The Case for Nutrition & Frailty Screening in Community-living Older Adults

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Outline

• Nutrition risk in Canadian older adults
• Nutrition risk and frailty
• Nutrition and falls
• Overlap among malnutrition, frailty and sarcopenia
• Looking forward with nutrition and frailty screening
• Implementing screening in the community
What are older Canadians eating?

• **Poor intake of all four food groups** (Quebec, British Columbia, New Brunswick, Ontario & Canadian Community Health Survey)

• **A variety of nutrients consumed below recommendations;** A, D, C, B6, B12, folate, B carotene, calcium, zinc, magnesium (Levy-Milne, 2004; New Brunswick Dept Health, 2005; Shatenstein et al., 2004)

• **65% do not consume 5 servings of vegetables & fruit** (CCHS 2.2)
Why Poor Food Intake Occurs

- Food apathy
- Reduced physical ability
- Restricted income
- Depression, social isolation, neglect
- Medication use
- Cognitive impairment
- Dentition
- Multi-morbidity
- Other priorities

- Older Adults in Canada (CCHS, 2008)
  - 42% in lowest income
  - 49% living alone
  - 49% with low social support
  - 43% infrequent social participation
  - 42% don’t drive
  - 62% report depression
  - 44% report disability
  - 54% 5+ medications
  - 46% poor oral health

German et al., 2011; Nykanen et al., 2013; Romero-Ortuno et al., 2011; Schilp et al., 2011; Ramage-Morin & Garriguet, 2013
What is nutrition risk?

- Risk factors are present that are known to impair food intake or affect nutrient utilization of the body
- Low or poor food intake
- Occurs before physical or overt signs of undernutrition e.g. significant weight loss
- Easier to improve nutritional risk than undernutrition
- Commonly measured by looking at accumulation of risk factors, food intake, and weight change; often based on self-report of risk factors
- Good tools predict outcomes associated with undernutrition, such as mortality
What is malnutrition?

- Inadequate intake of energy, macro or micronutrients
- Sustained inadequate intake leads to **functional change** in tissues of the body e.g. muscle loss, weakness, immune function, capacity for recovery, cognition
- Responds to re-feeding

Prevalence of Nutrition Risk Factors in Canada (based on SCREENII)

Population Sample, Stats Canada, CCHS 2008
(Ramage-Morin & Garriguet, 2013)

- 34% nutrition risk
- 47% weight change > 5lbs
- 27% poor appetite
- 26% swallowing problems
- 24% skip meals
- 37% low fruit/veg
- 42% eat alone
- 52% cooking difficulty
More vulnerable older adults...

**Vulnerable Community Sample**  
(Keller & McKenzie, 2003)

- 44% nutrition risk
- 22% weight loss
- 45% limit food & find difficult to manage
- 48% low fruit & veg
- 20% low milk products
- 35% chewing difficulty
- 23% swallowing difficulty
- 28% poor appetite
- 43% cooking difficulty
- 29% shopping

WWW.THE-RIA.CA
Consequences of nutrition risk in community living seniors

• Nutritional risk is independently associated with 5 year mortality in older men (Broeska et al., 2013); and with 18 month mortality in older adults who receive home care services (Keller & Østbye, 2003)

• Predicts health related quality of life in older adults who receive home care services (Keller & Østbye, 2004)

• Involuntary weight loss predicts death, institutionalization and poor emotional health and social functioning (Payette, 2005)
What is frailty?

Phenotype model
Shrinking, weakness, poor endurance and energy, slowness, and low physical activity level (1-2 conditions indicate pre-frailty)

Cumulative Deficit Model
Accumulation of deficits over time that reduces one’s capacity to resist stressors

“A medical syndrome with multiple causes and contributors that is characterized by diminished strength, endurance, and reduced physiologic function that increases an individual’s vulnerability for developing increased dependency and death”

Prevalence of Frailty - Community

• Community-dwelling older adults (>65 years)
  – At least 1 million (Hoover et al. 2013) and up to ¼ of Canadians (Muscedere et al. 2016)
  – 22.7% of a sample (age 65–102 years) with higher rates among women (25.3%) (Song et al. 2010)
  – 24% of those 90- to 94-year olds (95+ years = 39.5%) (Lee et al. 2016)

