Guidelines elderly population with CKD 3-5: “Nutrition”

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Clinical Practice Guideline on management of older patients with chronic kidney disease stage 3b or higher \((\text{eGFRr}<45\text{ml/min})\)

This guideline was developed by

\[ \text{ERBP} \]

with financial and logistical support of \( \text{ERA EDTA} \)
**Notion:** Nutritional status is a strong predictor of survival in patients starting or receiving chronic dialysis.

Nutritionele assesment in CKD 3B/4/5
Notion: Importance to identify reliable tools to assess nutritional status and diagnose protein-energy wasting.

Nutritionele assessment in CKD 3B/4/5
Hypothesis: Does there exist a tool in patients with advanced CKD stage that can be accepted as the gold standard to assess nutritional status

Nutritionele assessent in CKD 3B/4/5
Hypothesis: This implies: 1/ that the tool is associated with mortality and morbidity and/or other more elaborate nutritional scores

Nutritionele assessent in CKD 3B/4/5
Hypothesis: This implies that changes in the tool reflects changes in the nutritional status

Nutritionele assesment in CKD 3B/4/5
**Condition**: Such tools should be easy to use in a routine clinical basis so that patients at risk can be identified for further assessment and management

**Nutritionele assesment in CKD 3B/4/5**
TOPICS

1. Characteristics population with CKD3-5 with malnutrition
2. Definition of malnutrition
3. Prevalence of malnutrition in CKD 3-5
4. Causes of malnutrition in CKD 3-5
5. Consequences of malnutrition in CKD3-5
6. Albumine as biomarker for malnutrition
7. Evaluation and screening of nutritional status in elderly CKD 3-5 (assessment!)
8. Interventions for prevention and treatment in elderly CKD 3-5
1. Characteristics of the population with malnutrition: “old” and “frail”

Nutritionele assesment in CKD 3B/4/5
Profile of elderly kidney patient

• **Senior** age more then 80 years, “very old, old age”
• **Fit elderly**
• **Vital**, interested in social activity, contacts and travelling
• **Good BMI**, no malnutrition
• Prominently specific renal problems, less polypathology and comorbidity
Profile geriatric/frail kidney patient

- Characterised with specific profile:
  - old age
  - polypathology
  - polypharmacy
  - disturbed homeostasis and frailty
  - dominant tendency for immobility and bedridden
  - high risk for malnutrition
  - psychological, social and financial problems for which return home is nearly impossible
What do we know from nutrition in geriatrics?

- **Energy needs**: at least 30 kcal/kg/d, no data in CKD
- **Protein needs**: more than in younger adults: more than 1.2 g/kg/d
- **Micronutrients**: lack of calcium and vitamin D intake
- **Protein intake** in pulses (more than 80% of meal) acts more anabolic
- **Avoid social isolation**: eating in groups increases daily intake by 120 kcal
What do we know from CKD elderly?

- Increased nutritional deficiency
- Increased catabolic events
- Increased sedentarism (muscle atrophy)
- Increased loss of self-reliance
- Increased psychosocial isolation
- More need for nutritional work-up and dietary support
- Necessity for trials to find optimal nutrient intake in the old CKD population
- Increased risk for frailty
Frailty and chronic kidney disease

Frailty

- **Geriatric image** with functional decline and high mortality risk.
- **Complex clinical syndrome**
- Related to clinical and subclinical diseases which cause and maintain the problem
- **Prognostic factor** for a bad outcome.
- Characterized by a change in metabolic balance, disturbed biology, inflammation and hormonal deficiencies.
Physical frailty

- 1. Gripping force: muscle weakness
- 2. Speed of walking
- 3. Evolution of weight loss
- 4. Time to exhaustion
- 5. Physical (in)activity
Frailty and hemodialysis

Mc Adams-DeMarco et al. JAGS 2013;61:896-601

Figure 1. Distribution of frailty score in study population. The percentage of nonfrail, intermidiately frail, and frail participants are listed above the cutoffs.
2. Definition: What is malnutrition?

