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ORIGINAL RESEARCH

Facilitators and barriers to the use of economic evaluations in nutrition and public health

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Abstract

Aims: Interventions targeting diets have the potential to reduce a consistent fraction of the chronic disease burden. Economic evaluations of such interventions can be an important tool in guiding public health practitioners and decision makers at various levels, yet there are still not many economic evaluations in this area. This qualitative study explored facilitators and barriers in conducting and using economic analyses to inform decision makers in the field of public health nutrition.

Methods: Data were collected through written, open-ended questionnaires administered to twenty-three participants (13 from academia and 10 from government) using purposive sampling and analysed through a conventional content analysis.

Results: The analysis revealed two broad categories of barriers, which included: i) "Methodological challenges", and; ii) "Barriers related to application of economic evaluations." Two main categories of facilitators were also identified: i) "Facilitators to improving the methodology of economic evaluations", with subcategories further detailing frameworks and methods to be applied, and; ii) "Facilitators to broaden the use of economic evaluations", with most subcategories addressing science-into-policy translations. These barriers and facilitators to the use of economic evaluations in public health are perceived differently by researchers and policymakers, the former more focused on implementation aspects, the latter more concerned by methodological gaps.

Conclusion: Public health nutrition policies seldom take into account data from formal economic evaluations. Economic evaluation methodologies can be improved to ensure their broader application to decision making.

***Keywords**: economic evaluations, interviews, nutrition, public health, public policy.*

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Introduction

The social and economic burden of chronic diseases is a major source of concern for public health researchers and decision makers worldwide. According to the Global Burden of Disease (GBD) Study, over 91% of deaths and almost 87% of disability adjusted life years (DALYs) in the European Union are the result of non-communicable diseases (NCDs), mainly cardiovascular disease and cancers (1). With regards to dietary risk factors, the GBD Study group estimates that in the European Union over 950,000 deaths and over 16 million DALYs are attributable to dietary risks due to unhealthy diets, such as low whole grains, fruit and vegetables intake, low omega-3 intake and high sodium intake (2).

Along with an ageing population, obesity is a leading risk factor contributing to the burden of chronic diseases, and will play a key role in shaping the future use of healthcare services (3). Mean Body Mass Index (BMI) has increased worldwide over the last four decades (4). Already in 2008, the prevalence of adult obesity in European Countries reached "epidemic proportions", with some countries recording obesity rates higher than 25% (5). The prevalence of overweight or obesity is about22% among 11-years-oldsin Europe, and in Southern and Eastern Europe such prevalence is as high as 38-39% (6,7). Inequalities have been documented not only between, but also within countries. For example, there is a gradient throughout the educational attainment spectrum, where those with lower levels are more likely to be overweight or have obesity; the inequality gap is particularly marked in women (8,9). The future does not look brighter; according to projections modelled through 2030, on the basis of past and current BMI trends, obesity and obesity-related chronic diseases will continue increasing in almost all countries from the WHO European Region(10) and worldwide (11,12).

Chronic disease risk factors associated with poor dietary habits are often modifiable and preventable. Actions to reduce the exposure to such risk factors have the potential to reduce the social and economic burden of overweight, obesity (13), and chronic diseases (14).

Economic evaluations can be used to estimate costs and benefits related to different interventions or policy options and help to guide the decision making processes (15).In the field of nutrition, economic evaluations have shown that most of nutrition-related interventions and policies are cost-effective, especially those applied at the population level, such as reformulation initiatives to lower salt intake (16) or a legal limit on industrial trans-fat use in the European Union (17). Yet, as stated by some authors who performed economic evaluations of interventions aimed at improving dietary factors: "*Given the potential health gains related to such interventions, the paucity of such studies is alarming and indicates that additional evidence in this area is needed. It is difficult to design evidence-based policies with so little empirical evidence*." (18).

