Assessment of nutritional intake: how to investigate intake and what to ask

Dr Helen White
Why is assessment of nutritional intake so important?

ECFS Database
Annual comprehensive nutrition assessments are strongly encouraged. These should encompass a collation of anthropometric, dietary, biochemical and relevant clinical data.
Validation of a Nutrition Screening Tool for Pediatric Patients with Cystic Fibrosis

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ABSTRACT

Background: Cystic fibrosis (CF), nutritional diagnosis is of critical relevance because the early identification of nutritional-related complications enables early intervention and, consequently, influences patient prognosis. Up to now, there has not been a validated nutrition screening tool that takes into consideration clinical variables.

Objective: To validate a specific nutritional risk screening tool for patients with CF.

Design: Cross-sectional study. The nutritional risk score was compared with a risk score methodology proposed by McCarron and the Cystic Fibrosis Foundation.

Participants/Setting: Patients aged 0 to 20 years, with a diagnosis of CF confirmed by sweat chloride test, were included in this study, and their identification included two CF-related genetic variants (CFTR deletion). The nutritional screening tool was applied to 10 patients, 5 with high nutritional risk and 5 with low nutritional risk.

Main outcome measure: Earlier identification of nutritional risk in CF patients aged 0 to 10 years when a new screening tool was applied.

Statistical analysis performed: Agreement among the tools was assessed using Cohen’s kappa coefficient for categorical variables. Sensitivity, specificity, and accuracy were calculated. The significance level was set at p < 0.05. Statistical analysis were carried out in IBM SPSS Statistics for Windows version 23.0 (SPSS Inc., Chicago, IL, USA).

Results: Eighty-two patients (64.5%) were included in the study. The agreement between the proposed screening tool and the tool in screening was 75% (κ = 0.36). Sensitivity, specificity, and accuracy were 85%, 70%, and 80%, respectively. Agreement with the Cystic Fibrosis Foundation criteria was lower (κ = 0.24). There is no validity and the sensitivity and specificity were both 0.5.

Conclusion: The proposed screening tool with defined clinical variables presents earlier identification of nutritional risk in pediatric patients with CF followed by the use of tools.
Recommendations for dietary review

- Appropriate for patients at risk – and especially for those who are consuming or skipping meals and snacks during school
- 24 hour recall a useful qualitative tool
- 3-5 day diet record is necessary for a quantitative evaluation of energy and nutrient intake
- European guidelines suggest 3 monthly dietary review for children and 6 monthly for adults
Current recommendations guide the dietary questions that are asked

- 110-200% EAR Energy
- 20% RDI protein
- 35-40% energy fat
- 40-45% energy carbohydrate
- Calcium requirements should be met
Food diaries

- Establish intakes and eating patterns
  - Energy
  - Protein
  - Calcium
  - All nutrients

Dietary methods
- Interviews, diaries, food frequency questionnaires
Energy intake for people with CF: consensus guidelines

Infants and children 2 years 110%-200% of energy requirements for same-age healthy infants and children. Energy intake should be adapted to achieve normal weight- and length-for-age percentiles.

Children 2-18 years 110%-200% of energy requirements for same-age healthy children. Energy intake should be adapted to achieve target BMI percentile tailored to one-year age intervals.

Adults >18 years 110%-200% of energy requirements for same-age healthy population to maintain BMI targets. Energy intake should be adapted to achieve BMI targets.
What is achievable with dietary intervention alone

![Bar chart showing % EAR for energy across different age groups and interventions.](chart.png)

- **1.5 - < 5yrs**
- **5-12 years**
- **13-16yrs**
- **Adults**

% EAR for energy

- **CF**
- **Control**

Reference studies:
- Daniels et al. (1987)
- Powers et al. (2002)
- White et al. (1997)
- Tomezsko et al. (1992)
- Kowchak et al. (1996)
- Buchhahl et al. (1989)
- White et al. (2007)
- Hanning et al. (1993)
- White et al. (2007)
- Richardson et al. (2000)
- White et al. (2004)
- Moen et al. (2011)
Eating frequency

- Evidence that increased frequency of eating increases calorie intake
- 82% of participants consumed 3 daily meals. Eating, meal and snack frequencies were statistically significantly and positively associated with total energy intake.
- Each additional reported meal and snack was associated with an 18.5% and a 9.4% increase in total energy intake, respectively (P<0.001).