Nutritionele assesment in old/frail patients in CKD 3B/4/5
Malnutrition

- **Definition**: inadequate and unbalanced food intake and pathological consumption in the body.
- **Implies more aspects**:  
  - weight loss  
  - obesitas with sarcopenia  
  - inflammation  
  - starvation
Malnutrition in dialysis

- Nutritional state creating a *unbalance* for energy proteins other nutriënts
- which leads to a *measurable negative effect* on the tissue - and body condition, body shape and proportions, composition, body functions and clinical results
Malnutrition in dialysis

• **2 types of malnutrition:**
  - Proteïne-energy malnutrition
  - Micronutriënt malnutrition: vitamines, trace elements....
Water soluble vitamin defects in HD

- **Vitamin B1**
  Important loss by dialysis

- **Vitamin B5**
  Loss especially in more efficient dialysis techniques, sometimes due to low diet intake

- **Vitamin B6**
  ESA increases consumption of B6, some medication interferes with absorption

- **Vitamin B8**
  Reduced intestinal absorption in dialysis

- **Vitamin B9**
  Dialysis loss + medication interferes with absorption

- **Vitamin C**
  Dialysis loss and reduced intake by food
Less common water soluble vitamin defects on HD.

- **Vitamin B2**
  Cleared by dialysis, but deficiency is rarely
- **Vitamin B3**
  No dialysis loss, no supplement necessity
- **Vitamin B7**
  Produced in intestinal flora, rarely deficiency
- **Vitamin B12**
  Generally no deficiency (protein rich diet)
Fat soluble vitamins in HD: Mostly no deficiencies!

- **Vitamin A**
  Plasma values rather higher!

- **Vitamin E**
  No deficits. Supplementation in combination with vit C can help for muscle cramps

- **Vitamin K**
  No evidence for depletions, except in malabsorption

- **Vitamin D**
  Always a problem in kidney failure
Place for supplements in vitamin depletion on hemodialysis?

• Lack of evidence, no guidelines yet, only recommendations.
• DOPPS study: 16% decreased mortality risk in patients who took water soluble vitamins extra.
• No standard multivitamin preparations given!
• Diet? Attention for enough and varied food intake despite restrictions!
3. **Prevalence of malnutrition in CKD**

Nutritionele assesment in old/frail patients in CKD3B/4/5
Prevalence of malnutrition

• **Hemodialysis**

  - Depends on the chosen nutritional parameters: variation from 20% to 70% of the patients have protein-energy malnutrition

• **Peritoneal dialysis**

  - +/- 40% of the patients: protein malnutrition

  - Malnutrition leads to:
    1. decreased QOL.
    2. increased risk for fatal CV-events.
Prevalence of malnutrition in dialysis

- In HD: 30% with 8% severe malnutrition
- In PD: 42% with 10% severe malnutrition
- In CKD 3B-5: 28%-48% malnutrition
- On the base of albumine and prealbumine measurements (together strongly prognostic): 25% severe malnourished
- Malnutrition increases with duration time on dialysis and age
4. Causes of malnutrition in CKD?

Nutritionele assesment in old/frail patients CKD 3/4/5
Factors Contributing to Uremic Malnutrition in Hemodialysis Patients Are Multiple

Dialytic Factors
- Bioincompatibility
- Inadequate Dose of Dialysis
- Hemodialysis related catabolism

“Inadequate” Nutrient Intake

Metabolic/Hormonal derangements
- Metabolic Acidosis
- GH/IGF1 Resistance
- HPT
- Hyperleptinemia
- Hospitalizations
- Co-Morbidities
- Chronic Inflammation

Uremic Malnutrition
Causes of malnutrition

- Co-morbidity
- Inflammation
- Infections
- Atherosclerosis \(=\) (MIA syndrome)
- Multiple chirurgical interventions
Causes of malnutrition

- **Exogenously**: teeth, cooking aid, vision, shopping capacity
- **Mental**: demention or depression
- **GI**: malabsorption, uremic gastroparesis, loss of appetite digestive disorders
- **Social**: status: financial weak
- **Polypharmacy**
- **Reduced food intake on dialysis days**
1. Reduced food intake in dialysis:

- **Causes:**
  - Uremic toxines (inadequate dialysis)
  - Catabolisme
  - Low testosteron
  - Insuline resistency
  - Metabolic acidosis
  - Strict diet: protein and phosphorus restriction
Spontaneous Dietary Protein Intake During Progression of Chronic Renal Failure

Figure 1. Average values of dietary DPI and total daily creatinine excretion of patients monitored during the study, classified according to different levels of CrCl.