Although methodological challenges of economic evaluations in public health, and specifically in the field of nutrition, have been identified by various authors (19-22), to our knowledge there is little research on challenges and facilitators in transferring economic evidence of public health and nutrition interventions into policy (23).

The aim of this pilot study is to identify key barriers and facilitators to performing and applying data from economic evaluations in the decision making processes in nutrition public health and economics, to better understand and encourage the use of economic evaluations in planning, implementing and evaluating future interventions and policies.

Methods

Study design

Open-ended written interview questions (two broad questions, each with three sub-questions, Box 1) were given to participants on a dedicated web platform. A link to the questionnaire was sent to each participant via e-mail. Conventional content analysis was applied to analyse the qualitative data (24), with the overall purpose of describing participants' experiences, field knowledge and views on a topic that has received little previous investigation (25).

Participants

Participants were recruited from a pool of 30experts who participated in the 2015 workshop "Public Health and Nutrition Economics: the numbers behind prevention?", organized by the Joint Research Centre of the European Commission. Participants of the workshop were purposively chosen to ensure a range in expertise (public health, nutrition, and economics), representation (policymaking, academia, private sector, advocacy groups), and reach of action (local, national or international). Moreover, geographical criteria (EU and neighbouring countries) were taken into account. Inclusion criteria consisted of being a policymaker or an academic expert in any of the above-mentioned fields, and of having at least intermediate theoretical knowledge and/or work experience across all expertise domains (i.e. at least three years of study/experience in all domains: public health, nutrition and economics).

Twenty-seven people met the inclusion criteria, and 23 (13 from academia, 10 from government) participated in the study.

Procedure

The participants were selected between July and October 2015, the workshop took place on November 12-13, 2015, and the written interview was administered two weeks before the workshop, with a reminder sent after one week. The interview was sent via email, with the indication that the answers would be made available to all workshop participants, to foster discussion.

Oral or written consent of all participants was obtained. The study adhered to principles of ethical research practice (26).

Data analysis

Data were analysed through conventional content analysis, according to which coding categories are derived directly from the text data, through an inductive process, in order to move from specific instances to general statements. The advantage of such technique is that information is obtained directly from study participants, without imposing preconceived categories or theoretical perspectives. An example of the process is illustrated in Box 1.

Box 1. Themes of the written interview and example of meaning unit, condensed meaning unit and codes from content. BAU = business as usual. TFA = trans-fatty acids. PHEE = public health economic evaluations.

Themes			

1: How have economic evaluations of policies/interventions informed decision making in public health?
• General observations on facilitators and barriers to the use of economic evaluations in public health, nutrition and prevention of chronic diseases
• Examples of success stories in public health
  ○ from direct experience
  ○ from literature
• Examples of success stories in nutrition and physical activity
  ○ from direct experience
  ○ from literature
2: What are examples of possible or existing policies/interventions where economic evaluations are needed to help decision makers?
• General observations on facilitators and barriers to the use of economic evaluations in public health, nutrition and prevention of chronic diseases
• Examples of gaps in public health
  ○ from direct experience
  ○ from literature
• Examples of gaps in nutrition and physical activity
  ○ from direct experience
  ○ from literature			

Meaning Unit (MU)	Condensed MUs	Codes	Categories
"I think it was easy to argue in this case because there is hardly any controversy in this case in what regards the heart effects of TFA consumption and so there was/is no opposition to the ban but the calculation of the health effects and the costs saved are strong arguments to those that are perhaps less health-minded to prioritise and implement it."	When there are no controversies on health effects, it is possible to implement policies.	Scepticism	Barriers related to the use of PHEE in policy settings
	The calculation of health effects and costs in case of inaction is a strong argument to less health-minded policy-makers.	Inclusion of BAU scenarios to reveal costs of inaction	Facilitators to widen the use of PHEE in policy settings

