Conflicts of Interest

• Member of the Malnutrition In The Elderly Group, Nestle Australia

• Have participated in international initiatives that have been funded through educational grants from Nestle Inc.

• One of the research studies presented in this talk received research sponsorship from Organon Pty Ltd.

• In the past, during training years, I received small travel grants from Pfizer Australia and Servier to attend conferences
Australia’s Ageing Bulge

“Squaring Of The Population Pyramid”

Frailty
FRAILTY

• ‘the collected culmination of a lifetime of assaults on the body by medical problems or lifestyle’ ....‘it is marked by reduced resilience’


• ‘the frail individual is weak, slow and vulnerable to stressor events, such as illness, falls or any circumstance that compromises their physical and/or mental equilibrium’

Frailty Will Be Commonly Seen In Hospitals

• There has been very little research in this area in Australia

• Using prevalence figures from overseas:

It is possible that in 2011, more than 270,000 community dwelling Australians aged 70 years and over were frail or at-risk of frailty.

By 2050, four million Australians aged 70 years and older will either be frail or at-risk of frailty.

Courtesy of Dr Helen Feist, Demography Researcher, UoA
Frailty: Causes and Consequences

Shared risk factors
- ANOREXIA
  - Loss of appetite and/or reduced food intake
  - Early satiety
- SARCOPENIA
- Medications/Drugs
- Under-Nutrition
- FRAILTY
  - Impaired mobility, loss of strength, slow gait speed, nutritional problems, reduced physical activity
- DISABILITY
  - Falls
  - Fractures
  - Weight Loss

The Anorexia of Ageing

Decreased Appetite
- Decreased energy input
- Leptin (in males)
- Ghrelin
- Cholecystokinin
- Testosterone (in males)
- ↑ Inflammation
- ↓ Smell, ↓ Taste
- Weight Loss
  - Loss of Muscle Mass
  - Sarcopenia
  - Frailty
UNDER-NUTRITION IS COMMON AND HAS ADVERSE HEALTH CONSEQUENCES

The Mini Nutritional Assessment

Well nourished (MNA ≥ 24)
At risk of malnutrition (MNA= 17-23.5)
Malnourished (MNA<17)
### Malnutrition Universal Screening Tool (MUST)

1. **Have you / the patient lost weight recently without trying?**
   - No: 0
   - Unsure: 2
   - Yes, how much (kg):
     - 1-5kg: 1
     - 6-10kg: 2
     - 11-15kg: 3
     - >15kg: 4
   - Unsure: 2

2. **Have you / the patient been eating poorly because of a decreased appetite?**
   - No: 0
   - Yes: 1

**Total Score**

If unsure, ask if they suspect they have lost weight e.g. clothes are looser.

For example < ¾ of usual intake

May also be eating poorly due to chewing and swallowing problems

If your patients have lost weight and / or are eating poorly they maybe at risk of malnutrition i.e. score 2 or more.

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**References**

Nutritional Risk Is Common In The Community And Associated With Hospitalization

The Nutritional Status of 250 Older Australian Recipients of Domiciliary Care Services and Its Association with Outcomes at 12 Months

Renuka Visvanathan, MBBS,* Caroline Macintosh, PhD, BSc( hon);1 Mandy Callary, FRACP, MBBS,* Robert Penhall, FRACP, MBBS,* Michael Horroertz, PhD, FRACP, MBBS, and Ian Chapman PhD, FRACP, MBBS

OBJECTIVES: To identify predictors and consequences of nutritional risk, as determined by the Mini Nutritional Assessment (MNA), in older recipients of domiciliary care services living at home.

DESIGN: Baseline analysis of subject characteristics with low MNA scores (<24) and follow-up of the consequences of these low scores.

SETTING: South Australia.

PARTICIPANTS: Two hundred fifty domiciliary care clients (aged 67–99, 173 women).

MEASUREMENTS: Baseline history and nutritional status were determined. Information about hospitalization was obtained at follow-up 12 months later.

INTERVENTION: Letters suggesting nutritional intervention were sent to general practitioners of subjects not well nourished.