Pre-Frailty

– 35–50% in those over age 60 years
– More common in women
– Weakness is the most common criteria reported (Fernández-Garridoa et al. 2014)
Overlap between Malnutrition and Frailty

• Common symptoms of weight loss, exhaustion, weakness, and slowness (Fried et al. 2001)

• Common socio-demographic, physical, and cognitive risk factors (Boulos et al. 2016)

• Overlap in prevalence
  – ~98% non-frail = well-nourished
  – ~50% frail = malnourished (Bollwein et al. 2013)

• Malnutrition/risk of malnutrition = 4x increase in risk of frailty (Boulos et al. 2016)
Vicious and destructive cycle...

- Low / poor food intake
- Weight / muscle loss
- Frailty
- Poor appetite
Inadequate intake may be the root cause of some frailty...

• 3 year study in older women
  • Those with lowest protein (0.7 g/kg/d) at baseline lost 40% more muscle mass than those with highest protein intake (1.1 g/kg)
  • Low levels of serum vitamin D, carotenoids, selenium, zinc, B6, B12 also predicted disability (Semba et al., 2006)
Common basis to treating malnutrition and frailty

- Oral Nutritional Supplement (ONS):
  - Potential benefits on weight status and mortality (Milne et al. 2009)
  - Frailty indicators (Artaza-Artabe et al. 2016; Manal et al. 2016)
  - Nutritional status (Manal et al. 2016)

- High Quality Diets
  - Protein associated with skeletal muscle mass (Huang et al., 2016)
  - Benefits when paired with exercise → improved QOL and strength in pre-frail (Kwon et al. 2015)

- Nutritional intervention alone and in combination with cognitive and physical activity intervention improves strength and energy (Ng et al, 2015)

Early intervention supports improved outcomes
Falls: a potential outcome of frailty
(Abrahamsen et al., 2014; Scott et al., 2015)

• Sarcopenia = loss of muscle mass and strength
  – A component of frailty (weakness, slowness, exhaustion)

• Sarcopenia associated with fracture and falls
  – may be more influential in men than women

• Dynapenia (strength, due to quality of muscle) likely more relevant for falls, function
  – Falls in the last 12 months was associated with decreased hand grip strength (Lenardt et al, 2016)
Falls: a potential outcome of nutrition risk

• Those with a history of falls as compared to non-fallers were:
  – Less active, more nutrition risk, poorer balance, lower extremity strength, functional endurance
  – When adjust for other covariates, nutrition risk still an important predictor of fall history, as were lower extremity strength and balance (Johnson et al., 2003)

• Longitudinal study of random sample in Taiwan (Chien & Guo, 2014)
  – N= 4440; Nutritional risk ~10%
  – Nutritional risk associated with a fall in past year [OR 1.73 (1.23, 2.42)]
Falls: a potential outcome of nutrition risk (con’t)

- Malnourished patients identified in ER report falling in the past 6 months (Vivanti et al., 2009)

- Those who fall are more likely to be malnourished than those that do not (Meijer et al, 2012)

- Malnutrition is a predictor of falling (OR 1.978 95% CI 1.340-2.920) (Meijer et al, 2012)
Falls Prevention Intervention Recommendations

• “A strategy to reduce the risk of falls should include multifactorial assessment of known fall risk factors and management of the risk factors identified.” [Good evidence] (American Geriatrics Society)

• Frail, malnourished patients post discharge from hospital increase weight and improve function with ONS + dietitian support (Neelemaat et al, 2011)

→ Need to identify those who are at nutritional risk and treat

Vitamin D

- Vitamin D supplementation reduces falls by 20% (Meta-analysis- Bischoff-Ferrari et al., 2004; Michael el al, 2010)
  - Number needed to be treated to prevent 1 fall was 15
  - Improves muscle strength but not mass or power
  - Most effect in those with < 30nmol/l 25(OH)D (deficient)

- Vitamin D supplements of at least 800 IU per day should be provided to older persons with proven vitamin D deficiency. [Good Evidence]