Whitney Evans E, Jacques PF, Dallal GE, Sacheck J, Must A.
The role of eating frequency on total energy intake and diet quality in a low-income, racially diverse sample of schoolchildren
Public Health Nutrition 2014
Current macronutrient recommendations

- European food safety authority recommend 0.83g protein/kg body weight

- CF likely to be higher than this ie 20% of intake – aligned with protein intake needs of other individuals with inflammatory disease

- Current consensus is that individuals should consume
  - 35-40% of calories from fat
  - **20% calories from protein**
  - 40-45% calories from carbohydrate

- Adequate supplies of energy are essential to spare protein breakdown

- High fat mass but low lean mass not necessarily protective of lung function
Fat

- 35-40% energy intake
- Fat targets? 100g
Calcium

- Should be assessed at least annually (ESPEN-ESPGHAN-ECFS Guidelines)
- More frequently in children with abnormal growth rate, weight stagnation or weight loss
- Daily calcium intakes should be at a minimum to achieve dietary intake recommended by the EFSA
Calcium – the questions to ask

Number of portions of
Dairy products
Nuts
Dried fruits
Tinned, oily fish
Bread

• https://www.healthyeating.org/Healthy-Eating/Healthy-Eating-Tools/Calcium-Calculator
But..... not just about nutrient intake

Our questions should also be about

- Behaviours
- Adherence
- Knowledge
## Eating behaviours

<table>
<thead>
<tr>
<th>BPFAS-UK statement</th>
<th>CF</th>
<th>Control</th>
<th>P (X²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCB: Does not enjoy eating</td>
<td>32.8</td>
<td>4.6</td>
<td>0.000</td>
</tr>
<tr>
<td>Reluctant to come to mealtimes</td>
<td>20.0</td>
<td>3.1</td>
<td>0.005</td>
</tr>
<tr>
<td>Eats snacks but will not come to mealtimes</td>
<td>20.0</td>
<td>1.5</td>
<td>0.001</td>
</tr>
<tr>
<td>Has a poor appetite</td>
<td>30.0</td>
<td>7.8</td>
<td>0.002</td>
</tr>
<tr>
<td>Would rather drink than eat</td>
<td>22.1</td>
<td>4.7</td>
<td>0.005</td>
</tr>
<tr>
<td>Negotiates food to be eaten</td>
<td>20.9</td>
<td>7.8</td>
<td>0.046</td>
</tr>
<tr>
<td>IPR: I get frustrated when feeding</td>
<td>30.0</td>
<td>4.5</td>
<td>0.000</td>
</tr>
<tr>
<td>I coax my child to take bites</td>
<td>23.5</td>
<td>1.5</td>
<td>0.000</td>
</tr>
<tr>
<td>I don’t feel confident my child eats enough</td>
<td>21.5</td>
<td>7.8</td>
<td>0.045</td>
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<tr>
<td>I am unhappy about my child’s growth</td>
<td>30.0</td>
<td>4.8</td>
<td>0.000</td>
</tr>
<tr>
<td>My child’s eating pattern hurts health</td>
<td>24.2</td>
<td>3.1</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Adherence consistently reported as poor

White H, Shaw N, Denman S, Pollard K, Wynne S, Peckham DG. (2017) Variation in lung function as a marker of adherence to oral and inhaled medication in cystic fibrosis European Respiratory Journal 2017 Mar 8;49(3)
Addressing adherence early in conversations

‘Most adults find it hard to do all their treatments each day for good CF care. Please tell us which treatments you have done over the last week. You’re not alone if you’ve been missing some medications and treatments. It is hard to fit it in every day’

Treatment Adherence Questionnaire-CF
(Quittner et al, 2008)
Checking patient knowledge ....

<table>
<thead>
<tr>
<th>KNOWLEDGE SUBJECT AREA</th>
<th>KNOWLEDGE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERT</td>
<td>80</td>
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<tr>
<td>Vitamins</td>
<td>50</td>
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<tr>
<td>Liver</td>
<td>50</td>
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<tr>
<td>Airways</td>
<td>60</td>
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<tr>
<td>Nutrition</td>
<td>50</td>
</tr>
</tbody>
</table>
Knowledge

- Ability to manage medications
- Ability to manage nutrition therapy and food-related behaviours
- Perceived ability to follow CF Centre recommendations.

**Conclusion:** Questionnaire aspects could be incorporated within outpatient visits to identify problem areas in

- knowledge,
- food security
- confidence in skills
Conclusion – our questions should be:

- Energy and protein intakes and how these are measured against recommendations
- Calcium intake - number of portions of calcium containing foods each day
- Frequency of eating each day
- Food behaviours
- Knowledge of food content
- Adherence to treatments (Vitamins, Enzymes, higher fat, calorie diet)
Thank you for listening