Health Economics & Nutrition Economics

Cost & cost effectiveness nutrition therapy

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http://www.ispor.org/sigs/NutritionEconomics.aspx
Disclosure

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Dept Market Access, Global
Outline

- Health Economics
- Nutrition Economics
- Cost effectiveness nutrition therapy
Economics

the study of the optimal allocation of limited resources for the production of benefit to society (Samuelson 2005)

Health Economics

allocate limited health care resources among unlimited wants and needs to achieve the maximum health benefit

WHOSE PERSPECTIVE?
Economics

the study of the optimal allocation of limited resources for the production of benefit to society (Samuelson 2005)

Health Economics

the maximum health gain per Euro (value for money)
Basic concepts

- Cost of illness
- Economic evaluation
  - Cost-benefit
  - Cost-effectiveness
  - Cost-utility
  - (Cost-minimization)
- Decision making
- Budget Impact
Economic evaluation

\[ \text{Incremental} = \frac{\Delta \text{costs}}{\Delta \text{consequences}} \text{ (ICER)} \]

Intervention A

- Consequences
  - (re)admission
  - Rehabilitation
  - LOS
  - Complication

- Costs
  - LOS
  - Drugs

Intervention B

- Consequences
  - (re)admission
  - Rehabilitation
  - LOS
  - Complication

- Costs
  - LOS
  - Drugs
  - MN
Effectiveness +

Willingness to pay

Costs +

Effectiveness +

- Cost saving

Maastricht University
Nutrition Economics

Freijer K. Nutrition Economics: DRM & Economic value of medical nutrition-PhDThesis
2014, Maastricht Univeristiy NL
Nutrition Economics

- Merging of nutrition and health economics discipline
- Interdependency between nutritional habits, health and public expenses
- To illustrate health and economic aspects of specific changes in the daily nutrition and nutrition recommendations through the lens of cost-effectiveness

- Nutrition economics is defined as "a discipline dedicated to researching and characterizing health and economic outcomes in nutrition for the benefit of society"\(^1\)

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1. BJN 2011;105:157-166
(Medical) Nutrition

Novel synergistic combinations of nutrients

Nutrients focus on multiple physiological systems, safety has been proven

Pharma

(New) Chemical Entity

(one compound)

Focus on single intervention, adverse events
Nutrition Economics: An Introduction

Nutrition Economics – An Introduction
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KEY POINTS
• Nutrition Economics focuses on the interdependency between nutritional health, health, and public expenses.
• There is no systematic approach or specific methodology to assess the impact of nutrition on health and health-related quality of life despite a clear need from policymakers.
• The establishment of an ISPOR Nutrition Economics Special Interest Group is underway to develop recommendations on economic evaluations to describe and quantify the costs (both the immediate costs of the intervention and downstream consequences) and effectiveness of nutrition interventions, as well as to assess the impact for individuals, the health-care system, and society as a whole regarding disease-related malnutrition (DRM) as the initial focus.

Nutrition economics, as the name implies, is the merging of the nutrition and health economics disciplines to assess the impact of nutrition on health and disease and to illustrate the health and economic aspects of specific changes in the daily nutrition and nutrition recommendations through the lens of cost effectiveness. Nutrition economics is defined as “a discipline dedicated to researching and characterizing health and economic outcomes in nutrition for the benefit of society” [1]. This rising research field focuses on the interdependency between nutritional health, health, and public expenses. It supports nutrition, health economics, and health policy development in an evidence- and health-benefit-based manner [1]. It will increase the understanding of nutrition’s impact on health outcomes and of its absolute and relative monetary effect.

The nutrition field is extremely broad, with interventions from individual treatments to broad public health measures. Answers are needed to questions such as: How should the cost and effectiveness of nutrition interventions be quantified? How would one assess their impact or the individual, the health-care system, and society as a whole?

Until now, no systematic approach or specific methodology has been developed to assess the impact of nutrition on health and health-related quality of life despite a clear need from policy makers. There are many challenges in nutrition assessment. But from the difficulty in establishing a correlation between a product’s consumption and future health status, to confounding factors and specific methodological considerations, such as those encountered when assessing medical devices for reimbursement [2-4]. Economic evaluation will require a range of different approaches that compare nutrition-related costs to health outcomes, in order to sustain value-based decisions within systems providing health care.