Diet: phosphorus restriction in dialysis

- Problem in HD and PD
- Lab: 0.9-1.5 mmol/L
- Phosphorus restriction = 800-1000 mg/day
- Protein rich food = phosphorus rich food, finding the balance!
- Best to avoid inorganic phosphate and non-protein bind phosphates,
- Protein bind phosphate is ok
2. Metabolic acidosis on dialysis

- **Unbalance** in the pH of the blood with too low pH (<7.35)
- **Consequences:**
  - Triggers malnutrition
  - Stimulates protein catabolism
  - Reduce protein synthesis (promotes rhabdomyolysis)
- **Correction acidose** (lab = bicarbonate > 20 mmol/l) with sodium bicarbonate gelules and Vichy water
3. Elevated protein and energy needs on dialysis:

- Higher needs of energy in HD and PD than healthy persons
- Etiology: Changed metabolism induced by dialysis technique itself:
  - Inflammation
  - Peritonitis in PD
  - Loss of proteins in HD and PD
Causes of higher energy needs: Protein loss on dialysis

- **Hemodialysis**:  
  8 - 12g AA/HD session  
  1 - 3g peptides/HD session  
  (dependent on type of artificial kidney, dialysis time,...)

- **PD**: 1.7 - 4g AA/day  
  10 - 20g proteins/day  
  (30g/day in peritonitis)
Higher protein needs on dialysis

1. Dialysis diet = must be protein rich !!! (without inducing high uremia)

2. PD patients need more proteins than HD patients
Recommanded energy needs on dialysis

- **Protein intake (gr/kg BW/dag):**
  - HD: 1,2 - 1,4 (> 50 % HBV)
  - CAPD: 1,2 - 1,5 (>50 % HBV)

  **HBV = high biological value**

- **Energy intake (kcal/kg BW/day):** 35
  - (<60 j : 35)
  - (>60 j : 30)

  *(ESPEN: European society for clinical nutrition and metabolism)*
5. Consequences of malnutrition

Nutritional assessment: for who in CKD 3B/4/5/ ??
Malnutrition: consequences

- Disturbed immunity (HIV-like syndrome)
- Reduced muscle mass (sarcopenia)
- Reduced muscle strength (sarcodynia)
- Reduced bone mass (osteopenie/porose)
- Disturbed behavior (trace elements)
- Low cholesterol (inverse epidemiology)
- Low urea, creatinine, low albumine
- Increased cardiovascular morbidity
- Frailty
Consequences of malnutrition

• Delayed wound healing
• Decubitus development
• Infections
• Atrophy of the intestine mucosa, malabsorptie
• Edema caused by low albuminemia
• = Strong predictor of survival
Consequences of malnutrition

- **Protein energy wasting syndrome**: PEW: frequent in CKD
  - 20% – 60% on start of dialysis
  - Age dependent:
    - 30% between age 40 y and 65y
    - 50% age more 65y
  - Tools to assess??
6. Serum albumin as a biomarker of malnutrition???

Nutritional assessment of the old/frail patients in CKD 3 B/4/5
Two concerns in nutritional policy and screening

• 1. Is albumin a good **biomarker** of nutrition? (Is sAlb < 3.5 mg/dl a risk and pre-albumine < 30 mg/dl?)

• 2. Is there a place for **protein restriction** in the diet of the elderly in (pre) dialysis stage (CKD4/5)?
Interest of albumin

- Marker of food intake (related to nPCR) however it is a weak biomarker of malnutrition
- Marker of underlying disease (cardiac!)
- Strong marker of inflammation (correlating with CRP) and endothelial dysfunction
- Always to correlate with fluid overload or dilution
- Correlating with urinary and peritoneal loss
- Biomarker of mortality and outcome
4. Plasma protein measurements

The plasma albumin concentration

- Negative correlation between the plasma albumin concentration and mortality
  - < 35 g/L
  - Bioincompatible dialysis membranes
  - Underlying access infections
  - Occult infection or inflammation

Combe C. Influence of nutritional factors and hemodialysis adequacy on survival of 1610 French Patients. AJKD. 2001
Protein restriction in the diet of elderly in predialysis

- No hard proof for renoprotection on eGFR in elderly population
- Diet compliance only 60%
- Higher risk for deficient energy intake
- Increased catabolism and muscle wasting
- BUT! Multiple favorable effects
Favorable effects of protein restriction

- Less inflammation (decrease IL6, leptine etc)
- Ameloration of dyslipidemia
- Ameloration insuline resistance
- Reduction phosphorus intake
- Reduction FGF 23 (= CV risk factor by disturbance in the bone metabolism )
- Improvement of acidosis
- Improvement of ESA sensitivity
- Decreased salt intake (barbeque!), better RR control
7. Q5a of the clinical practice guideline in ERBP:

Which is the best alternative to evaluate nutritional status in older patient with advanced CKD 3b or higher (eGFR < 45 ml/min.1.73m²) or on dialysis beside serum albumine.
How to detect malnutrition?