Data were already in written format, and firstly two researchers (AL and VM) read all the texts consequently, to immerse themselves in the data, have a common understanding, and detect both manifest and latent content.
Secondly, AL and VM selected four interviews (two for each participant category, i.e. academia and government), and, for each interview, independently identified and condensed simple meaning units (words, sentences or paragraphs containing aspects related to each other through their content and context).Discussion and resolution of discrepancies by consensus followed this second stage.
Third, AL extracted the condensed meaning units of the remaining interviews; VM reviewed the extraction process, and discrepancies were again discussed and resolved by consensus.
At a fourth stage, AL created and assigned codes to all condensed meaning units; subsequently, VM independently assigned the codes created by AL and added new codes as necessary. Subsequently, discussion between AL and VM took place to reach consensus on the coding procedure.
Finally, similar codes were grouped into comprehensive subcategories and categories, through an inductive process carried out by AL, which consisted of comparison, reflection and interpretation.
The software QDA data miner was used to facilitate the above processes.

Results

Twenty-three participants (10 from policy-making bodies, and 13 from academia) were engaged in this study, for a total of 5,436 words (median: 161 words; interquartile range IQR 25-75: 79-237 words).Their main characteristics (gender, expertise, reach of action and geographic coverage) are presented in Table 1.

Table 1. Participants characterisation

Policymakers							
Gender		Expertise		Area of action		Geographic area	
M	7	Public health	4	EU	4	EU	9
F	3	Economics	4	National or sub-national	6	Non-EU	1
		Nutrition	2				
Researchers							
Gender		Expertise		Area of action		Geographic area	
M	6	Public health	3	Non applicable		EU	8
F	7	Economics	7			Non-EU	5
		Nutrition	3				

The participants identified two sets of barriers to performing PHEE, and two categories of facilitators: methodological challenges in performing PHEE, barriers related to the use of PHEE in policy settings, facilitators to improve the methodology of PHEE, facilitators to widen the use of PHEE in policy settings. These categories and their subcategories are summarized in Table 2.

Table 2. Facilitators and barriers classified in categories and subcategories, with examples obtained from data analysis

	Sub-categories	Examples
Methodological challenges	Definition and measurement of outcomes	*"Public health interventions […] are supposed to have a substantial impact on health and health care systems, but the assessment and the consequences on health are not sufficiently analysed, for multiple reasons [such as] difficulties to measure the impact (indirect and/or direct consequences)". (Policymaker)* *"Some questions arise: should we focus on health-related behaviours or on anthropometrics (weight, waist circumference,…)? How long should the intervention last in order to have an impact?" (Researcher)* *"Calculations for [long-term] cost-effectiveness should be [performed in] every project in the area of primary prevention. This would enable reviewers/decision makers to decide which of the proposed actions would give the highest long-lasting (i.e. longitudinal) impact for the money spent". (Researcher)*
	Lack of adequate frameworks	*"Methods to evaluate public health interventions are less well established than those for medical interventions" (Policymaker)* *"Lack of standardised methodologies and evidence based approaches, and no special focus of HTA units and bodies [are challenges encountered] in public health evaluations". (Policymaker)* *"[In public health nutrition,] the magnitude of the association [between exposure and outcome] is relatively small. So, the case for carefully designed cost-effectiveness analysis appears to be strong" (Researcher)*
Implementation	Scepticism	*"My feeling is that there is still some controversy around the real effect [of SSB taxation] on [SSB] consumption and eventually health". (Policymaker)* *"Requests for evaluations are happening in (and are a symptom of) a context in which policymakers are increasingly confronted with intractable problems to which science may not always be fully equipped to reply. Policymakers are flooded with scientific literature (some of which of weak basis), institutional reports, lobbyists' papers and social media posts". (Policymaker)*

