Is there room for improvement in nutrition economics?

Prof. Giovanni Fattore, Director of Policy Analysis Department and CERGAS Research fellow

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The golden rule

Effectiveness of interventions come first!

Without evidence of effectiveness there is no room for cost-effectiveness!!
Palm oil and blood lipid–related markers of cardiovascular disease: a systematic review and meta-analysis of dietary intervention trials

Elena Fattore, Cristina Bosetti, Furio Brighenti, Carlo Agostoni, and Giovanni Fattore

ABSTRACT

Background: Palm oil (PO) may be an unhealthy fat because of its high saturated fatty acid content.

Objective: The objective was to assess the effect of substituting PO for other primary dietary fats on blood lipid–related markers of coronary heart disease (CHD) and cardiovascular disease (CVD).

Design: We performed a systematic review and meta-analysis of dietary intervention trials. Studies were eligible if they included original data comparing PO-rich diets with other fat-rich diets and analyzed at least one of the following CHD/CVD biomarkers: total cholesterol (TC), low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol, TC/HDL cholesterol, LDL cholesterol/HDL cholesterol, triacylglycerols, apolipoprotein A-I and B, very-low-density lipoprotein cholesterol, and lipoprotein(a).

Results: Fifty-one studies were included. Intervention times ranged from 2 to 16 wk, and different fat substitutions ranged from 4% to 43%. Comparison of PO diets with diets rich in stearic acid, mono-unsaturated fatty acids (MUFA), and polyunsaturated fatty acids (PUFAs) showed significantly higher TC, LDL cholesterol, apolipoprotein B, HDL cholesterol, and apolipoprotein A-I, whereas most of the same biomarkers were significantly lower when compared with diets rich in myristic/laurate acid. Comparison of PO-rich diets with diets rich in trans fatty acids showed significantly higher concentrations of HDL cholesterol and apolipoprotein A-I and significantly lower apolipoprotein B, triacylglycerols, and TC/HDL cholesterol. Stratified and meta-regression analyses showed that the higher concentrations of TC and LDL cholesterol, when PO was substituted for MUFA and PUFAs, were not significant in young people and in subjects with diets with a lower percentage of energy from fat.

Conclusions: Both favorable and unfavorable changes in CHD/CVD risk markers occurred when PO was substituted for the primary dietary fats, whereas only favorable changes occurred when PO was substituted for trans fatty acids. Additional studies are needed to provide guidance for policymaking. Am J Clin Nutr 2014;99:1331–50.

1From the Departments of Environmental Health Sciences (EF) and Epidemiology (CB), IRCCS-Istituto di Ricerche Farmacologiche “Mario Negri,” Milan, Italy; the Department of Food Science, Università di Parma, Parma, Italy (FB); the Department of Clinical Sciences and Community Health, University of Milan, IRCCS Ospedale Maggiore Policlinico, Milan, Italy (CA); and the Department of Policy Analysis and Public Management & Centre for Research on Health and Social Care Management, Università Bocconi, Milan, Italy (GF).
Critical review of economic evaluation studies of interventions promoting low-fat diets

Giovanni Fattore, Francesca Ferrè, Michela Meregaglia, Elena Fattore, and Carlo Agostoni

Various national and local policies encouraging healthy eating have recently been proposed. The present review aims to summarize and critically assess nutrition-economic evaluation studies of direct (e.g., diet counseling) and indirect (e.g., food labeling) interventions aimed at improving dietary habits. A systematic literature review was performed by searching 5 databases (PubMed, Ovid Medline, EconLit, Agricola, and Embase) using a combination of diet-related (fat, diet, intake, nutrition) and economics-related (cost-effectiveness, cost-benefit, cost-utility, health economics, economic evaluation) key words. The search yielded 36 studies that varied in target population, study design, economic evaluation method, and health/economic outcome. In general, all provide limited experimental evidence and adopt the framework of economic evaluations in healthcare. Certain important aspects were not well considered: 1) the non-health-related effects of nutrition interventions on well-being; 2) the private nature of food expenditures; 3) the distributional effects on food expenditures across socioeconomic groups; and 4) the general economic implications (e.g., agrofoods, import/export) of such interventions. Overall, the methodology for the economic evaluation of nutrition interventions requires substantial improvement.
Introduction and objective of the study

- The increasing interest in policy actions aimed at improving people's diet suggests the crucial role of economic evaluation of nutrition interventions (Wong et al., 2011; Nuijten, 2011).

- The aim of the review is to summarize and critically assess economic evaluation studies conducted on interventions (directly or indirectly) aimed at voluntary dietary improvements.