- Vitamin D supplements of at least 800 IU per day should be considered for people with suspected vitamin D deficiency or who are otherwise at increased risk for falls. [At least fair evidence]

Protein

• Need sufficient protein intake to stimulate muscle protein synthesis and inhibit breakdown
  – Whey (Leucine rich) more effective than casein or soy
  – 1.2 g/kg/d enhances benefits of progressive resistance training (Meta-analysis Cermak et al., 2012)

• Impact of protein seems to be greatest in those with more nutrition risk (Zoltick et al, 2011; Larocque et al, 2015; Michael et al, 2010)
Weight loss to prevent falls? (Scott et al., 2015; JafariNasabian et al., 2017)

- Obesity may promote bone and muscle through mechanical loading
- Increased adiposity $\rightarrow$ pro-inflammatory cytokines and endocrine factors that impair muscle and bone
- Obese may be more likely to fall
- Unclear if obese more likely to fracture
- Caloric restriction results in loss of muscle and fat mass and potentially bone mass
  $\rightarrow$ need to combine weight loss with progressive resistance training
Treatment starts with identification: What can we do to identify risk?
Nutrition Screening: What is it?

• A process to identify an individual who is:
  ✓ At risk of malnutrition (risk factors are present that impair intake and/or increase the body’s needs for nutrients and/or energy)
  ✓ Malnourished
  ✓ Likely to benefit from further nutrition assessment and treatment

• It is a rapid and simple process conducted by admitting or front line staff, typically a nurse, not a nutrition professional.
Principles of “Ethical Screening”

• **Target** people in potential need of nutrition assessment and treatment

• **Identify** nutrition problems and appropriate course of action (e.g. assessment, treatment)

• Have a **referral/treatment algorithm** in place to promote appropriate and efficient referral
  
  e.g. Integrated Nutrition Pathway for Acute Care

• Include follow-up and **monitoring** post treatment

Keller HH. et al. 2006
Nutrition Today.
Polling Question: If you don’t already do nutrition screening, what is the likelihood of starting in the next 6 months?

- Very unlikely
- Likely
- Not sure if we are ready
- Getting ready
- Will definitely be doing
- We already do screening
Main considerations in selecting a screening tool

- **Easy**
- Front-line personnel can use
- Uses existing personnel, processes
- Inexpensive to collect on all clients
- On electronic medical chart

- Implemented as part of a general work-up
- Data readily available
- Appropriate for the setting in which it is to be used
- Specific to the population
Malnutrition
Is your patient at risk?

**Malnutrition Screening Tool (MST)**

1. Have you/the patient lost weight recently without trying?  
   - No 0  
   - Yes, how much (kg)?  
     - 1 – 5 1  
     - 6 – 10 2  
     - 11 – 15 1  
     - > 15 2  
   - unsure 2  

2. Has the patient been eating poorly because of a decreased appetite?  
   - No 0  
   - Yes 1

**Total Score**

Score 2 or more

If yes, ask if they suspect they have lost weight – eg, clothes are looser

For example, less than three-quarters of usual intake may also be eating poorly due to chewing and swallowing problems

Of weight loss and appetite questions

**Score 1 to 1.9**

If your patients have lost weight and/or are eating poorly – is, score two or more, or they are very underweight, then they may be at risk of malnutrition.

**Score > 1.9**

**Step 1**: Calculate BMI

**Step 2**: Calculate weight loss score

**Step 3**: Calculate disease effect score

**Step 4**: Overall risk of malnutrition

Add scores together to calculate overall risk of malnutrition

- Score 0: Low Risk
- Score 1: Medium Risk
- Score 2: High Risk

**Step 5**: Management guidelines

- **0 Low Risk**  
  - Routine clinical care
  - Repeat screening weekly – for severely undernourished inpatients

- **1 Medium Risk**  
  - Repeat screening weekly
  - Avoid modiﬁcations in usual care
  - Record malnutrition risk category
  - Urge commensurate with weight

- **2 or More High Risk Treat**  
  - Intensive care
  - Consider involvement of dietitian
  - Consider involvement of pharmacist
  - Consider involvement of nurse

**Score Formula**

- BMI score + Weight loss score + Acute disease effect score

**Score Formula**

- Age score + Total score

- If age < 70 years: add 1 to total score above

Score < 3: Weekly rescreening of the patient. If the patient is e.g. scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk factors.

