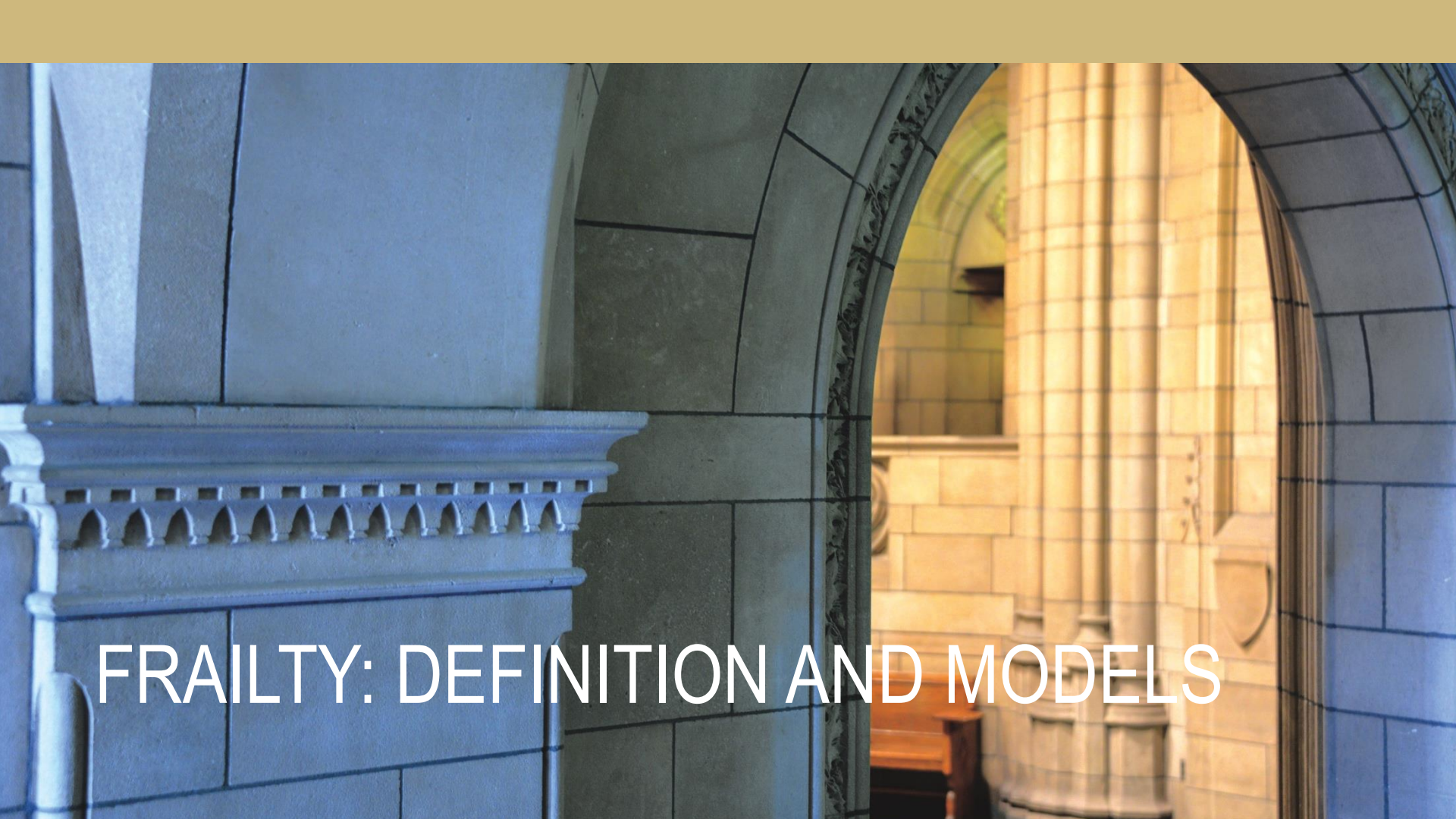




DNP/ANP and Frailty Care

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FRAILTY: DEFINITION AND MODELS

Frailty

- Cause incompletely understood
- Decrease in physiologic reserve
 - Accentuated over the normal age-related decline in physiologic reserve
 - Failure of homeostatic mechanisms
 - Multiple systems
 - Neuromuscular, neuroendocrine and immunologic dysfunction
- Increased vulnerability to stressors