		"I would highlight the decision of withdrawing the GRAS (generally recognized as safe) status to TFAs (trans-fatty acids) in the US and the ongoing EU considerations of setting a limit to its content in foods as a success story. In both cases there were economical evaluations made that clearly demonstrated the added value of a "ban" on the industrially produced TFA both in health and economic terms. I think it was easy to argue in this case because there is hardly any controversy in this case in what regards the heart effects of TFA consumption and so there was/is no opposition to the ban". (Policymaker)
	Lack of strategy for effective budget allocation	*"The conclusion [from an economic evaluation] was that there was no need [for a new highly specialized hospital yard], but the final decision was to open one any way". (Researcher)* *"Actions and interventions [to promote healthy lifestyles and to reduce obesity] proposed in the national preventive program for public health […] fall within budget planning, without any solid proofs for (cost) effectiveness of actions and interventions undertaken". (Researcher)*
Methodological facilitators	Growing interest in frameworks and methods	*"[There is a growing] interest in the development of appropriate methodological frameworks and methods to assess interventions aimed at improving nutrition behaviour". (Researcher)* *"Evidence based on result from nutrition studies following harmonized methodology, indicators and cut offs for different indicators [is available]". (Researcher)*
	Multidimensional evaluations (whole-of-society approach)	*"Due to [its] complex nature and multiple causes, improving nutrition requires the collaboration of multiple sectors, including agriculture, health, education, trade, environment, and social protection. [Practically, we should start suggesting] to include an expert in the field of health economics when planning a primary prevention programme or a scientific project". (Researcher)* *"It would be good to (…) have a solid and as much as possible global assessment of the effects of [fiscal] policies (by global I mean 360 degrees, what effects did it have on consumption, health, market, industry, reformulation, innovation, country finances, etc)". (Policymaker)*
	Data stratification at different levels	*"There is lacking economic evaluation of [breast, cervical and colon cancer] screenings and it is necessary to introduce national based evidence to support such interventions". (Researcher)* *"A lot of evaluations of obesity prevention programs have been performed, but there is more research needed on obesity prevention in*

		the socially deprived families. […] These people are the hardest to reach". (Researcher) *"Such programs [targeted to socially deprived families] will probably need more financial resources than prevention programs for the general population, but the cost-savings in the long-term could be potentially higher in this subgroup." (Researcher)*
	Sustainable research infrastructure	*"Primary prevention actions and their evaluations must be continuous and must have continuous financial support because once the project stops almost all effort is lost". (Researcher)*
Implementation facilitators	Production of comparative analysis	*"Cost-effectiveness evaluations (…) may be crucial when deciding which actions from the same division are to be considered at the top priority". (Researcher)* *"Economic evaluation contributes to evidence-based decision making by helping the public health community identify, measure, and compare activities". (Policymaker)*
	Targeted evaluations that respond to concrete needs	*"Evaluations on the efficacy and efficiency of tools are useful to guide policymakers (…). The evaluation [of implementation processes], although not a full-fledged evaluation, [could be] important for political guidance." (Policymaker)* *"PHE evaluations in general would support impact assessments for EU/national policies/initiatives (including repeals of existing legislation) in the area of food and health. Examples are: measures addressing nutritional composition of foods; marketing (and not only advertising to children) of products; school/public workplace policies aiming to improve diet/physical activity". (Policymaker)*
	Transposal of good practices	*"Many countries are considering SSB taxes in different forms and (…) a solid [economic evaluation] could inform other countries and other potential taxes, too". (Policymaker)*
	Inclusion of BAU scenarios to reveal costs of inaction	*"Given the potentially sizeable benefits of healthier lifestyles for improved population health, understanding the costs and impacts of lifestyle-focused health promotion interventions is an important policy priority" (Policymaker)* *"The calculation of the health effects and the costs saved are strong arguments to those that are perhaps less health-minded to prioritise and implement [a nutrition policy]". (Policymaker)*
	Transparency	*"National governments should enhance the transparency and publicity of operation by disclosing all decisions and contracts" (Researcher)* *"It is crucial to have transparent decision making based on evidence, including […] economic evidence". (Researcher)*

*BAU = business as usual.

