Health Economics

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Week – 08

Lecture 38- Principles of Economic Evaluation: Introduction

Welcome friends once again to our NPTEL MOOC module on Health Economics. So far, we have been explaining a couple of lectures on economic evaluations. The various concepts of economic evaluations we have already started, however the details of economic evaluations should be followed very carefully. In this lecture, we are targeting for the readers to understand the principles of economic evaluation, like what are the different types and how we can go for it. Hence, we have kept this (title) as an introduction to the principles of economic evaluation.

However, you need to follow what we did it earlier. In the previous two lectures of this week, we introduced economic evaluation using a highly theoretical approach and we emphasized the different theories which are useful for economic evaluation. And this is very important because this has high intellectual directions and the economic evaluation in particularly is quintessentially an applied technique and arguably the main practical contribution economics makes to decision making in health and healthcare.

And this is in continuation to our previous week also. We discussed on economics of health systems and in this week also we are somewhere on the periphery emphasizing on the evaluation of the economic health system or understanding the health system through its evaluation. Hence, the target of this unit, this particular lecture is to introduce the principles of economic evaluation and their types. The remaining lectures of this week will act as a bridge between theoretical underpinnings, which we already started in the previous two lectures and also the practical applications of economic evaluation, that we will learn in the next two weeks. And also, the two weeks basically are on their monetary evaluation, non-monetary evaluations, the different methods even including health efficiency. So, these are all aspects we will be addressing.

Then in the introduction of this principle, how to understand health economic evaluation? This is in the context of health that can be termed as the comparative analysis of alternative courses of action in terms of both, that is health consequences and their cost. So, cost or health outcomes are indeed important. Economic evidence is increasingly being used for informing health policies. Consequently, ensuring the best value for money is placed high on the agenda by any government in the globe and that too will identify their economic considerations.

Hence, the important questions that are relevant are like which services to be provided or

which services to provide?, what amount should be provided?, at what stage it should be best to provide?, and to whom it should be provided? These need to be answered through our principles or explanations. This further requires a different kind of evidence like can it work? which generally refers to efficacy. And to what extent will it work? that is related to effectiveness. Is it worth investing compared to other things that can be done using the same amount of investment? which concerns with cost-effectiveness or efficiency.

Hence, the three aspects will be identified. One is efficacy- can it work? That is all about, and then effectiveness- to what extent, if it works then to what extent it works? Then, it is cost efficiency, cost effectiveness is really important and that is why we usually deal with efficiency analysis. All these questions and evidence of their validity and reliability require an appropriate understanding of health economic evaluations. Lack of understanding about the underlying principles of health economics evaluation may result in different analysis like use of inappropriate type of analysis then use of inconsistent methodologies.

So, lack of understanding about the underlying principles of health economics evaluation may result in the inappropriate type of analysis or inconsistent methodologies which may tend to inappropriate policy decisions and benefiting none, that might happen. And so, let us understand the principles of health economic evaluation in a comprehensive way.

Hence, there are two types of economic evaluation. One is called partial, and another is called full. So, we will clarify what is called partial. These study examines (the partial economic evaluation) examines only cost or consequences, but do not look at both together or related cost to consequences or basically means one and its implication, and another is not linked in the partial economic evaluation. Second aspect of the partial economic analysis is, it examines only cost and consequences, but only evaluate a single course of action (not comparing), but do not compare with other alternative options. If both are taken like cost and consequences, but it only examines one program at a time. However, in the full one, other aspects are true, like it emphasizes the comparative aspects of the alternative courses of action in terms of both cost as well as consequences (that is all outcomes or effects). You can refer to Drummond 2005 paper and study.