• **Validated instruments** for screening for dialysis patients?? They don’t exist!

• **No real measurements** in CKD to detect malnutrition.

• Combination of different parameters!
Screening malnutrition on dialysis

- Blood parameters (EBPG)
- Anthropometric data
- Estimation by dietician
- Body composition?
Screening for malnutrition on dialyse:

1. Blood parameters (ERBP)
   - Se albumin < 3.5 mg/L: increased relative mortality risk
   - Se prealbumin < 0.3 g/l
   - Se cholesterol: < 150 mg/dl = too low
     increased mortality risk (150 – 180 mg/dl = low normal)
   - PCR = nPNA (protein nitrogen appearance)
     > 1 g/kg, protein intake through diet history.
Screening: Who is malnourished on dialysis?

- **2. Anthropometric data:**
- BMI < 23 kg/m²
- Weight loss 5% over 3 months, 10% over 6 months
- Total body fat percentage < 10%
- Muscle mass 5% decrease on 3 months, 10% on 6 months
- Protein intake < 0.8 g/kg/d
- Low energy intake < 30 kcal/kg/d
Screening: Who is malnourished on dialysis?

- **2. Antropometric data:**
  - Interdialytic weight gain
  - Plus 4% à 4.5% = acceptable for optimal feeding
  - <3%: probably less good food conditions, eat more bad

- Follow up unplanned loss dry weight over the last 3-6 months
  - >10% = clinical significant
  - 5%–10% = probable risk for malnutrition
Screening for malnutrition on dialyse: How?

- Combination of anthropometric data and specific blood parameters (EBPG)

- Beside objective parameters also estimation of the dietician with screening tools

- Regularly (re-) assessment of nutritional status by trained dietician.
Screening for malnutrition

• 3. Screening tools for dieticians

• Subjective global assessment = SGA
SGA as a screening tool for dialysis patients

- In literature many times described for dialysis patients
- Strong predictor for survival
- Easily reproducible
- No correct estimation on grade of malnutrition
- Different perception by different persons?
SGA

Subjective Global Assessment

- Subjectieve + objectieve parameters
- Score van 1 tot 7

DEEL 1
- Gewichtsverlies
- Eetgedrag
- G-I symptomen

DEEL 2
- Fysisch onderzoek: Spiermassa en cutaan vet
SGA: subjective global assessment
## Alternative screening: NRS 2002: nutritional risk screening