With the increasing number of nutrition-related interventions and the consequent number of economic evaluations, the time has come to establish a group to drive and support nutrition-related research and economic evaluations.

The economic evaluation of disease-related malnutrition (DRM), meaning undernutrition in health care [5-7].

The causes of DRM are multi-factorial. The metabolic stress on the body due to an acute or chronic disease resulting in catabolism is one of the most important and prevalent [6]. The effects of DRM can complicate the disease process by weakness/tiredness, impaired functioning of organs, such as the heart, lungs, and GI system, and slower wound healing. Any of these effects result in a greater chance for clinical complications [7,8].

DRM thus leads to the increased likelihood of patient complications, as potential (re) admission(s), and length of hospital stay(s). Any of these results is associated with higher health care costs [9-11]. It has been calculated that approximately 1.3 million patients in Europe are suffering from DRM, at an estimated cost of €170 billion [11,12]. This is more than double the amount of money spent on obesity, based on figures from the UK [13].

Improvement in the quality or quantity of food supplied can ameliorate this type of under-nutrition. Unfortunately, in many cases, the patient cannot or will not consume a sufficient amount of nutrients needed to meet their increased nutritional requirements.

In the case of a disease treatment, it is important to consider additions to their daily nutrition or alternatives to improve nutritional intake, such as medical nutrition. Medical nutrition comprises parenteral nutrition (regulated in pharmaceutical legislation) as well as all forms of external nutritional support that are regulated as “foods for special medical purposes” (FSMP), as defined by the European Commission Directive 1999/21/EC, independent of the mode of application [14].

FSMP is a special category for food that is intended for the dietary management of diseases or medical conditions that are not, or are not adequately, addressed by conventional dietary management. This field provides solutions for a variety of conditions ranging from the acute phase of diseases to chronic conditions.
Cost of illness

(DISEASE RELATED) MALNUTRITION

Morbidity
- wound healing ↓
- infections (+3x) ↑
- complications (+3x) ↑
- convalescence ↓

Mortality (+12x) ↑

Treatment (+30%) ↑

Hospitalisation (+30%) ↑

COSTS

QUALITY OF LIFE

Prevalence

In Europe: 33 million people\(^1\)

Cost of illness

(DISEASE RELATED) MALNUTRITION

In Europe: €170 billion per year

## Economic consequences of DRM in EU

<table>
<thead>
<tr>
<th>Country</th>
<th>Costs of malnutrition</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK&lt;sup&gt;1&lt;/sup&gt;</td>
<td>€19.6 billion</td>
<td>Public expenditure on malnutrition in 2011-12</td>
</tr>
<tr>
<td>Germany&lt;sup&gt;2&lt;/sup&gt;</td>
<td>€9 billion</td>
<td>Additional costs due to malnutrition across all care sectors in 2003</td>
</tr>
<tr>
<td>The Netherlands&lt;sup&gt;3,4&lt;/sup&gt;</td>
<td>€1.9 billion (€8 billion)</td>
<td>Additional costs due to malnutrition in 2011 (total costs)</td>
</tr>
<tr>
<td>Republic of Ireland&lt;sup&gt;6&lt;/sup&gt;</td>
<td>€1.4 billion</td>
<td>Public expenditure on malnutrition in 2007</td>
</tr>
</tbody>
</table>

Cost - effectiveness

(DISEASE RELATED) MALNUTRITION

Early identification
Screening
A range of strategies to manage malnutrition, e.g. dietary advice and/or special (medical) nutrition
Cost - effectiveness

(DISEASE RELATED) MALNUTRITION

Nutritional benefits

Functional benefits

Clinical benefits

Economical benefits

Economic evaluation – syst reviews


Economic evaluation for protein and energy supplementation in adults: opportunities to strengthen the evidence

In summary, the available economic evidence indicates that protein and energy supplementation in treatment or prevention of malnutrition provides an opportunity to improve patient wellbeing and lower health system costs.