Methodological challenges in performing PHEE

Participants considered issues related to definition and measurement of outcomes as fundamental barriers in performing PHEE. validity of the analysis. Measurement difficulties identified pertained primarily to the assessment of exposures to dietary risk factors, outcomes related to such exposures, social and economic costs of diseases, and economic costs of policy interventions. Moreover, the long time lag (between implementing an intervention and seeing health benefits at the population level) requires use of modelling techniques to project possible benefits into the future, and to relate them to changes in disease patterns.

A second challenge, perceived by both researchers and policymakers, is the absence of adequate frameworks to guide a PHEE. The participants pointed out that, adequate frameworks exist and are commonly used in clinical settings, and mentioned health technology assessment (HTA); on the contrary, there are no such frameworks and standardised methodologies for the evaluation of nutrition interventions. The need for carefully designed frameworks and methodologies suitable to public health nutrition is therefore high.

Barriers related to the use of PHEE in policy settings

Many participants noted that the background evidence, on which PHEE should be based, is at times controversial or scientifically weak, and other voices and stakeholders may easily discredit these efforts. There is therefore scepticism in using PHEE in policymaking settings, especially because of low quality evidence. When the level of scepticism

The choice and definition of the outcome to report on (from behaviours to biomarkers and the number of related diseases and deaths) are not trivial issues, as such choices can yield very different results in terms of cost-effectiveness and may challenge the

towards a particular nutrition-related issue is low, as in the case of the effects of trans-fatty acids consumption on cardiovascular disease, the economic evaluation is more likely to succeed in influencing such policy.

On the other hand, most of the interviewed researchers pointed out that the allocation of public budgets does not always reflect what is recommended by the evidence (economic evidence or, in more extreme cases, evidence of effect), and gave some examples of stakeholder influence in funding public health interventions. They considered this a barrier to the use of PHEE.

Facilitators for improvement of the methodology of PHEE

This category consists of four subcategories, identified mainly by the researcher participants: 1) growing interest in frameworks and methods, 2) multi-dimensional evaluations, following a whole-of-society approach, 3) data stratification at different levels, according to SES and geographic regions, and 4) sustainable research infrastructure.

Lack of a suitable framework has been previously identified as a major methodological barrier in PHEE. Researchers are optimistic that this issue will be addressed, as there is a growing interest in developing better frameworks and methods to perform economic evaluations in public health; for instance, the following areas have been mentioned: harmonized methodology, measurement of exposure and outcome,

identification of indicators and sensitive cut-offs for such indicators.

A thorough identification of the stakeholders' perspectives, such as the healthcare perspective or the whole of society perspective, appeared to be crucial for well-suited economic evaluations, according to researchers and decision makers. Interventions and policies in the field of nutrition and obesity prevention have an impact not only on the targeted population groups, but also on various sectors of our societies. Economic analysis should therefore be multidimensional and address costs and benefits for all relevant stakeholders. Health economists should attempt to provide costs and benefits for each group of stakeholders.

In addition to assessing and reporting specific costs and benefits of interest to different stakeholders, there is also interest in disaggregating results according to geographic specificities, or to SES of populations. According to the researchers consulted, such stratifications, if available, would increase the credibility of PHEE. For example, estimates obtained using country-level data would be perceived as more reliable and more relevant than estimates obtained with regional or global data.

Last, a sustainable research infrastructure should be in place to ensure the production of methodologically sound PHEE. According to some researchers, such infrastructure should have a dedicated team or unit, and consistent financial support.

Facilitators to widen the use of PHEE in policy settings

This category includes facilitators of the demand for PHEE and consists of five subcategories: 1) production of comparative analyses; 2) targeted evaluations that respond to concrete needs; 3) transposal of good practices; 4) inclusion of BAU (business as usual) scenarios to reveal costs of inaction; 5) transparency in decision making.