- We consider a number of nutrition interventions expected to stimulate individuals to modify their nutrition behaviour (e.g. nutritional counselling, information campaigns, food labelling and fiscal measures).
Methods (1/3)

• Systematic literature review following the PRISMA statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)

• Four electronic databases searched: PubMed, OVID Medline, EMBASE and

• A combination of diet-related keywords (i.e., fat, diet, intake, nutrition) and economic-related terms (i.e., cost-effectiveness, cost-utility, cost-benefit, health economics, economic evaluation)

• English full-text papers published up to March 31, 2013
Methods (2/3)

Inclusion criteria:

- address voluntary diet interventions (either positive actions – i.e., introducing or increasing the consumption of a healthy food, or negative actions – i.e., eliminating or reducing the consumption of a harmful food)
- report an economic evaluation of any sort (i.e. documenting both clinical outcomes improving wellbeing and information about use of scarce resources - costs)
- are original studies (i.e., no review articles, meeting abstracts, editorials)

Studies assessed using the standard “checklist” for critical appraisal of economic evaluation studies (Drummond, 2005) complemented with the Consensus on Health Economic Criteria CHEC-list focusing on the quality of economic evaluations (Evers et al., 2005)
Methods (3/3)

Papers are considered for inclusion if they:

- address voluntary diet interventions (either positive actions – i.e., introducing or increasing the consumption of a healthy food, or negative actions – i.e., eliminating or reducing the consumption of a harmful food)
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Results (flow chart)

265 Potentially relevant records identified by searching electronic databases
PubMed (n= 83 )
Ovid MEDLINE (R) (n= 101)
EMBASE (n= 81)

103 Duplicates removed

162 Records screened

138 Records excluded after screening titles and abstracts
48 clinical nutrition
27 no nutritional intervention
20 no economic evaluation
15 review articles
8 maternal or infant under nutrition
7 commentary/editorial/ trial protocol
6 no full text available
5 no English papers
2 animal studies

24 Full-text retrieved and screened

14 Additional full texts retrieved after screening the reference lists of relevant review articles and the retrieved full texts

38 Full-text screened and included in the review
Results
(country)

Studies use (or generate) data from the USA (n=16), European countries (n=14), Australia (n=6), Chile (n=1) and Canada (n=1)
Results
(study design)
Results (nutritional intervention)

- Low-fat diet: 16
- Salt intake reduction: 7
- Fruit and vegetable consumption: 5
- Low-calorie diet: 8
- Low-carbohydrate diet: 1
- Pre-prepared meals avoidance: 2
- Water intake: 1
- Not specified: 1
Results (policy instrument)

- Experimental and quasi-experimental studies usually adopt nutritional counselling (i.e. traditional individual and/or group lessons with a dietician or innovative instruments such as video-lesson packets, picture books, home visits, phone discussions and e-mail messages) in order to promote healthier diets and lifestyle.
- One study assess the effects of a public information campaign encouraging a switch from whole to skim milk.
- Another one evaluate a TV advertising control programme of energy-dense food and beverage.
- Modelling studies often predict health-related and economic effects of potential policy interventions such as banning industrial trans-fatty acids, raising taxes on a range of unhealthy food and nutritional labelling.
Results
(economic evaluation)
Results (study perspective)

- **Healthcare perspective** (n=20): a narrow perspective where only direct medical costs (e.g., for laboratory test, treatment) are included.
- **Societal perspective** (n=15): other costs are included, typically referring to non-medical services (e.g., social care), productivity losses, and time spent by patients and caregivers.
- **Public sector perspective** (n=3): the costs supported by government in order to implement the nutrition intervention (e.g., media advertising, loss of tax revenues, F&V stamps for low-income consumers).
- Level of specification of cost analysis and methods for cost measurement widely differ across studies.
- A few studies limit their analysis to the intervention costs (e.g., for screening and education), while others try to estimate industry costs (e.g., product reformulation or labelling) resulting from the nutritional policy.
- Limited attempt to investigate the impact on the agri-food system.
Results (study outcomes)

• 23 studies adopt a **clinical endpoint** (e.g., strokes prevented)
• 10 studies use a clinical surrogate (**biomarker**), such as systolic blood pressure, high density lipoprotein, blood cholesterol, body weight and BMI
• 5 studies limit their outcome assessment to the direct **nutritional consequences** of the intervention (e.g., fat, F&V, salt and other nutrients intake; milk consumption).
• Diet or nutritional status of study participants are generally assessed through **dietary questionnaires** (e.g., diet diaries; 24-hour diet recalls; food frequency questionnaires) or **health screening** (e.g., blood cholesterol)
Results (study results)