The decline in body weight after the age of 60 is disproportionately that of lean body tissue (i.e., sarcopenia); this has adverse effects. In a recent large study of community-dwelling people aged 65 and older in the United States, weight loss in excess of 5% body weight over 3 years increased in 47% and was associated with a

5% Malnourished
+ 40% At-risk

Hospitalization
Hospital LOS
Fall
Over 12 months

Nutritional Risk Leads To Poor Discharge Outcomes From Rehabilitation

Nutritional screening of older people in a sub-acute care facility in Australia and its relation to discharge outcomes

Renuka Visvanathan1,2, Robert Penhall1, Ian Chapman2
1Department of Geriatric and Rehabilitation Medicine, Royal Adelaide Hospital, Adelaide, SA, Australia
2Department of Medicine, University of Adelaide, Adelaide, SA, Australia

Address correspondence to: R. Visvanathan. Fax (+61) 8 822 36472. Email: r.visvanathan@ozemail.com.au

Abstract

Objectives: to determine the prevalence of under-nutrition using brief screening methods and to determine the relation between these results and (1) those of a more standard nutritional assessment and (2) discharge outcomes.

Design: prospective study.

Subjects: 65 (21 males) patients older than 65 years.

Settings: sub-acute care facility.

Measurements: the Mini Nutritional Assessment, standard nutritional assessment, and rapid screen and discharge outcome.

Results: the prevalence of under-nutrition was high. The prevalence of under-nutrition identified by the screening method used. Compared to the standard nutritional assessment the rapid screen containing (1) body mass index <22 kg/m²; and/or (2) recent weight loss of ≥ 5% over the previous 3 months and the mini-tiered Mini Nutritional Assessment process (at-risk subjects 46% of total) further evaluated using standard nutritional assessment had sensitivities of 78.6 and 89.5% and specificities of 97.3 and 87.5% respectively in diagnosing under-nutrition. Under-nourished patients identified by the standard nutritional assessment (50.0% (under-nourished) versus 21.6% (nourished); P = 0.017), the two-tiered Mini Nutritional Assessment process (50.0% (under-nourished) versus 21.6% (nourished); P = 0.017) and the rapid screen (56.5% (under-nourished) versus 21.4% (nourished); P = 0.004) were more likely to be discharged to an acute hospital or an accommodation with increased support (poor discharge outcomes) than nourished patients.

Conclusions: all screening methods identified patients more likely to have a poor discharge outcome. The highly specific but less sensitive “rapid screen” may be the best method in facilities with limited resources as it can be easily incorporated into nursing/medical admissions and avoids biochemical investigations in all patients. The more sensitive two-tiered Mini Nutritional Assessment is better of scarce resources.
Poorer Nutritional Status Associated With Long LOS

Poorer nutritional status classified by MNA-SF (BMI) associated with longer: indicating that for every SD drop in MNA-SF (BMI) score, LOS increased by 0.19 SD

Lower GNRI score on admission, indicating poorer nutritional status, was associated with lower discharge function

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Length of Hospital Stay (days) B SE 95% CI P</th>
<th>Discharge Function (BI) B SE 95% CI P</th>
<th>Discharge Other than to Home OR SE 95% CI P</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNA</td>
<td>-0.12 0.004 -0.02 to 0.00 0.162 0.11 0.23 -0.08 to 0.83 0.093 0.96 0.03 0.90 to 1.02 0.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNA-SF-BMI</td>
<td>-0.19 0.01 -0.08 to 0.10 0.027 0.06 0.40 -0.42 to 1.16 0.320 0.93 0.05 0.84 to 1.04 0.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNA-SF-CC</td>
<td>-0.18 0.01 -0.03 to 0.00 0.041 0.07 0.37 -0.37 to 1.10 0.329 0.97 0.05 0.87 to 1.07 0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNA-SF-MAC</td>
<td>-0.16 0.01 -0.02 to 0.00 0.106 0.05 0.36 -0.42 to 0.10 0.418 0.94 0.05 0.85 to 1.03 0.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUST</td>
<td>0.02 0.02 -0.03 to -0.04 0.804 -0.4 1.04 -2.63 to 1.49 0.555 0.96 0.14 0.73 to 1.27 0.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GNRI</td>
<td>0.06 0.002 -0.004 to 0.002 0.450 0.13 0.08 0.01 to 0.33 0.043 0.99 0.01 0.96 to 1.01 0.19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*All regression models controlled for 6 core confounding variables: age, gender, CCI, MMSE, Admission BI, Lives Alone.
The multiple regression models additionally controlled for CRP levels and GDS-15. LOS outcomes also controlled for "move not home".  †β = Standardised Beta Coefficient.  §SE = Standard Error