Acknowledging the limitations on both financial and human resources, researchers and policymakers agreed on the importance of economic evaluations in comparing different policy options targeting nutrition and, more broadly, public health. Comparative analysis enables the choice of the most cost-effective option and could increase the demand for PHEE.

Some of the policymakers interviewed have used economic evaluations "to guide" or influence colleagues in a decision-making process. There is the potential for demand for PHEE to rise if economic evaluations respond to concrete needs, thus having a direct impact on decision makers, and providing guidance in daily practices. Moreover, some of the policymakers interviewed, indicated that having more examples of legislation informed by economic evidence may in itself stimulate the greater demand for PHEE.

Economic evaluations can be useful also in evaluating transposal of good practices from their inception into different practice contexts; for instance, economic evaluations of taxation interventions can be carried out in those countries where sound public health taxation has been already implemented, to best inform countries in the process to design similar schemes. According to some of the policymakers interviewed, such cases can increase the demand for PHEE.

The costs of inaction need also to be known. This could be done, for example, by including BAU scenarios when performing comparative economic analyses. A case in point is to clarify the high costs of inaction in

obesity and related chronic diseases, both in social and monetary terms, as noted by some policymakers. This could be a key driver for action but also for increasing the demand for PHEE.

Lastly, most researchers identify a desire for transparency in policy decision making as a very important rationale for economic evaluations.

An expert meeting on nutrition economics has also previously identified and commented on key features of economic evaluations in nutrition, such as: societal perspective and multi-stakeholder approach in identification of costs and benefits, comparison of alternatives, and generalisability of results (28).

Discussion

Main findings and comparison to the literature

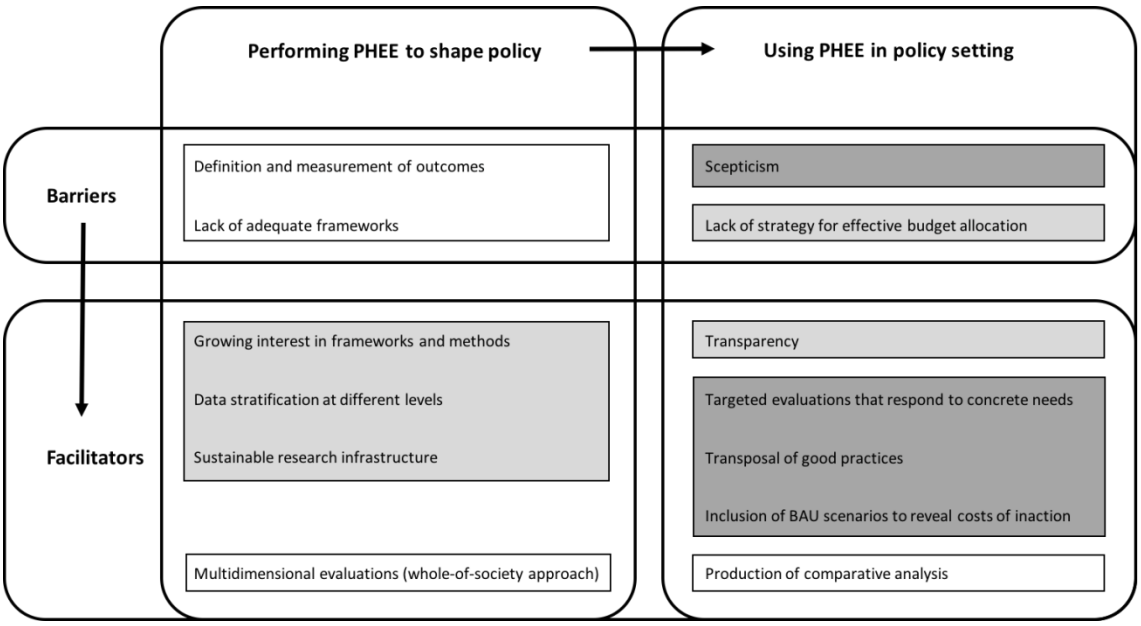
This qualitative analysis aimed to identify key barriers and facilitators of performing public health economic evaluations and in including them in the development of policies in the area of nutrition and prevention of chronic diseases. We found that barriers (methodological challenges and barriers related to the use of PHEE) were symmetrical to facilitators (facilitators to improve the methodology and increase the use of PHEE), meaning that facilitators were those factors that reduced barriers in either performing or using PHEE.

