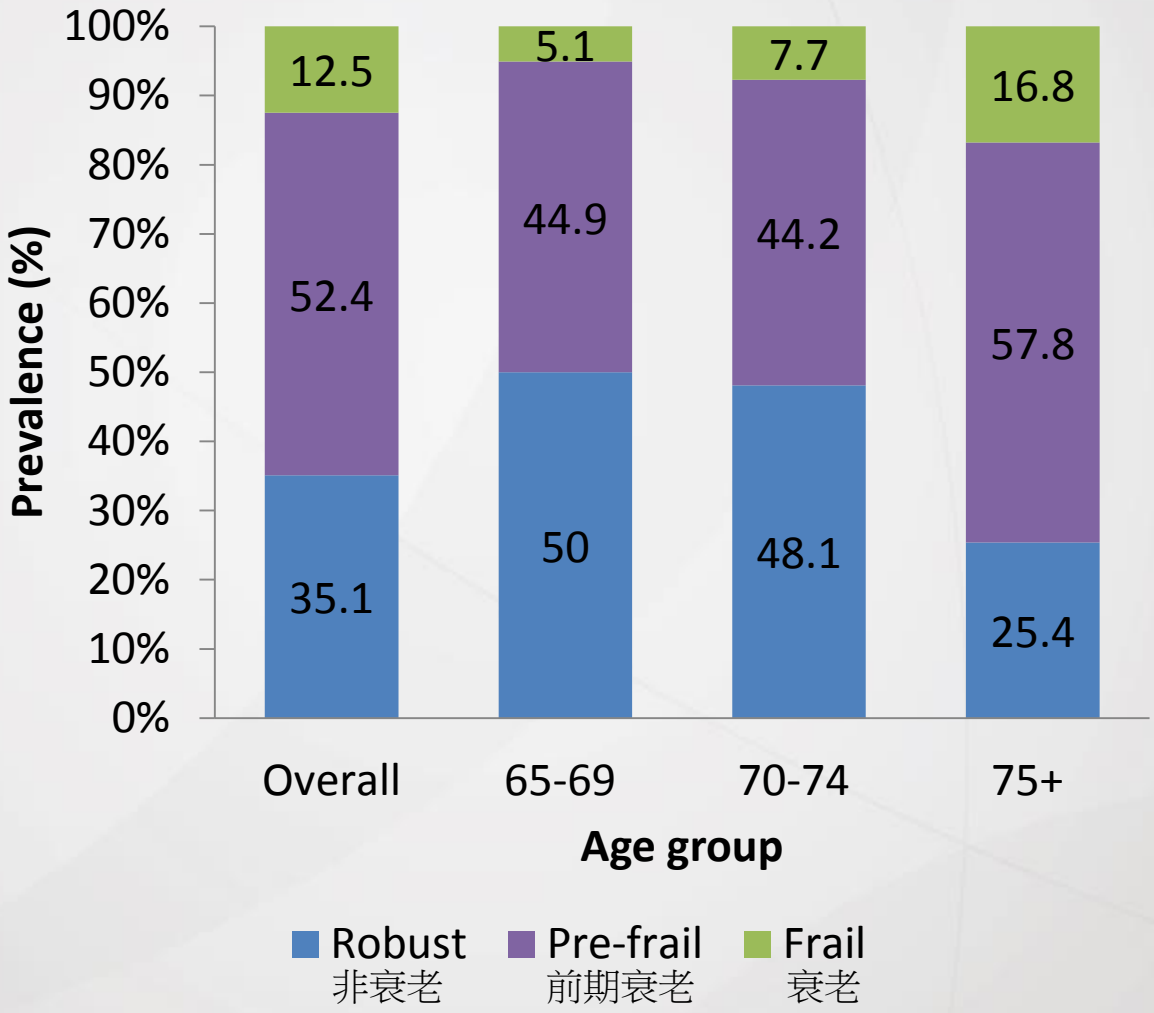
- About 1 in 8 (12.5 %) of community-dwelling population aged 65+ were frail
  平均每8名年齡為65歲或以上的社區人口中，便有1人出現衰老問題

- Pre-frailty was found to be common, more than half (52.4%) of the community-dwelling population aged 65+ were pre-frail
  前期衰老相當普遍，超過一半的65歲或以上的社區人口（52.4%）已踏入前期衰老



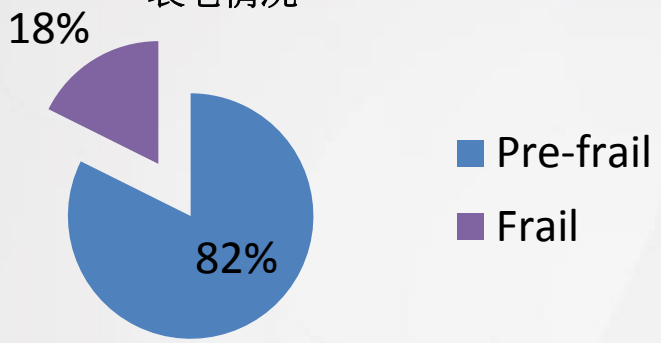
Morley et al. J Nutr Health Aging 2012;16(7):601-8

The prevalence of frailty increased with age
衰老情況隨年齡上升



Characteristics of participants
參加者的特徵

Frailty status
衰老情況



- **Inclusion criteria for phase 2 assessment**
  第二階段納入條件:
  Aged 65+, pre-frail / frail 六十五歲或以上前期衰老/衰老長者