Dr Elsa Dent PhD Work

Results MNA-SF (M) vs. Fried’s (Frail)

Table: Efficacy values of MNA-SF malnutrition classification in identifying frailty using Fried’s Criteria (n=100)

<table>
<thead>
<tr>
<th>MNA-SF Cut-off Scores</th>
<th>&lt;7</th>
<th>&lt;8</th>
<th>&lt;9</th>
<th>&lt;10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>0.515</td>
<td>0.636</td>
<td>0.803</td>
<td>0.879</td>
</tr>
<tr>
<td>Specificity</td>
<td>0.912</td>
<td>0.794</td>
<td>0.765</td>
<td>0.500</td>
</tr>
<tr>
<td>PPV</td>
<td>0.919</td>
<td>0.857</td>
<td>0.869</td>
<td>0.773</td>
</tr>
<tr>
<td>NPV</td>
<td>0.492</td>
<td>0.529</td>
<td>0.667</td>
<td>0.680</td>
</tr>
<tr>
<td>YI</td>
<td>0.427</td>
<td>0.430</td>
<td>0.568</td>
<td>0.379</td>
</tr>
</tbody>
</table>

PPV, Positive Prediction Value; NPV, Negative Prediction Value; YI, Youden Index

Dent E, JNHA
### Nutritional Risk Is More Common With Increasing Frailty

#### Table 1: Prevalence of malnutrition by the level of care

<table>
<thead>
<tr>
<th>Clinical Setting</th>
<th>Undernourished (MNA&lt;17)</th>
<th>At-risk Undernutrition (MNA 17.23.5)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European community (healthy)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elderly home-care rural Finland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitals: Acute</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swiss acute geriatric unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitals: Sub-acute</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Level Care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swedish Old People’s Home (Hostel)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Level Care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Living with Dementia- Sweden</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swedish Nursing Home</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MNA < 17: malnourished MNA 17.23.5: at-risk of malnutrition

### Poor Outcomes Related To Nutritional Risk

- Hospitalisation
- Hospital Length of Stay
- Falls
- Residential Care Placement
- Post-operative complications
- Delayed wound healing
- Infections
- Pressure sores
- Health Care Costs
- Health Care Utilization

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Contributing Factors To Nutritional Risk

"Meals on Wheels"

M  Medication effects
E  Emotional problems, especially depression
A  Anorexia tardive (nervosa), alcoholism
L  Late-life paranoia
S  Swallowing disorders
O  Oral factors (poor fitting dentures, cavities)
N  No money
W  Wandering and other dementia-related behaviors
H  Hormonal  e.g. hyperthyroidism
E  Enteric problems (e.g. malabsorption)
E  Eating problems (e.g. inability to feed self)
L  Low-salt, low cholesterol diets especially in institutions
S  Social problems (e.g. isolation, inability to obtained preferred foods)

In Hospital

- Subjective Global Assessment was used to assess 3122 patients from 56 hospitals in Australia and New Zealand
- Response via a 24 hour survey

Food consumption <50% in 35% of ‘Nourished’ and 50% of ‘Malnourished’ subjects

The Body Mass Index

- Weight in Kg / [Height in m]²

- WHO Healthy BMI range is 18.5-25kg/m²
  Overweight BMI range is 25-<30 kg/m²
  Obese BMI range is 30+ kg/m²

This is **different** in older people

---

**Note increased risk at approximately 22kg/m²**

**Note no increased risk in the WHO overweight category**

23.5kg/m² was used as the reference BMI

---

**FIGURE 2. HRs (95% CIs) of all-cause mortality according to BMI for men and women aged ≥65 y. BMI was modeled with restricted cubic splines in a random-effects dose-response model. A BMI (in kg/m²) of 23.5 (most common midpoint for the reference BMI category) was used as the reference to estimate all HRs. The vertical axis is on a log scale.**

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**AJCN 2014**

Jane E Winter, Robert J Maclnnis, Naiyana Wattanapongsirikoon, and Caryl A Newsom

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What is Weight?