Frailty

- A clinical syndrome
- Manifestations
 - Unintentional weight loss and/or loss of muscle mass (sarcopenia)
 - Weakness
 - Fatigue
 - Inactivity
 - Decreased dietary intake
 - Common signs: sarcopenia, balance & gait abnormalities, osteopenia, malnutrition

Precipitants

- Progressive age-related decline in physiologic reserve coupled with a trigger event
 - Examples: acute illness, injury, adverse event, immobility
 - Incomplete recovery
 - Failure to regain premonitory state
 - Stepwise decline and/or susceptibility to subsequent triggers

Identifying Frailty

- Numerous instruments exist
 - 2019 systematic review identified 51 (Faller et al.)
 - Variable in what measured and length
 - No gold standard
- Two most widely accepted approaches
 - Physical frailty phenotype
 - Frailty index

Physical Frailty Phenotype

- Developed by Fried and colleagues (2001)
- Frailty: clinical syndrome including unintentional weight loss, weakness, slow walking speed and low physical activity
- Operationalization
 - Weight loss > 10 lbs (4.54 kgs) in past 12 months
 - Grip strength in lowest 20% based on gender and BMI
 - 15-foot walking time in slowest 20% by gender and height
 - Low kcal expenditure/week (men < 383; women <270)
 - Weakness - self-reported exhaustion

Physical Frailty Phenotype

- Using physical frailty phenotype to diagnosis frailty
 - No deficits – robust; no frailty
 - 1-2 deficits – prefrail
 - 3 or more deficits - frail

Frailty Index

- Rockwood and colleagues (2005)
- Frailty: the cumulative effect of individual deficits – the greater the number the more likely to be frail
- Originally identified 70 deficits
 - Counted number present to calculate frailty index
 - The proportion of measured deficits present

Frailty Index

- Subsequent studies have reduced and adapted the number of countable deficits
 - Have included various symptoms, signs, abnormal laboratory values, diseases and/or disabilities
 - Xue et al (2019): 48 items
 - Non-frail: ≤ 0.2
 - Pre-frail: > 0.2 to ≤ 0.35
 - Frail: > 0.35
- Limitation – as used generally requires a comprehensive geriatric assessment

FRAIL Scale

- Simple tool
 - May be more useful clinically

Symptom/Sign	Assessment
Fatigue	Are you fatigued?
Resistance	Cannot walk up one flight of stairs?
Ambulation	Cannot walk a block?
Illnesses	Do you have more than 5 illnesses
Loss of weight	Have you lost > 5% of your weight in the past 6 months?

No positive response =
robust (not frail)
1-2 positive responses =
pre-frail
3 or more positive
response = frail



PREVALENCE

Frailty

- Prevalence varies by
 - Setting
 - How frailty is operationalized

Prevalence of Frailty

- Community: 2012 systematic review (Collard et al.)
 - 21 studies (61,500 older individuals)
 - Various measures of frailty
 - Wide variation in prevalence: 4.0 - 59.1%
 - Overall weighted prevalence
 - 10.7% for frailty (21 studies)
 - 41.6% for pre-frailty (15 studies)
 - Weighted prevalence higher in women (9.6%) than men (5.2%) (11 studies)
 - Prevalence increased with age (4 studies): 15.7% in those 80-84 years and 26.1% in those \geq 85 years

Prevalence of Frailty

- Acute care settings: 2018 scoping review (Theou et al.)
 - 617 studies on frailty
 - Conducted on various types of units
 - Most (67%) did not report how measured
 - 122 reported prevalence
 - Median prevalence varied by unit/department: 34% to 69%



CONSEQUENCES

Frailty: Negative Outcomes

- Falls
 - Risk of falling 1.7 higher (2016 Systematic review with 6 studies; Vermeiren et al.)
 - Almost 3 times higher risk of fractures
- Acute illnesses
 - Delirium
 - Post-operative complications
- Functional decline and disability
 - Risk of developing ADL disabilities increased by nearly 2 (Vermeiren et al.)