Policymakers and researchers diverged in their opinions and perspectives. For instance, in the category "Barriers related to the use of PHEE", researchers identified "Lack of strategy for effective budget allocation." In evaluations (whole-of-society approach), and data stratification at different levels (geographical and social determinants enable the inclusion of equity considerations in economic analyses). A wide variation in approaches and methodologies in economic studies on dietary factors, and the consequent call for an adequate framework, has also been documented (20,22).

Our findings on methodological barriers and facilitators resonate with previous literature, indicating that researchers performing economic evaluations need to improve their communication of the structure and results of their analyses to decision makers (27). For instance, Weatherly and colleagues (19) identified four main methodological challenges in assessing the cost-effectiveness of public health interventions: attribution of effect, measuring and valuing outcomes, identifying inter-sectoral costs and consequences, and incorporating equity considerations. They are similar to those identified in our study: definition and measurement of outcomes (where "definition" includes effect attribution and "measurement" includes measuring and valuing outcomes), multidimensional contrast, policymakers mentioned "Scepticism" attributed largely to doubts about the quality of the data, conclusiveness of the findings, controversies and limitations of current PHEE practices. Nonetheless, both groups provided numerous insights about methodological challenges and data paucity. With regards to facilitators, only researcher participants identified the availability of stratified data for geographical and social

conditions as a facilitator towards the production of methodologically sounder PHEE, and only policymaker participants highlighted the need for providing targeted evaluations responding to concrete needs as a facilitator of greater use of PHEE. Generally speaking, researchers focused on methodological facilitators, while policymakers stressed a need for more widespread use of PHEE (Figure 1).

Figure 1. Main categories and subcategories of facilitators and barriers to PHEE identified by researchers only (light grey boxes), policymakers only (dark grey boxes) or both (white boxes)



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Strengths and limitations

Despite existing discussions on generalisability of qualitative studies, nonetheless we consider our analysis as the first attempt to systematically collect perceptions on barriers and facilitators in translating economic evidence into policy from a broad, though small, sample of both researchers and policymakers from the European region.

While the general nature of the questions posed allowed for great freedom in responses and could accommodate the differences in the participants' expertise, more specific questions would have returned more concrete thoughts and examples. The fact that answers were made available to all workshop participants without anonymity could also have influenced the respondents and resulted in their more cautious expressions and examples.

Because of the limited number of questions asked and the relatively small number of participants, findings should be taken with caution; subsequent work might be done, including a larger number of participants with a more in-depth interview questionnaire.

Implications for policy and research

To our knowledge, there are no other studies addressing facilitators and barriers to the use of economic evidence in public health nutrition: so far studies have addressed only methodological gaps in economic evaluations of public health interventions (19,21,22) and nutrition interventions (20).

The paucity of successful cases in which economic evaluations played a role in shaping policies should also be considered, as pointed out by most participants during in the questionnaire and during the workshop. Some expressions, such as "*My feeling*" or "*Science may not always be fully equipped*", may reflect this fact. Such observations may also reflect the difficulties in accounting for complex societal phenomena: changes in eating habits (29) or environmental sustainability (30) are two among numerous examples.

The results from our analysis show an increasing interest and unmet demand for public health policies informed by economic evaluations. Enablers of the use of economic evaluation should be further facilitated. Expanding the application of sound PHEE to policymaking will ensure a better informed process and, presumably, better outcomes in terms of the intended effects of the policies.

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