Phase 1 assessment
第一階段評估

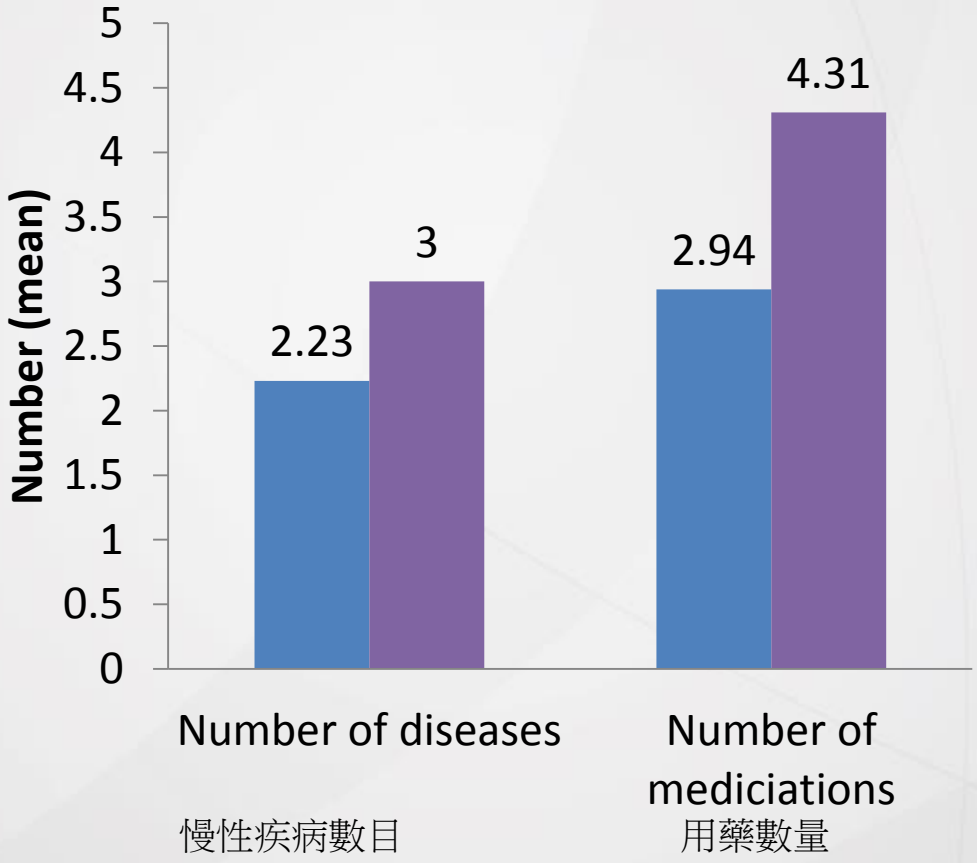
Phase 2 assessment
第二階段評估

- N = 255
- M 男性: 26 (10.2%)
- F 女性: 229 (89.8%)

Morley et al. J Nutr Health Aging 2012;16(7):601-8

Frail elderly tended to have more chronic diseases and received more medications compared with pre-frail elderly

