JAMDA 15 (2014) 17–29

JAMDA

journal homepage: www.jamda.com

Review

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

Karen Freijer BHS [a,*], Martijn J.L. Bours PhD [b], Mark J.C. Nuijten MD, PhD [c], Marten J. Poley PhD [d,e], Judith M.M. Meijers PhD [f], Ruud J.G. Halfens PhD [f], Jos M.G.A. Schols MD, PhD [g]

[a] *School for Public Health and Primary Care (CAPHRI), Maastricht University, Maastricht, The Netherlands*
[b] *Department of Epidemiology, School for Oncology and Developmental Biology (GROW), Maastricht University, Maastricht, The Netherlands*
[c] *Ars Accessus Medica, Jisp, The Netherlands*
[d] *Institute for Medical Technology Assessment (iMTA), Erasmus University Rotterdam, Rotterdam, The Netherlands*
[e] *Department of Pediatric Surgery, Sophia Children's Hospital, Erasmus MC, Rotterdam, The Netherlands*
[f] *Department of Health Services Research (Focusing on Chronic Care and Ageing), School for Public Health and Primary Care (CAPHRI), Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, The Netherlands*
[g] *Department of General Practice and Department of Health Services Research, School for Public Health and Primary Care (CAPHRI), Maastricht University, Maastricht, The Netherlands*

Keywords:
Systematic review
economic value
costs
medical nutrition
disease-related malnutrition
oral nutritional supplements

A B S T R A C T

Economic evaluations for medical nutrition, such as oral nutritional supplements (ONS), are relatively uncommon compared with other health technologies, and represent an area that has not been reviewed so far. In this systematic review, economic evaluations of enteral medical nutrition in the management of disease-related malnutrition (DRM) were reviewed and qualified to estimate the economic value. Initially, 481 studies were found, of which 37 full-text articles were assessed for eligibility and were rated on their quality using the Quality of Health Economic Studies (QHES) instrument. The final review focused on the high QHES quality economic evaluation studies. As both the studied medical nutrition intervention and the form of the economic evaluation varied, a quantitative synthesis (meta-analysis) was not attempted but a critical analysis and comparison of the individual study results were performed. ONS was the most studied intervention, covering several patient populations and different health care settings. Outcomes included cost savings (n = 3), no significant extra costs per unit of clinical and/or functional improvement (n = 1), or significantly higher costs per unit of clinical and/or functional improvement but still cost-effective for the used threshold (n = 4). This review shows that the use of enteral medical nutrition in the management of DRM can be efficient from a health economic perspective.

The situation in developed countries regarding health care is changing. An economic crisis is demanding budget constraints, while at the same time health care costs are likely to continue rising as populations get older, technology improves, and public expectations grow.[1] Therefore, there is growing pressure on decision makers and health care providers to obtain the maximum possible benefit, given the resources available.[2] This is where health economic evaluations can play an important role. In essence, these are comparative analyses of both the costs and consequences (or outcomes) of 2 or more possible treatments.[3] Depending on whether the consequences are expressed as monetary measures, natural units, or preference-based measures, the analysis may be a cost-benefit (CBA), cost-effectiveness (CEA), or cost-utility analysis (CUA).[4–6] The main outcome of such analyses is expressed as the difference in costs divided by the difference in effects, the so-called incremental cost-effectiveness ratio (ICER), for example costs per life-year gained. Comparing the cost-effectiveness ratio of a studied treatment with the ratios of other programs will tell whether or not the studied treatment is indeed efficient (cost-effective).

Economic evaluations for pharmaceuticals and other health technologies, including devices, have been common practice since the

KF is a PhD student at Maastricht University, and is also an employee of Nutricia Advanced Medical Nutrition (NAMN). The University of Maastricht has an unrestricted agreement with NAMN to enable KF to do research.

All authors were involved in the research methods and procedures. KF, MJLB, and MJP conducted the review; KF wrote the paper and had primary responsibility for the final content; MJLB, MJCN, MJP, JMGA, JMMM, and RJGH reviewed the paper. All authors have read and approved the final manuscript.

* Address correspondence to Karen Freijer, BHS, School for Public Health and Primary Care (CAPHRI), Maastricht University, p/a PO Box 445, 2700 AK Zoetermeer, The Netherlands.

E-mail address: k.freyer@maastrichtuniversity.nl (K. Freijer).