Frailty: Negative Outcomes

- Hospitalization
 - 2016 systematic review (Kojima): frailty was a significant predictor of hospitalization among community-dwelling elders
 - 2016 Systematic review (11 studies; Vermeiren et al.): likelihood of hospitalization was twice as high
 - Significantly longer length of stay
- Institutionalization
 - 2016 Systematic review (5 studies; Vermeiren et al.) risk of institutionalization was 1.7 times higher
- Mortality: numerous studies
 - 2016 Systematic review (24 studies): likelihood of premature mortality 2.3 times higher (Vermeiren et al.)
 - Higher risk after controlling for multimorbidity (Zucchelli et al.)

Other Outcomes

- Cognitive impairment
 - 2019 systematic review (Borges et al.): baseline frailty was associated with nearly two times greater likelihood of cognitive impairment compare to non-frail older adults
- Depression
 - 2017 systematic review (Soysal et al.)
 - Prevalence of depression: 38.6%
 - Odds of depression was 4 times higher



IMPLICATIONS FOR CARE

NP Care

- Recognition of the frail and pre-frail patient
 - The older adult at risk for adverse outcomes
- Comprehensive assessment to Identify and effectively manage potential triggers
- Early implementation of supportive interventions with the goal of preventing pre-frailty from progressing to frailty or acceleration of frailty

Supportive Interventions

- Goals: to prevent loss of muscle mass and improve energy and strength
 - Early intervention to address triggers particularly
 - Low activity
 - Inadequate nutrition
 - Medications that may contribute to frailty or trigger events

Exercise

- Several systematic reviews provide support for exercise interventions
 - 2012 (Chou et al.): compared to usual care, frail elders participating in an exercise intervention had significant improvements in gait speed (4 studies), in balance (4 studies), and in performance of ADLs (3 studies)
 - 2015 (de Labra et al.): also examined the effect of exercise on
 - Muscle strength with 5 of 7 studies reporting improvement
 - Frailty (based of frailty phenotype): one study which reported significant improvement

Exercise

- 2017 (Vlietstra & Hendrickx) systematic review examined effect of exercise interventions of sarcopenia (one sign of frailty)
 - No significant improvement in total body muscle mass (3 studies)
 - Significant improvement in appendicular lean muscle mass (2 studies)
 - Significant improvement in leg muscle mass (2 studies)

Exercise: Focus on Resistance Training

- 2018 Systemic review (Lopez et al.): resistance training alone or as part of multimodal exercise program
 - Muscle mass: improved from 3.5% to 7.5% after 12 weeks (2 studies); no difference in 3 studies
 - Muscle strength: significant improvements in lower extremity strength in 8 or 12 studies
 - Gait speed: improved in 5 of 8 studies
 - Falls: significant reduction in 3 of 4 studies

Nutrition

- 2017 Systematic review (Lopez et al.) provided evidence on the role of nutrition in frailty
 - Micronutrient deficiencies
 - Protein intake
 - Overall dietary quality
 - Mediterranean diet score
- Limited intervention studies
 - Effect of protein supplementation may be protective but little evidence about treatment
 - Even less evidence on micronutrient supplementation

Multi-Domain Interventions

- Interventions targeting more than one factor contributing to frailty
- 2017 Systematic review (Dedeyne et al.)
 - Targeted ≥ 2 domains (exercise, nutrition, pharmacological, psychological or social)
 - 12 studies
 - Overall, multi-domain interventions were more effective than those targeting a single domain in relation to frailty status, muscle mass and strength and physical functioning
 - Exercise seemed to play an essential role in multi-domain interventions.

Pharmacologic Interventions for Frailty?

- Very little research
 - Angiotensin converting enzyme inhibitors may halt or slow decline in muscle strength in old age
 - Use of Vitamin D is controversial
 - Studies examining senolytic drugs (selectively eliminate senescent cells)
- Currently no effective pharmacologic interventions

Consider Vulnerability to Stressors

- The increased vulnerability of frail elders to stressors needs to be considered in the manage of other co-morbid health issues
 - The risk-benefit ratio of treating chronic health problems (e.g., hypertension) needs to be carefully considered
 - The use of high-risk medications should be minimized



CAN WE PREVENT FRAILTY??

Potential to Prevent Frailty

- Although there are potential target, e.g., preserving muscle mass, maintaining strength and optimal nutritional status
 - There is a lack of research on interventions to prevent frailty



THANK YOU!

QUESTIONS???

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