**Table 1**: Initial Screening

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI &lt; 20.5?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the patient lost weight within the last 3 months?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the patient had a reduced dietary intake in the last week?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2**: Final Screening

<table>
<thead>
<tr>
<th>Impaired nutritional status</th>
<th>Absent score 0</th>
<th>Absent score 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal nutritional status</td>
<td>Normal nutritional status</td>
<td></td>
</tr>
<tr>
<td>W/t loss &gt;5% in 3 months or fluid intake below 25–50% of normal requirements in preceding week</td>
<td>Hip fracture or chronic patient, in particular with acute complications such as COPD, chronic hemodialysis, diabetes, oncology</td>
<td></td>
</tr>
<tr>
<td>Moderate score 2</td>
<td>Moderate score 2</td>
<td></td>
</tr>
<tr>
<td>W/t loss &gt;5% in 2 months or BMI 18.5 – 20.5 or increased general condition or fluid intake 25 – 50% of normal requirement in preceding week</td>
<td>Major abdominal surgery, stroke, severe pneumonia or other significant condition requiring hospitalization</td>
<td></td>
</tr>
<tr>
<td>Severe score 3</td>
<td>Severe score 3</td>
<td></td>
</tr>
<tr>
<td>W/t loss &gt;5% in 1 month (&gt;15% in 3 months) or BMI &lt; 18.5 or increased general condition or fluid intake 0% – 25% of normal requirement in preceding week</td>
<td>Head injury, severe burn or trauma, transplant recipients, intensive care patients (APACHE = 10)</td>
<td></td>
</tr>
</tbody>
</table>

**Score Formula**

- Age score + Total score

- If age < 70 years: add 1 to total score above

Score < 3: Weekly rescreening of the patient. If the patient is e.g. scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk factors.

**SNAQ**

- Did you lose weight unintentionally?  
  - More than 6 kg in the last 6 months
  - More than 3 kg in the last month

- Did you experience a decreased appetite over the last month?

- Did you use supplemental drinks or tube feeding over the last month?
  - no intervention
  - moderately malnourished, nutritional intervention
  - severely malnourished, nutritional intervention and treatment dietician
What is SCREEN II?

Seniors in the Community: Risk Evaluation for Eating and Nutrition
SCREEN II

- SCREEN can be self or interviewer administered
- Expert involvement in wording
- Seniors involved in development
- Abbreviated version also available
- Validated against a dietitian’s rating of nutritional risk

- Demonstrated test-retest reliability
- Intermodal, inter-rater reliability
- SCREEN program
  - Referral process based on identified risk items
- Can be included on EMR or other platforms

EJCN, 2005; J Clin Epi, 2007
Items on SCREENII

- Weight change*
  - Loss/gain
  - Intentionality
  - Perception
- Skipping meals*
- Diet restrictions/difficulty
- Appetite*
- Eating alone*
- Use of meal replacements

- Intake
  - F&V*
  - Milk products
  - Meat & alternatives
  - Fluid*
- Swallowing*
- Chewing
- Grocery difficulty
- Cooking difficulty*

* On abbreviated version
Example Question

How much fluid do you drink in a day?

Examples are water, tea, coffee, herbal drinks, juice, and soft drinks, but not alcohol.

- □  Eight or more cups
- □  Five to seven cups
- □  Three to four cups
- □  About two cups
- □  Less than two cups
Nutri-eSCREEN ... for self-management
www.eatrightontario.ca/escreen

Eating Habits Survey
Welcome! If you are an older adult, this questionnaire will help you find out how you are doing with choosing foods that help you stay healthy and active.

Answer 14 short questions about your eating habits. This should take about 10 minutes.