- Most studies conclude that the intervention examined is cost-saving (n=21) or cost-effective (n=10)
- A few articles (n=7) conclude that the intervention concerned is not cost-effective or that health outcome improvements are negligible
- Some equity aspects are present in a few papers: 5 studies conduct sub-group analyses (by race, gender, age, income, education, marital status and health condition) and other 9 studies focus on ethnic minority (e.g. Alaskan) or low socio-economic groups
- No study discusses the equity implications of interventions that may impose additional private expenditure to households
Results (sensitivity analysis)

• The vast majority of the studies (n=30) test the robustness of their results through a sensitivity analysis.

• Techniques more frequently adopted are one-way sensitivity analysis (n=18) and probabilistic sensitivity analysis (i.e., Monte Carlo simulations; n=10).

• 8 studies present their results according to different scenarios.

• The parameters mainly tested through the sensitivity analyses are time-related variables (e.g., time horizon, discount rate, proportion of effects lasting lifelong), disease incidence rates (e.g., cardiovascular risk) and direct medical costs.
Paucity of economic evidence

- Only 38 published studies performing an economic evaluation of interventions aimed at improving nutritional habits have been identified.
- Given the potential of health gains of these interventions, the paucity of such studies is alarming and signals that economic evidence is simply not available.
- Study often neglect the wide socio-economic implications of changes in nutrition habits (they typically focus only on food and medical costs).
A critical point

Methodologies and guidelines developed for the economic evaluation of healthcare interventions are followed by the vast majority of studies, but traditional health technologies are different from nutrition interventions.
Challenges of the economic evaluation of nutrition interventions

1. Nutrition habits are culturally and socially embedded and differ substantially from medical services → need to evaluate how to induce behavioural changes rather than simply investigate the comparative benefits of nutrients on human health (health is not the only motivation of eating); QALYs measures may be inadequate to capture wellbeing gains

2. Food expenses are generally private and not part of a public healthcare budget → the relevant constraint in this case is the available income (the framework of cost-effectiveness may be inadequate)

3. Equity issues: if healthier diets require additional expenses or anyway interventions create additional financial burdens, policies have different economic implications across socio-economic groups

4. Agriculture and food industry implications: higher demand for healthier food can boost domestic production or imports → significant economic impacts (e.g., level of trades, price of food) between and within nations
What’s cost-effectiveness analysis

- CEA is a specific technique used to perform an economic evaluation of intervention
  - The basic idea is to maximize health given a fixed budget (typically healthcare budget)
  - The higher the ICER, the lower the priority of the intervention
  - Interventions above a certain threshold (€ 30K?) are not cost-effective (there are better uses in the healthcare sector)
  - Popular in HTA
The merit of CEA

- It measures the health value of “government” money (if only governing spending is included in the cost analysis).

- It can measure the health value of “societal” money (if all costs are included).

- It can’t measure the overall value of societal money: QALYs and DALYs are health-related measure of wellbeing .... And we do not eat only for being healthy!
Is it useful in the area of nutrition interventions?

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Is Cost-Benefit Analysis preferable?

- It includes all effects on resources (costs) and wellbeing (effects)

- However, it generally uses “money” as unit of measure to compare costs to benefits (it implies to assign a monetary value to health improvements)

- It can be easily framed in such a way that all social actors’ costs and benefits are clearly presented (whose costs? whose benefits?)

- In cost-effectiveness analysis the “monetization” of benefits it is partly hidden because comes with the threshold above which the intervention is not cost-effective
My view on CEA and CBA in nutrition

- Standard CEA (only healthcare budget) only useful to signal the healthcare budget implications of possible similar interventions

- Wider CEA (to include non healthcare costs) more useful but requiring methodological advancements (how to estimate the extra costs attributable to the impact on the industry, if any; how to take into account that nutrition costs are generally private)

- More difficult to develop a metric to replace QALYs with a measure that can capture non health-related quality of life

- CBA is a better framework in the case of nutrition but
Is CBA a better framework?

- It is a more flexible method
- It can clearly show distributional effects (who gains, who loses from the intervention?)
- Its use signals that there are multiple objectives in government decisions (people health but also employment, economic growth, etc....) and different social actors (patients, tax-payers, corporations...)
- Potentially more coherent with economic theory (welfare economics)
CBA a better framework! But

- Less palatable by citizens and politicians (at least for the allocation of resources in the healthcare sector)

- Much less developed methodologically (it has taken 30 years to develop high standard shared by authorities for CEA)