Freijer K et al. JAMDA (2014) 15, 17-29

The Economic Value of Enteral Medical Nutrition in the Management of Disease-Related Malnutrition: A Systematic Review

This review shows that the use of enteral medical nutrition in the management of DRM can be efficient from a health economic perspective.
The use of medical nutrition with sick and malnourished elderly persons results in net benefits between €1,433 and €3,105 per person. For each euro that is invested in the treatment of a malnourished person society saves €1.90 to €4.20.
Economic evaluation – meta analysis

Meta-analyses

A systematic review of the cost and cost effectiveness of using standard oral nutritional supplements in the hospital setting

This review suggests that use of standard ONS in the hospital setting generally produce cost savings and are cost effective in patient groups with variable age, nutritional status and underlying conditions.

Mean cost saving: 12% (£746) per patient
Economic evaluation – meta analysis


Meta-analyses

A systematic review of the cost and cost effectiveness of using standard oral nutritional supplements in community and care home settings

This systematic review with meta-analysis suggests that use of standard ONS in the community, with and without additional use in hospital, can produce favourable financial outcomes and can be cost effective.

Meta analysis - reduction of:
• Complications (infections)
• Falls
• Functional limitations

Mean cost saving: 9% (< 3 months)
5% (> 3 months)

Reduction of hospitalisation – 16.5%
(p<0.001)
Economic evaluation – Care home


Original article

Cost-effectiveness of oral nutritional supplements in older malnourished care home residents

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b Department of Gastroenterology, University Hospitals Southampton NHS Foundation Trust, Southampton General Hospital, Tremona Road, Southampton, SO16 6YD, UK

Conclusion: This pragmatic randomised trial involving one of the oldest populations subjected to a cost-utility analysis, suggests that use of oral nutritional supplements in care homes are cost-effective relative to dietary advice.

ONS vs dietary advice alone is cost-effective
ICER = £10,961-£11,875/QALY
## Treatment plan DRM

<table>
<thead>
<tr>
<th>Intake vs requirement</th>
<th>Nutrition intervention by dietitian</th>
<th>Evaluation &amp; action Hospital</th>
<th>Evaluation &amp; action Nursing home</th>
<th>Evaluation &amp; action Community care</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% of requirement</td>
<td>protein- and energy-rich nutrition</td>
<td>Globale monitoring (weegbeleid)</td>
<td>Globale monitoring (weegbeleid)</td>
<td>Patiënt houdt inname en gewicht bij ≤ 10 werkdagen (telefonische evaluatie)</td>
</tr>
<tr>
<td>75 - 100% of requirement</td>
<td>protein- and energy-rich nutrition, possibly supplemented with medical sipfeed</td>
<td>&lt; 48 uur: evaluatie Continueren/ aanvullen met drinkvoeding</td>
<td>≤ 10 werkdagen: evaluatie Continueren of aanvullen met drinkvoeding</td>
<td>≤ 10 werkdagen: evaluatie Continueren of aanvullen met drinkvoeding</td>
</tr>
<tr>
<td>50 - 75% of requirement</td>
<td>medical sip and/or tube feed, to which protein- and energy-rich nutrition is added</td>
<td>&lt; 48 uur: evaluatie Continueren of overgaan op sondevoeding</td>
<td>≤ 5 werkdagen: evaluatie Continueren of overgaan op sondevoeding</td>
<td>≤ 5 werkdagen: evaluatie Continueren of overgaan op sondevoeding</td>
</tr>
<tr>
<td>&lt; 50% of requirement</td>
<td>complete tube nutrition is indicated, supplemented with whatever is possible orally</td>
<td>&lt; 48 uur: evaluatie Continueren of orale voeding (drinkvoeding) indien mogelijk</td>
<td>≤ 2 werkdagen: evaluatie Continueren of orale voeding (drinkvoeding) indien mogelijk</td>
<td>≤ 2 werkdagen: evaluatie Continueren of overgaan op volledige sondevoeding of orale voeding (drinkvoeding)</td>
</tr>
</tbody>
</table>
Supplementary feeding