<table>
<thead>
<tr>
<th>Nutritionele toestand</th>
<th>+ Onderliggende aandoening (stress-metabolisme)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AFWEZIG</strong></td>
<td></td>
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<tr>
<td>Score 0</td>
<td>Normale nutritionele toestand</td>
</tr>
<tr>
<td><strong>MILD</strong></td>
<td></td>
</tr>
<tr>
<td>Score 1</td>
<td>Gewichtsverlies &gt; 5% in 3 mnd</td>
</tr>
<tr>
<td></td>
<td>Voedselinname 50-75% van de normale behoeften gedurende de voorbije week</td>
</tr>
<tr>
<td></td>
<td><strong>MILD</strong></td>
</tr>
<tr>
<td>Score 1</td>
<td>Heupfractuur</td>
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<tr>
<td></td>
<td>Chronische patiënten, vooral met acute complicaties, cirrose, chronisch obstructief longlijden, chronische hemodialyse, diabetes, oncologie</td>
</tr>
<tr>
<td><strong>MATIG</strong></td>
<td></td>
</tr>
<tr>
<td>Score 2</td>
<td>Gewichtsverlies &gt; 5% in 2 mnd</td>
</tr>
<tr>
<td></td>
<td>BMI 18,5-20,5 + algemeen verzwakte toestand</td>
</tr>
<tr>
<td></td>
<td>Voedselinname 25-50% van de normale behoeften gedurende de voorbije week</td>
</tr>
<tr>
<td></td>
<td><strong>MATIG</strong></td>
</tr>
<tr>
<td>Score 2</td>
<td>Majeure abdominale heelkunde</td>
</tr>
<tr>
<td></td>
<td>Beroerte</td>
</tr>
<tr>
<td></td>
<td>Ernstige pneumonia</td>
</tr>
<tr>
<td></td>
<td>Hematologische maligniteit</td>
</tr>
<tr>
<td><strong>ERNSTIG</strong></td>
<td></td>
</tr>
<tr>
<td>Score 3</td>
<td>Gewichtsverlies &gt; 5% in 1 mnd (&gt; 15% in 3 mnd)</td>
</tr>
<tr>
<td></td>
<td>BMI &lt; 18,5 + algemeen verzwakte toestand</td>
</tr>
<tr>
<td></td>
<td>Voedselinname 0-25% van de normale behoeften gedurende de voorbije week</td>
</tr>
<tr>
<td></td>
<td><strong>ERNSTIG</strong></td>
</tr>
<tr>
<td>Score 3</td>
<td>Schedeltrauma</td>
</tr>
<tr>
<td></td>
<td>Beenmergtransplantatie</td>
</tr>
<tr>
<td></td>
<td>Intensieve zorgen (APACHE ≥ 10)</td>
</tr>
</tbody>
</table>
Total score nutritional condition (0 to 3) + Total score underlying disease (0 to 3) + extra point if patient ≥ 70 years

As total score ≥ 3: start nutritional support
Screening for malnutrition

• **Body composition tools voor dietician**

• =Lean body mass

- BIA: bio impedance analyse
- DEXA: dual energy Xray absorption spectometry
- Handgrip strength
SGA in 14 studies measured and compared with:

- 1. Malnutrition inflammation score (MIS)
- 2. Geriatric nutritional risk index (GNRI)
- 3. Malnutritional screening tool
- 4. Antropometry
- 5. Handgrip strength
- 6. Total body nitrogen
- 7. Total body potassium
- 8. Dual X-ray absorptiometry
- 9. Bioimpedance
- 10. Serum albumine and other biochemical factors
Q5a of clinical practice guideline in ERBP: improving assessment nutritional status

(1028 articles, 14 selected):

**Recommandation 1C**: we recommend the SGA as the gold standard to assess nutritional status of older patients with CKD 3B/4/5
Q5a of clinical practice guideline in ERBP: improving assessment nutritional status

**Suggestion 2C**: may be used a score including serum albumin, body mass index, serum creatinine normalized to body surface area en npNA to assess nutritional status of older patients with CKD 3B/4/5
Nutritional assessment and screening

- **GOLD STANDARD** =

  **SGA:** very useful tool with good accordation for
  - protein energy wasting
  - total body nitrogen
  - serum albumin
  - antropometry
  - bioimpedance

- Quality of studies was judged adequate (2), intermediate (4) or poor (8) resulting in an overall limited quality of evidence!
Nutritional assessment and screening

• **Further research recommendations:**

• **PEW (protein energy wasting) score**: 1 study, presented by the International Society of Renal Nutrition and Metabolism in 2008. (score with 4 grades) derived from 4 nutrition parameters: albumin, BMI, normalized screea value, and nPNA power: -6 months variation of PEW score is strong predictor of survival
  - PEW increases with age
8. Q5b of clinical practice guideline in ERBP

Which interventions are effective in improving nutritional status in elderly/ frail patients with advanced CKD (eGFR < 45 ml/min/ 1.73m^2) or on dialysis
8. Q5b of clinical practice guideline in ERBP

Needs for a step by step plan to correct malnutrition in elderly/frail patients. Uncertainty and disagreement exist on optimal nutritional care!
HD: Behandeling voor ondervoeding

Soort behandeling voor malnutrietie

<table>
<thead>
<tr>
<th>Behandeling</th>
<th>% van de HD patiënten</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPN (intra-dialytisch parenterale voeding)</td>
<td>2.1%</td>
</tr>
<tr>
<td>Sondevoeding</td>
<td>0.3%</td>
</tr>
<tr>
<td>Verrijkte voeding</td>
<td>1.5%</td>
</tr>
<tr>
<td>Voedingsdrank met nefrol.samenstelling</td>
<td>5.5%</td>
</tr>
<tr>
<td>Algemene voedingsdrank</td>
<td>0.1%</td>
</tr>
</tbody>
</table>
Dietary intakes and nutritional status evaluation