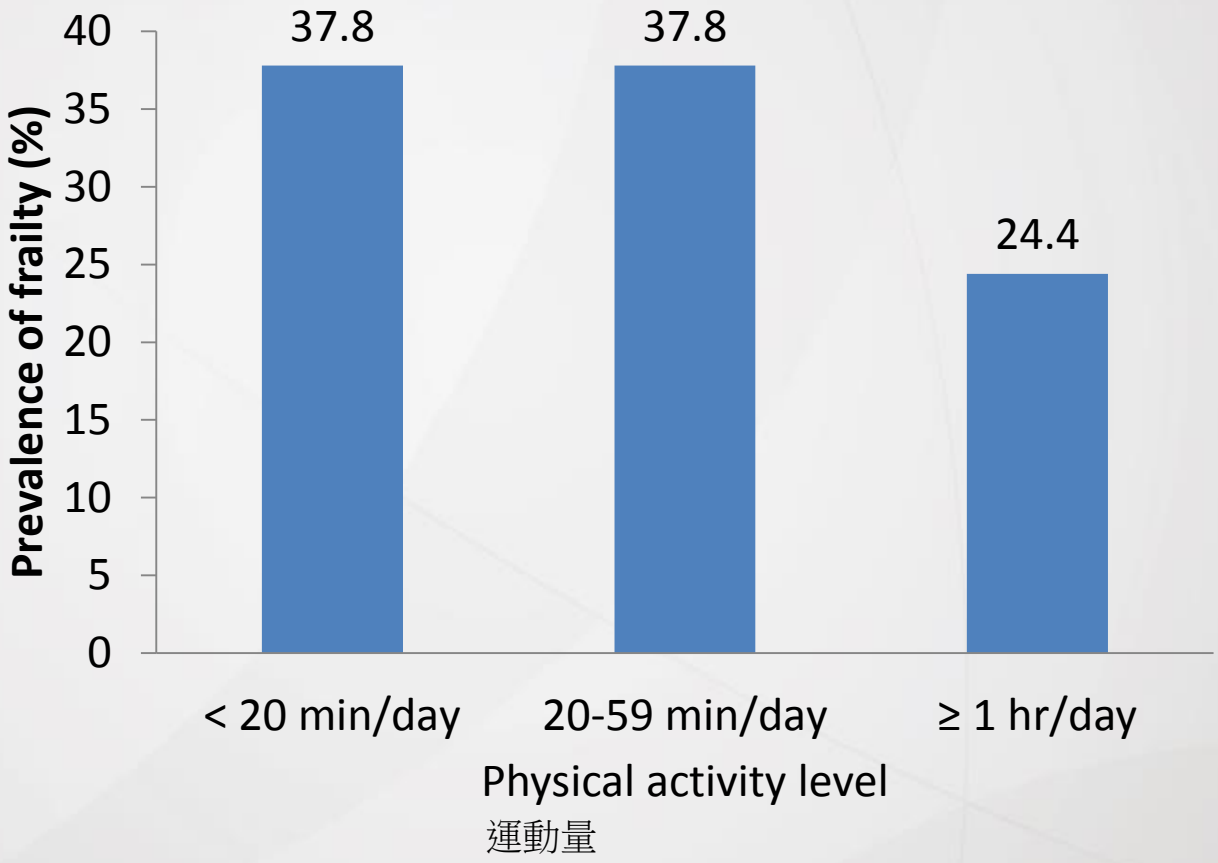
與前期衰老的長者比較，衰老長者一般有較多慢性疾病，用藥數量較多



Age- and sex-adjusted
p<0.01 (no. of diseases)
P<0.01 (no. of drugs)

Elderly with a higher physical activity level showed a lower prevalence of frailty

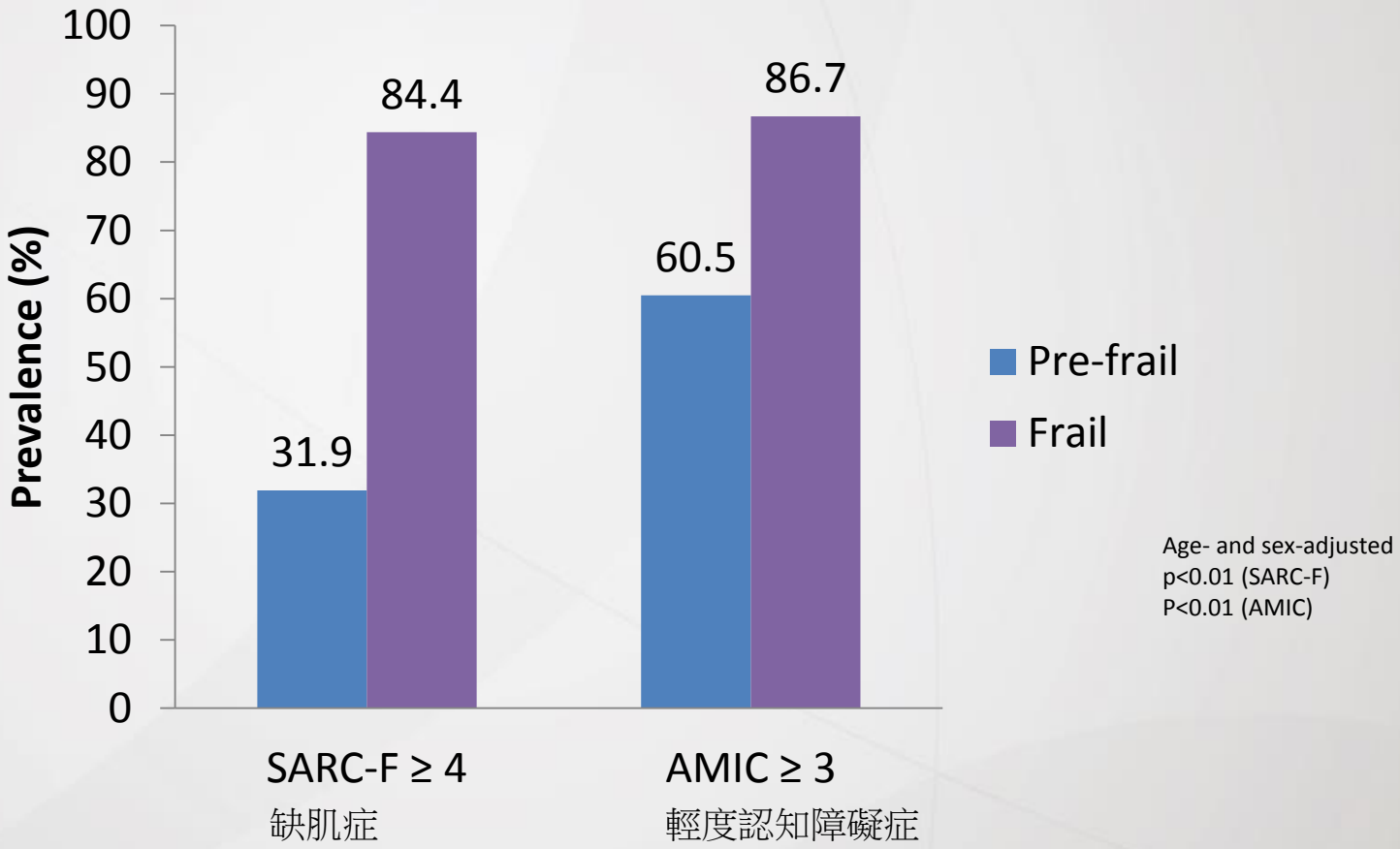
高運動量的長者較少出現衰老



Age- and sex-adjusted
$p<0.05$

Frail elderly showed a higher prevalence of sarcopenia and mild cognitive impairment compared with pre-frail elderly