WATER
BLOOD
MARROW

BONE

FAT

MUSCLE

40%

BMI Body Comparison

Where has the muscle gone?
Muscle Is Important In Older Age

<table>
<thead>
<tr>
<th>WATER</th>
<th>BLOOD</th>
<th>MARROW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BONE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduced</td>
<td></td>
</tr>
<tr>
<td>FAT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase</td>
<td></td>
</tr>
<tr>
<td>MUSCLE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduced</td>
<td></td>
</tr>
</tbody>
</table>

OSTEOPOROSIS  FRACTURES

Reduced

OBESITY

Diabetes
Myocardial Infarction
Stroke
Obstructive Sleep Apnoea
Hypertension

Sarcopenia

Loss of Independence
Falls and Fracture
Frailty

Weight Loss In Older People Associated With Muscle Mass Loss

With loss of weight there is a loss of lean mass which is undesirable

When weight is gained, very little of the weight gain is due to lean mass (i.e. harder to regain)

Newman et. al. AJCN 2005; 82: 872-878
Protein Intake For Older People

Protein Requirements In Older People- An International Expert Consensus [2012]
Key Recommendations From The Group

- To maintain muscle, older people need more dietary protein than younger people:
  1.0 to 1.2g/kg body weight/day

- It is also recommended that 25 to 30g of protein (2.5 to 2.8g of leucine) is consumed with each of the three main meals

- In older people with acute or chronic disease, then the protein requirements increase to between 1.2 to 1.5g/kg body weight/day

- Ingesting protein after exercise is likely to benefit in terms of building muscle

Caution With Renal Disease

<table>
<thead>
<tr>
<th>Kidney function und kidney disease</th>
<th>Non-dialysis CKD</th>
<th>Hemodialysis</th>
<th>Peritoneal dialysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROT-AGE recommendations for older people with kidney disease</td>
<td>• Severe CKD - GFR &lt; 30: 0.8 g/kg BW/day</td>
<td>1.5 g/kg BW/day</td>
<td>1.5 g/kg BW/day</td>
</tr>
<tr>
<td></td>
<td>• Moderate CKD - 30&lt; GFR &lt;60: more protein, but GFR should be monitored 2x/year</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Mild CKD - GFR &gt; 60: no problem to increase protein intake</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Avoid Prolonged Fasting

"LET'S EASE INTO THIS--I WANT YOU TO TRY FASTING BETWEEN MEALS."

Provide Assistance

PROTECTED MEALTIMES
The nutritional health of our patients is very important to us

This ward operates Protected Mealtimes

AT LUNCH FROM 11:30 TO 1:00
AT DINNER FROM 5:30 TO 7:00

During this period of time, we ask that there are minimal interruptions, so our patients can have a calm and relaxing environment to eat. Visitors can use this time to refresh themselves or are welcome to help by encouraging, feeding or observing patients instead. If interested in helping, please check with nursing staff on how you can assist your loved one.

If possible please do not call the ward during these times, so that nursing staff can focus on assisting patients that need help.

If you have any further questions or concerns, please feel free to speak to our friendly nursing staff.
Encourage Socialisation

What To Do To Improve Health

1. Exercise
2. Exercise
3. Exercise
4. Exercise
5. Exercise
6. Exercise
7. Exercise
8. etc.

yes, yes, yes—now, seriously—what can we do to improve our health?
Encourage Physical Activity
Encouraging staff participation = Culture change

- Executive support
- Review organisation structure
- Training
- Create Value and belief statements
- Effective communication
- Use employee focus groups
- Redesign your approach to reward and recognition

The review of organisation structure
Key In Hospital Recommendations

- nutrition and oral health screening on admission
- good access to dietetics
- good access to dental services
- high quality food services
- access to ethnic appropriate meals
- protected meal times
- avoid prolonged/unnecessary fasting
- assistance with feeding
- address reversible factors
- early mobilization and physical therapy
- encourage family/friends to be present (socialization)
- system/organizational support + direct care champions
- regular education and training

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