“Be cautious using enriched food that will only provide extra energy and/or protein but without sufficient amounts of vitamins and minerals”

“Healthcare professionals should ensure that the overall nutrient intake of oral nutritional support offered contains a balanced mixture of protein, energy, fibre, electrolytes, vitamins and minerals.”
### Quality standard QS24: 5th place in scale of achievable savings

<table>
<thead>
<tr>
<th>Why does this guidance save money?</th>
<th>Estimated saving per 100,000 (£)</th>
<th>Impact level</th>
</tr>
</thead>
<tbody>
<tr>
<td>assessment and treatment of malnourished patients. If this was fully implemented and resulted in better nourished patients then this would lead to reduced complications such as secondary chest infections, pressure ulcers, wound abscesses and cardiac failure. Conservative estimates of reduced admissions and reduced length of stay for admitted patients, reduced demand for GP and outpatient appointments indicate significant savings are possible.</td>
<td>-71,800</td>
<td>High</td>
</tr>
</tbody>
</table>

Maastricht University
The Value of Dietetics for Malnourished Hospital Patients

For every € 1 spent on dietary advice, society saves (net/year):

Onco gastro/intestines, lungs: € 3 - 23 (€ 4-42 million)
Head/neck: € 2 – 5 (€ 1,5-4 million)
Elderly patients: € 1 - 2 (€ 15-78 million)
Cost-benefit of dietitian

Cost-benefit analysis of dietary treatment

Treatment by the dietitian has various social benefits. The health of the patient (and his family) improves, such that costs of health care can be avoided and the production of the patient increases. The treatment of patients with obesity and obesity-related diseases creates social benefits of €0.4 to €1.9 billion over a period of five years. For every €1 spend on dietary counseling of these patients, society gets a net €14 to €63 in return. €56 in terms of improved health, €3 net savings in total health care costs and €4 in terms of productivity gains.

SEO Report No. 2012-76A
seo economic research
Goal:
To develop a systematic approach or specific methodology for the assessment of nutrition in outcomes research.

Background:
Nutrition economics, as the name implies, is the merging of the nutrition and health economics disciplines to assess the impact of nutrition on health and disease and to illustrate the health and economic aspects of specific changes in the daily nutrition and nutrition recommendations through the lens of cost effectiveness. Nutrition economics is defined as "a discipline dedicated to researching and characterizing health and economic outcomes in nutrition for the benefit of society" [1].

This rising research field focuses on the interdependency between nutritional habits, health, and public expenses. It supports nutrition, health economics, and health policy development in an evidence- and health benefit-based manner [1]. It will increase the understanding of nutrition's impact on health outcomes and of its absolute and relative monetary effect.


Working Group:

If you would like to submit a new proposal for a manuscript and/or a tool, please send an email to: sigs@ispor.org

To join this SIG Working Group, see: Join a Special Interest Group.
Measuring the Added Value Provided by Dietitians

Healthcare systems in Europe are facing challenges such as demographic change (aging, migration) and rising costs. In order to keep healthcare affordable, choices have to be made and it is therefore important to demonstrate the economic value of particular interventions, but also the economic value of disciplines such as dietetics that use health economics (HE) data to inform these choices.

This raises the fundamental question: how do we allocate limited health care resources when faced with unlimited wants in order to achieve the maximum health benefit? One of the ways to answer this question is by using an economic evaluation of alternative courses of action in terms of their costs and consequences. Such an evaluation is commonly called cost-benefit analysis (or sometimes cost-effectiveness or cost-utility). The analysis typically looks at the extra...
Take home messages

- **Cost of illness** → high *additional* costs

- **Optimal nutritional management** can save costs → *added value of dietitians!*

- **Nutrition Economics** → specific area within health economics → still in progress → join [https://www.ispor.org/sigs/NutritionEconomics.aspx](https://www.ispor.org/sigs/NutritionEconomics.aspx)

- Applying future Nutrition Economics guidelines → until then perform **high quality economic evaluations**
  (use health economic evaluation guidelines & reporting standards)
Let’s make the world a better place.