與前期衰老的長者比較，衰老長者患上缺肌症及輕度認知障礙症的情況較普遍



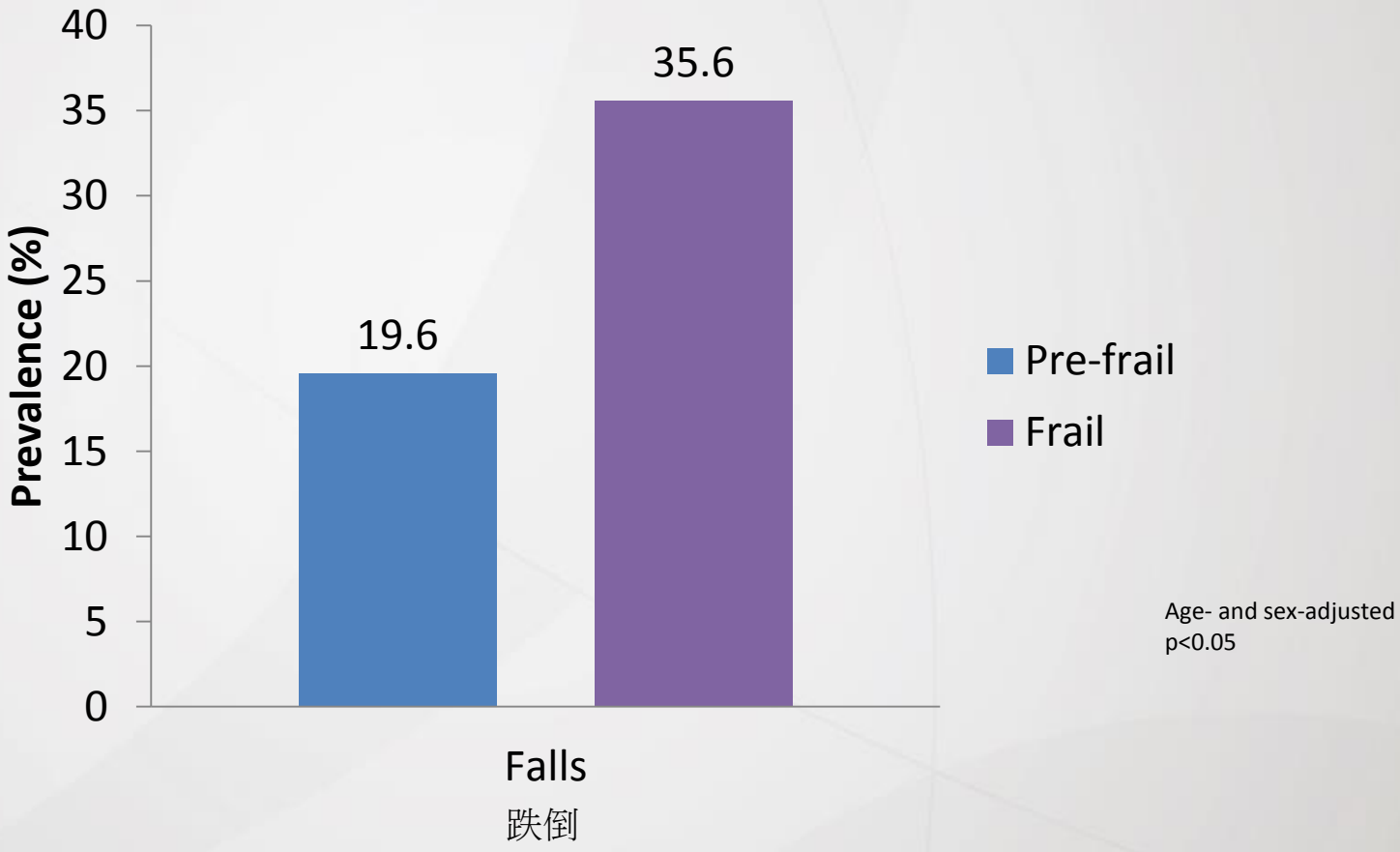
Age- and sex-adjusted
p<0.01 (SARC-F)
P<0.01 (AMIC)

SARC-F questionnaire for sarcopenia (strength, assistance with walking, rise from a chair, climb stairs, and falls)
Malmstrom et al. JAMDA 2013;14(8):531-2

AMIC, Abbreviated Memory Inventory for the Chinese for subjective memory problems and related complaints
Lam et al. Int J Geriatr Psychiatry 2005;20(9):876-82