1525-8610/$ - see front matter Copyright © 2014 - American Medical Directors Association, Inc.
http://dx.doi.org/10.1016/j.jamda.2013.09.005

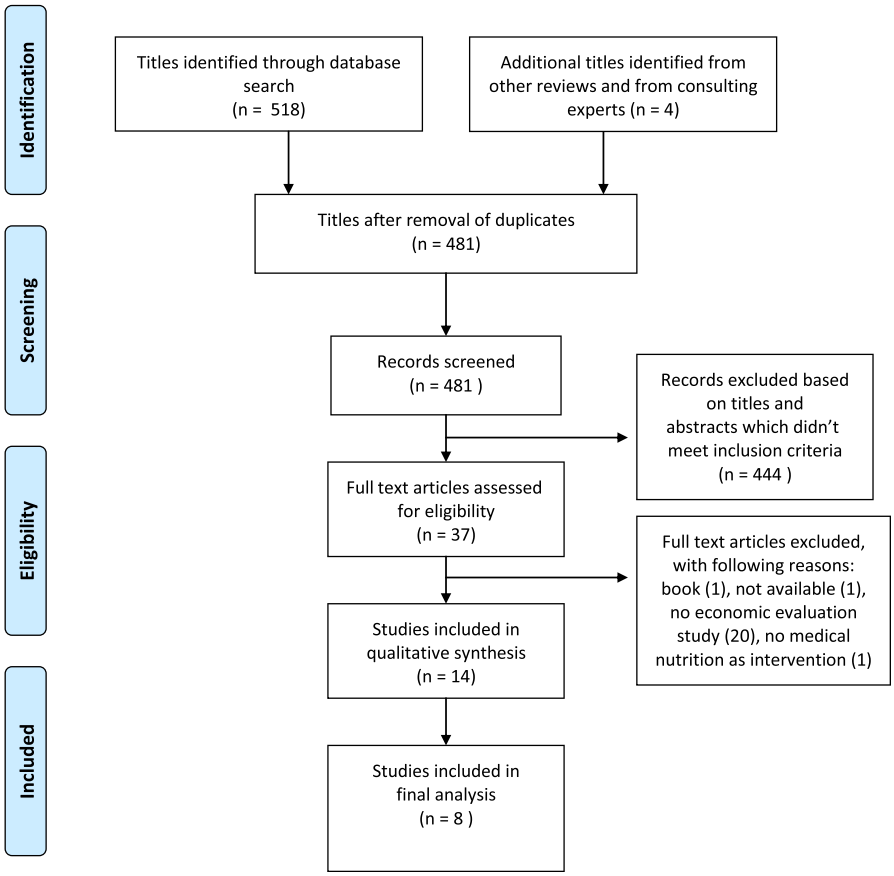

Fig. 1. Flow diagram of the systematic review process.

1990s. Since that time, reimbursement agencies in different countries have developed evaluation guidelines, resulting in a large body of published literature on economic evaluations of health technologies.[7] Health economic evaluations for medical nutrition though are not common yet. Medical nutrition comprises parenteral nutrition, regulated in pharmaceutical legislation, as well as all forms of nutritional support that are regulated as "foods for special medical purposes" (FSMP), defined by the European Commission Directive 1999/21/EC independent of the route of application.[8] For the purposes of this systematic review, the term medical nutrition is used only for FSMP, which is a category of dietary foods for particular nutritional uses, specially processed or formulated, and intended for the dietary management of patients and to be used under medical supervision. One of the indications for the use of medical nutrition is malnutrition.[9–11] There is convincing clinical evidence for the benefits of medical nutrition, including weight gain, improvement of muscle function, reduction in mortality, complications and (re-) admission, improvement of wound healing, and an increase of quality of life.[12–16] For the purposes of this systematic review, the term malnutrition is used only for undernutrition in health care, caused by changes of the body metabolism due to acute or chronic diseases and/or treatment interventions, which increases the daily nutritional needs, also known as disease-related malnutrition (DRM). Although in some cases improvement of the quality or quantity of food supplied can ameliorate the problem, in many cases the person concerned is simply unable or unwilling to consume sufficient normal food to meet their requirements to manage the DRM. In this case, it is vital to consider other options to improve nutritional intake, such as FSMP products, which include oral nutritional supplements (ONS), as well as enteral tube feeding (ETF) via nasogastric, naso-enteral, or percutaneous tubes.

In the European Union (EU) countries, about 20 million patients are affected by DRM (33 million in Europe), costing EU governments up to €120 billion annually (€170 billion in Europe).[17–19] In the United States, approximately 33% to 54% of hospitalized patients are suffering from DRM, depending on the screening method used. The prevalence of protein energy undernutrition for residents of long term care facilities is between 23% and 85%, and up to 65% of residents have unintended weight loss and undernutrition.[10] Total costs associated with DRM in the United States have not been calculated as such, but several studies show increased costs reaching from a mean daily expense of $228 per patient for malnourished patients compared with a mean daily expense of $138 per patient for well-nourished patients.[20] Also, patients who experienced declines in their nutrition status during their hospital stays had higher mean hospital charges ($45,762) compared with patients who remained nourished during their hospitalizations ($28,631).[21]

To estimate the efficiency (costs in relation to effects) in high-quality economic evaluations of enteral medical nutrition for DRM in adults in developed countries, we conducted a systematic review of published studies on this topic.

Methods

This systematic review was conducted according to the UK National Health Service Centre for Reviews and Dissemination (CRD) guidelines[22] and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[23] The principal stages and steps undertaken in the reviewing process are shown in Figure 1.