Your Benefits
- What you eat impacts your health
- Find out what you are doing well
- Find out where you can improve
- Learn about some steps you can take to improve your eating habits

Your Results
- Step 1 Tell us a bit about yourself
- Step 2 Complete all 14 questions
- Step 3 When you are finished, we will tell you your results
- Step 4 Find nutrition resources and links to help you to improve your habits

Click Here To Start
Connecting Frailty and Nutrition Screening

• Overlapping characteristics in screening/assessment tools include:
  – Weight loss/decreased body mass
  – Functional capacity
  – Weakness (grip strength)
  – Cognitive status

• Frailty/pre-frailty could be used as a justification for nutrition screening.
  – The five Fried criteria, self-reported or observed slowness, weakness or exhaustion at routine visits could be a trigger.
  – The seven-point Clinical Frailty Scale could also be used to identify frailty based on clinical judgment.
  – Pre-frailty assessment with key indicators: handgrip strength, 5 meter walk
  – Target a segment of the population with increased frailty/undernutrition e.g. >75 years
Clinical Frailty Scale

1. **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2. **Well** – People who have no active disease symptoms but are less fit than Category 1. Often, they exercise or are very active occasionally, e.g. seasonally.

3. **Managing Well** – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4. **Vulnerable** – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up,” and/or being tired during the day.

5. **Mildly Frail** – These people often have more evident slowing, and need help in high order ADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6. **Moderately Frail** – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

7. **Severely Frail** – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~6 months).

8. **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** – Approaching the end of life. This category applies to people with a life expectancy < 6 months, who are not otherwise evidently frail.

Where dementia is present, the degree of frailty usually corresponds to the degree of dementia:

- **Mild dementia** – includes forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

- **Moderate dementia** – recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

- **Severe dementia** – they cannot do personal care without help.
Polling Question: Do you think frailty should be used as a trigger for nutrition screening in the community?

- Yes
- No
- Not sure
- It would not work in my practice
- It is already done in my practice
Getting Frailty and Nutrition Screening in the Community

- The whole team, including physicians, nurses, dietitians and other health professionals, needs to be aware of the importance of nutrition and frailty.
- Screening does not need to be done by the professional who will treat.
- For implementation of screening to be effective and sustainable, practices should outline a feasible and realistic plan to follow.
- Start small and don’t jump into full screening before the team is aware of its importance or before you have tested a few tools.
Questions to consider before starting screening...

- Who will do the screening/ask the questions?
- When will screening be done? Will we target a specific group?
- Which tool will be used?
- What happens if a person is at risk?
- Who will provide a diagnosis (in the case of malnutrition) and treatment?
- What are the training needs of those involved in screening and diagnosis?
- How often should a person be screened?
- What community services are available to provide support to frail and/or malnourished patients?
Implementing Screening

• Staff (including nurses) education about impact of malnutrition and frailty and importance of screening
• Make sure screening connects to assessment and that staff are aware that a referral follows a positive screening
• Work with staff until they are comfortable with the form/process (i.e. tweaking layout)
• Embed the questions into nursing admission forms, electronic medical records
• Use reminders, and small group interactions to reinforce
• Conduct audits and report back results to staff
• Celebrate success
In Summary...

• 34% of Canadians are at nutrition risk
• There is an overlap in nutrition risk and frailty, with malnutrition/risk of malnutrition = 4x increase in risk of frailty
• There is a connection between nutrition risk, frailty and falls
• Multifactorial interventions are required to prevent falls, which may include: ONS, vitamin D, protein, high quality diets, and physical activity
• Nutrition screening can be used to identify nutrition risk
• There are many factors to consider for implementing screening in the community
Questions?
References


Broeska VE, Lengyel CO, Tate RB. 2013. Nutritional Risk and 5-Year Mortality of Older Community-Dwelling Canadian Men: The Manitoba Follow-Up Study. 32(4)


References (con’t)


Lenardt, Carneiro, Betiolli, Binotto, Ribeiro, Teixeira, 2016. Factors associated with decreased hand grip strength in the elderly Esc. Anna Nery, 20(4)


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Vivanti AP, McDonald CK, Palmer MA, Sinnott M. 2009. Malnutrition associated with increased risk of frail mechanical falls among older people presenting to an emergency department. 21(5), 386-394.