Falls were more common among the frail elderly compared with pre-frail elderly

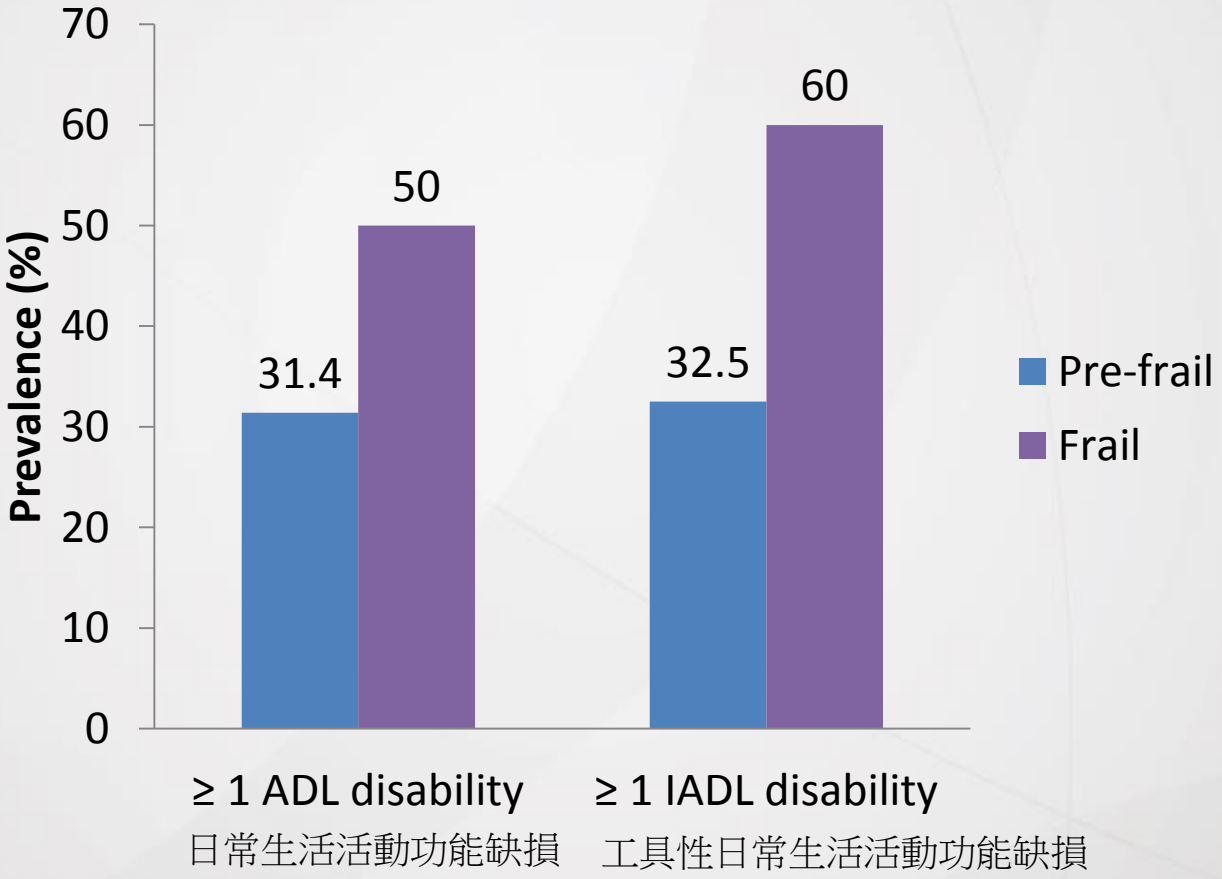
與前期衰老的長者比較，衰老長者較容易跌倒



Age- and sex-adjusted
$p<0.05$

ADL and IADL disabilities were more prevalent among the frail elderly compared with pre-frail elderly

與前期衰老的長者比較，衰老長者患上日常生活活動功能及工具性日常生活活動功能缺損較為嚴重



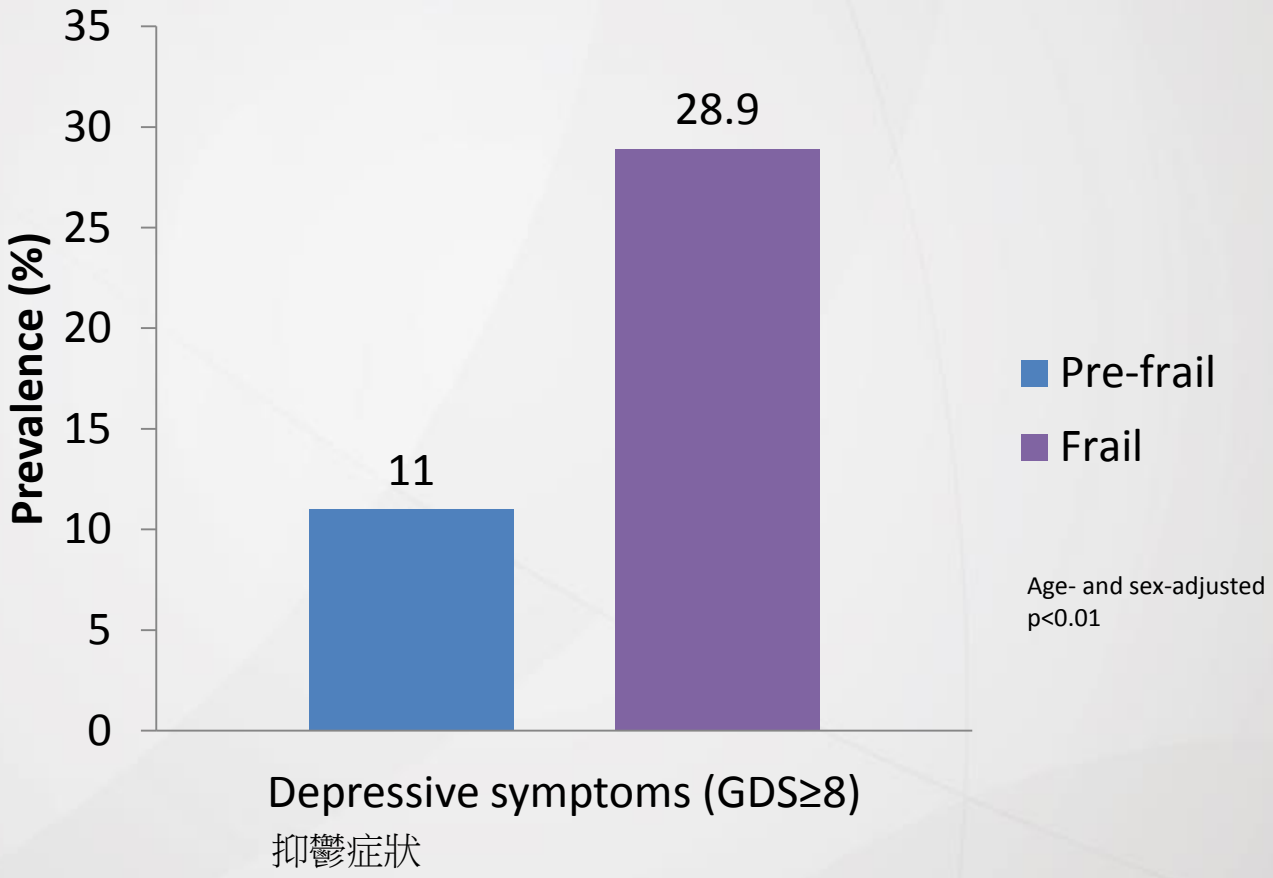
Age- and sex-adjusted
p<0.05 (ADL)
p<0.01 (IADL)