Moderate undernutrition
Spontaneous intakes
≤ 30 kcal/kg/day
≤ 1.1 g protein /kg/day

Severe undernutrition
BMI < 20
Body weight loss > 10% within 6 mo
Albumin < 35 g/l
Transthyretin < 300 mg/l

Spontaneous intakes
> 20 kcal/kg/d

Dietary counselling

Oral supplements

Lack of compliance

IDPN

No Improvement

Spontaneous intakes
< 20 kcal/kg/d
or
Stress conditions

Enteral Nutrition if EN is not possible:
Central venous PN

No Improvement
Q5b of clinical practice guideline in ERBP

(1028 abstracts, 26 withhold (8 RCT’s)):

We suggest (2C) a trial of structured dietary advice and support
Limitation of the analyzed trials

- Most included trials had a weak study quality
- Only 5 RCT’s, 18 observational studies with small sampling (5 to 224p)
- Limited data available for mortality and other core endpoints
Place for oral supplements: study results

- Statistical improvement of nutritional parameters
- Increase of serum albumin alone
- Increase of serum albumin and SGA
- Increase of serum albumin without SGA changes
- Very few data on outcome parameters
Place for IDPN (intradialytic parenteral nutrition)

• Dialysis is a catabolic procedure with loss of amino acids and negative nitrogen balance
• All studies rapport an improvement of serum albumin, pre-albumin and SGA
• (1 RCT orale supplements versus IDPN)
Place for IDPN (intradialytic parenteral nutrition)

- IPDN in combination with exercises on dialysis, gives most favorable anabolic results with least proteolysis
- IPDN starting early in conditions of anabolic resistance: 1. inflammation 2. acidosis
Interventions for improvement of nutritional state

• **Saving of the nutritional state** dominates above each other kind of diet restriction (phosphorus, lipids, protein etc..)

• **Place for alternatives**: gastric tube feeding, intra peritoneal amino acids supplementations in PD
Interventions for improvement of nutritional state

- **Lack of evidence of** added value to prefer parenteral intradialytic nutrition above oral supplementation (amino acids, lipids, proteins, maltodextrin etc.) or diet advice

- **Correction of metabolic acidosis** is save and cheap
Interventions for improvement nutritional state:

• “Low quality, largely anecdotal studies”:
  - rhGH (recombinant growth hormone) (6 and 8 patients)
  - nandrolone decanoate (16 patients)

• Independent prediction of 54% fall of the 2 years mortality, less hospitalisation, and amelioration of the Karnofsky score at dialysis after IDPN (1 study)
Interventions for improvement nutritional state:

- Positive association was found between dietician follow up before dialysis and higher albumin level after start dialysis and low cholesterol level at start of dialyse (only one study)

- Longer than 12 months predialysis follow by dietician improved the first year survival at dialysis
Summary of interventions of nutritional state

- Inadequate data on the effects of nutritional supplementation on the improvement of mortality and support in CKD3B/4/5

- Suggestion to start nutritional supplementation to achieve the recommended targets to improve nutritional state.

- Suggestion to start a study in structured diet advice and dietarian support with view to ameliorate nutritional state.
Recommendations for further research

1. Assessment of the impact of correction of metabolic acidosis (NAHCO3) on mortality, morbidity and general functional status of elderly with advanced CKD.
Recommendations for further research

- 2. Assessment of the impact of oral supplementation of calories and/or protein on mortality, morbidity and functional status of elderly in CKD.
Recommendations for further research

3. Assess whether interventions have the same effect size in malnourished patients as in non-malnourished patients to prevent de novo malnourishment.
CONCLUSION I

Malnutrition and protein energy wasting are prevalent in old and frail patients with advanced CKD or in dialysis. It is however unclear which interventions are most effective. Quantity and quality of evidence in this field are quite poor.
CONCLUSION II

There is only a limited number of RCTs, only surrogate outcome parameters have been reported. There is no consensus about the definition of nutritional status or which nutritional parameters need to be addressed or are relevant in this population, so it remains difficult to assess suitability and effect of interventions.
ADD LIFE TO YEARS AND NOT, YEARS TO LIFE !! (With or without strict diet!!)