ADL, Barthel index of Activities of Daily Living. Total possible scores range from 0-20, with lower scores indicating increased disability

IADL, modified Lawton Instrumental Activities of Daily Living scale . Total possible scores range from 0-12, with lower scores indicating increased disability

Depressive symptoms were more prevalent among the frail elderly compared with pre-frail elderly

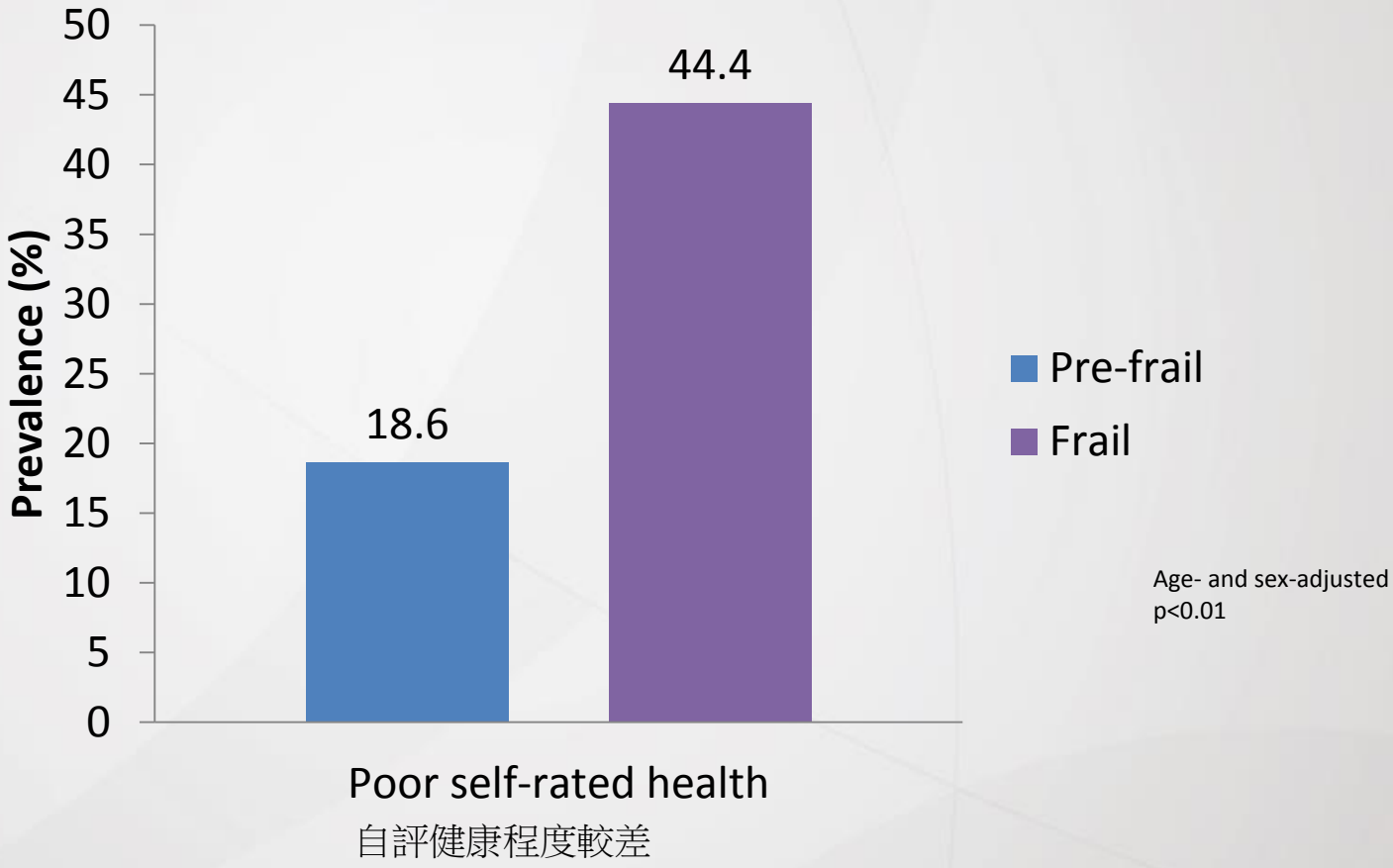
與前期衰老的長者比較，衰老長者出現較多抑鬱症狀



GDS, Geriatric Depression Scale (15-item). Total possible scores range from 0-15, with higher scores indicating higher levels of depressive symptoms

Frail elderly showed a higher prevalence of poor self-rated health compared with pre-frail elderly

與前期衰老的長者比較，衰老長者的自評健康程度較差



Age- and sex-adjusted
p<0.01

Summary of findings

- In 2014, about 1 in 8 (12.5%) of community-dwelling population aged 65 and above had frailty
- Pre-frailty was also found to be common, more than half (52.4%) of the community-dwelling population aged 65+ were pre-frail
- The prevalence of frailty increased with age, being 5.1% for people aged 65-69 years and 16.8% for those aged 75 years and above
- Older age, number of chronic diseases, use of medication, physical activity, sarcopenia, mild cognitive impairment, falls, ADL and IADL disabilities, depressive symptoms and self-rated health were factors associated with frailty

Exercise-based interventions for physical frailty: systematic review

Exercise interventions appear to have a role in increasing muscle strength and improving physical performance

Table 2. Summary of the effect of exercise on sarcopenia in randomised, controlled studies meeting the inclusion criteria

Reference	Population	Number studied (M/F)	Age, years Mean (SD) [Range]	Intervention		PEDro score	Outcomes measured	Main results
				Description	Duration (months)			
Binder *et al.* [23]	Frail, community-dwelling	91	83 (4)	Progressive RET; CON (low-intensity home exercise)	9	5	MM (DEXA), MS (KE)	Total body FFM increased in the progressive RET group, but not in the CON group ($P = 0.005$) MS increased to a greater extent in the progressive RET than in the CON group ($P = 0.05$)
Bonnefoy *et al.* [24]	Frail, care institution	57 (7/50)	83	RET + SUPP; CON + SUPP; RET + PLA; PLA + CON	9	5	MM (FFM by labelled water), MP, PP (chair rise)	RET did not improve MM or MP, but improved PP versus CON ($P = 0.01$)
Bunout *et al.* [25]	Community-dwelling	98 (36/62)	≥70	RET + SUPP; SUPP; RET; CON	18	4	MM (DEXA), MS (quadriceps strength), PP (12-min walk)	FFM did not change in any group RET improved MS versus CON ($P < 0.01$) PP remained constant in RET group, but declined in the CON group ($P < 0.01$).
Suetta *et al.* [29]	Frail, post-operative elective hip replacement	36 (18/18)	[60–86]	RET; ES; CON (standard rehabilitation)	3	5	MM (US), MS (quadriceps), PP (stair climbing)	RET improved MM, MS and PP versus CON (all $P < 0.05$) In the ES or CON groups, there was no increase in any measurement outcomes
Goodpaster *et al.* [26]	Sedentary, community-dwelling	42 (11/31)	[70–89]	PA (aerobic, strength, flexibility, balance training); CON (health education)	12	5	MM (CT scan), MS (KE)	MM decreased in both groups (but losses were not different between groups) MS loss was decreased in CON, but completely prevented in PA (between group change not significant)
Kemmler *et al.* [27]	Community-dwelling	246 (0/246)	69.1 [65–80]	High-intensity multipurpose exercise programme; CON (wellbeing)	18	6	MM (DEXA), MS (isometric leg extension), PP (timed up and go)	Multipurpose exercise was associated with significant improvements in MM ($P = 0.008$), MS ($P = 0.001$), PP ($P < 0.001$) versus CON
Rydwik *et al.* [28]	Frail, community-dwelling	96 (38/58)	>75	PA (aerobic, muscle strength, balance exercises); nutrition intervention; PA + nutrition intervention; CON	3	5	MM [FFM = BW-fat mass (skin folds)], MS (leg press, dips), PP (timed up and go)	PA improved MS ($P < 0.01$ for dips), but did not improve MM or PP versus CON

BW, body weight; CON, control; CT, computerised tomography; DEXA, dual-energy X-ray absorptiometry; ES, electrical stimulation; F, female; FFM, free-fat mass; FM, fat mass; KE, knee extension; M, male; min, minute; MM, muscle mass; MP, muscle power; MS, muscle strength; RET, resistance exercise training; PA, physical activity; PLA, placebo; PP, physical performance; SD, standard deviation; SUPP, nutritional supplement; US, ultrasound.

Cruz-Jentoft, A.J. et al. Age Ageing 2014;43(6):748-759

The effect of nutrition in frailty

Reference	Study design	Participants	Exposure	Findings
Leon-Munoz et al. BMC Medicine 2015; 13: 11	Prospective study over 3.5 years with incident frailty as outcome	1872 community-dwelling people >=60 years	Adherence to prudent dietary pattern	Reduced risk of incident frailty between third and first tertile of adherence (OR 0.4 95%CI 0.2-0.8, P-trend 0.009)
Shikany et al. J Gerontol A 2014;69(6):695-701	Prospective study with a mean follow-up of 4.6 years using incident frailty as outcome	5,925 men >=65 years (US MrOs study)	Dietary Quality Index	High quality index inversely associated with the development of frailty (Q5 v. Q1 OR 0.18 95% CI 0.03-0.97)
Talegawkar et al. J Nutr 2012;142:2161-66	Prospective study with a mean follow-up of 6 years using frailty outcome as above	690 community-dwelling people>=65 years	Adherence to Mediterranean diet	Score >=6 v s. <=3; OR 0.3 (0.14-0.66)

Cameron *et al. BMC Medicine* 2013, **11**:65
http://www.biomedcentral.com/1741-7015/11/65

BMC Medicine

RESEARCH ARTICLE Open Access

A multifactorial interdisciplinary intervention reduces frailty in older people: randomized trial

Ian D Cameron[1*], Nicola Fairhall[1,2], Colleen Langron[3], Keri Lockwood[1], Noeline Monaghan[1], Christina Aggar[4], Catherine Sherrington[2], Stephen R Lord[5] and Susan E Kurrle[3]

Abstract

Background: Frailty is a well known and accepted term to clinicians working with older people. The study aim was to determine whether an intervention could reduce frailty and improve mobility.

Methods: We conducted a single center, randomized, controlled trial among older people who were frail in Sydne... s the comp... asked to tre... by the Cardi... ndary outco...

12-month intervention, individually tailored to each participant based on their frailty characteristics as assessed at baseline.

- *E.g., Weight loss > Dietician evaluated nutritional intake*
- *E.g., Weakness/slowness > Received physiotherapy sessions*

Results: A total of 216 participants (90%) completed the study. Overall, 68% of participants were women and the mean age was 83.3 years (standard deviation, 5.9). In the intention-to-treat analysis, the between-group difference in frailty was 14.7% at 12 months (95% confidence interval: 2.4%, 27.0%; $P = 0.02$). The score on the Short Physical Performance Battery, in which higher scores indicate better physical status, was stable in the intervention group and had declined in the control group; with the mean difference between groups being 1.44 (95% confidence interval, 0.80, 2.07; $P < 0.001$) at 12 months. There were no major differences between the groups with respect to secondary outcomes. The few adverse events that occurred were exercise-associated musculoskeletal symptoms.

Conclusions: Frailty and mobility disability can be successfully treated using an interdisciplinary multifaceted treatment program.

Trial registration: Australia and New Zealand Clinical Trials Register (ANZCTR): ACTRN12608000250336

Keywords: activities of daily living, frail elderly, randomized controlled trial, therapeutics, walking

ELSEVIER

Alzheimer's & Dementia 5 (2009) 50–60

Alzheimer's & Dementia

Review Article

Immediate and delayed effects of cognitive interventions in healthy elderly: A review of current literature and future directions

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Abstract

Background: Research on the potential effects of cognitive intervention in healthy elderly has been motivated by (1) the apparent effectiveness of cognitive rehabilitation in Alzheimer's disease (AD) patients; (2) the face validity of bolstering skills eventually burdened by disease; (3) interest in low-cost/noninvasive methods of preventing or delaying onset of disease; (4) the epidemiologic research suggesting protective effects of educational attainment and lifelong participation in cognitively stimulating activities; (5) the burgeoning industry of brain training products and requisite media attention; and (6) the aging world population.

Methods: We performed a systematic review with meta-analytic techniques to analyze randomized controlled trials of cognitive interventions in healthy elderly.

Results: The weighted mean effect size (Cohen's *d*) of cognitive intervention across all outcome measures after training was .16 (95% confidence interval, .138 to .186). The existing literature is limited by a lack of consensus on what constitutes the most effective type of cognitive training, insufficient follow-up times, a lack of matched active controls, and few outcome measures showing changes in daily functioning, global cognitive skills, or progression to early AD.

Conclusions: Our review was limited by a small, heterogeneous, and methodologically limited literature. Within this literature, we found no evidence that structured cognitive intervention programs delay or slow progression to AD in healthy elderly. Further work that accounts for the limitations of past efforts and subsequent clear and unbiased reporting to the public of the state and progress of research on this topic will help the elderly make informed decisions about a range of potential preventive lifestyle measures including cognitive intervention.

Keywords: Alzheimer's disease; Lifestyle interventions; Cognitive training; Brain training; Healthy elderly

Effect of Physical Activity on Cognitive Function in Older Adults at Risk for Alzheimer Disease

A Randomized Trial

ORIGINAL CONTRIBUTION

Effects of Aerobic Exercise on Mild Cognitive Impairment

A Controlled Trial

Laura D. Baker, PhD; Laura L. Frank, PhD, MPH; Karen Foster-Schub
Charles W. Wilkinson, PhD; Anne McTiernan, MD, PhD; Stephen R. Pl
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The Effect of Exercise Training on Cognitive Function in Older Adults with Mild Cognitive Impairment: A Meta-analysis of Randomized Controlled Trials

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Objectives: *Investigations of exercise and cognition have primarily focused on healthy or demented older adults, and results have been equivocal in individuals with mild cognitive impairment (MCI). Our aim was to evaluate efficacy of exercise on cognition in older adults with MCI.* **Design:** *We conducted a meta-analysis of random controlled trials (RCTs) of exercise effects on cognitive outcomes in adults with MCI. Searches were conducted in Medline, EMBASE, CINAHL, PEDro, SPORTSDICUS, PsychInfo, and PubMed.* **Participants:** *Adults aged over 65 years with MCI or Mini-Mental State Exam mean score 24–28 inclusive.* **Measurements:** *Study quality was assessed using the PEDro scale; data on participant and intervention characteristics and outcomes were extracted, followed by meta-analysis.* **Results:** *Fourteen RCTs (1,695 participants; age 65–95 years) met inclusion criteria. Quality was modest and under-powering for small effects prevalent. Overall, 42% of effect sizes (ESs) were potentially clinically relevant (ES >0.20) with only 8% of cognitive outcomes statistically significant. Meta-analysis revealed negligible but significant effects of exercise on verbal fluency (ES: 0.17 [0.04, 0.30]). No significant benefit was found for additional executive measures, memory, or information pro-*

Conclusion: *There is very limited evidence that exercise improves cognitive function in individuals with MCI, although published research is of moderate quality and inconclusive due to low statistical power*

Key Words: Exercise, cognition, MCI

Conclusion

- The FRAIL scale could be used to detect frailty in the community, allowing targeted intervention to potentially retard decline and future disability, reduce use of hospital services, and perhaps psychological well-being.

- Future research include examining the use of the tool in the hospital and long-term care settings; establishing priority for the detection of the pre-frail or frail state; and randomized controlled trials of interventions that can be incorporated as part of existing services

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