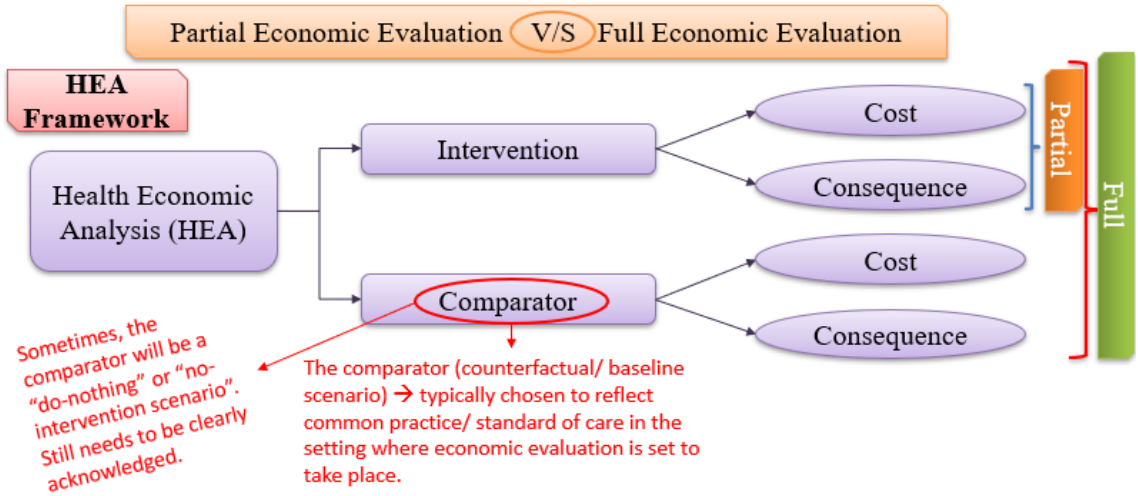
Full economic evaluation studies, aim to describe, measure and value all relevant alternative courses of action (that is their intervention of X versus comparator that is Y) and their resource inputs and consequences. And hence, partial examines only cost or consequence. It has the discussion like, either it takes into account the cost analysis or costing description or at a time it only checks the outcome or consequence description. If any it checks, it will check at a program, only a single program not in a comparative context. So far as the cost analysis is concerned, some of the examples we used to encounter is like cost of illness analysis, budget impact analysis etc.

Coming to the partial, but partial even if it considers cost as well as consequence, but it only emphasizes a single program, not identifying whether this program is better as compared to other, that is the part of full economic evaluation. So, this is what cost to outcome description is, but for a single program. These are all discussed here. Partial evaluation or

partial economic evaluation either explicitly or implicitly ignores the comparator which may overlook relevant cost or consequences and that do not allow comparison to relevant policy alternatives.

Coming to the full economic evaluation, it examines both cost and consequences also alternative courses of actions. There are different types of full economic evaluation. They are basically defined as cost benefit analysis as CBA, cost effectiveness analysis is called CEA and cost utility analysis called CUA, cost minimization analysis as CMA and cost consequence analysis as CCA. Out of 5, 3 are mostly performed and last 2 are least performed. These different evaluations, these 5, are based on similar principles. At first, they appear interchangeable, but differ in their fundamental methodology and interpretations. We will clarify all those details.

Let us compare these two together, partial economic evaluation analysis and full economic evaluation analysis.



We start by the HEA framework, that is called health economic analysis. It requires interventions through cost and consequence, and there are roles of comparators as well. Comparators if we compare with another program and their evaluation again through the cost and consequences. When only intervention is being discussed for their cost and outcome, that is precisely the part of partial evaluation analysis, this is what.

In entire one, we also take the count of comparator as well to understand the full program existing, whether the single program is really the best or not? In that case, we have to take the help of comparator. So, that is why it is called full economic evaluation. So, role of comparator, what is comparator then? So, comparator is like, this is also called the counterfactual or the baseline scenario. This is typically chosen to reflect the common practice or standard of care in the setting where economic evaluation is set to take place.

Sometimes the comparator will be a- 'do nothing' or 'no intervention scenario'. Still, it needs to be clearly acknowledged, even if comparator is not that required but has to be

acknowledged. So, which one to choose? It is quite the obvious answer though it is difficult in the process to identify, but the obvious answer is that all the partial equilibrium evaluations can provide valuable information. They cannot alone guide decision making. As, only knowing an intervention's cost or the economic burden of a disease does not indicate an intervention's value of money.

For healthcare decisions making surrounding resource allocations etc., it is vital to evaluate both the cost and consequences of the intervention in question and to compare it to a relevant alternative course of action or policy option, that is the role of comparator. But how did we arrive at this conclusion? To know this, let us go for a hypothetical example with the recent cases of COVID-19 crisis. We know that there are different vaccines made by India. We start with, Bharat Biotech introducing an inter-nasal vaccine named INCOVACC for COVID-19 India and we would use a pre-existing injection vaccine, that is called COVAXIN (India's first indigenous COVID-19 vaccine) as a comparator to that of the INCOVACC.

Here we say, partial economic evaluation when we use cost outcome study, which only evaluate one course of action, that is only if it is INCOVACC. In case of full economic evaluation, we use cost-benefit analysis, evaluating two or more alternative courses of action together. So, these two are, where both cost and outcomes are expressed in monetary terms. We will again clarify monetary and non-monetary terms in our next week in detail.

Coming to the context once again, economic analysis of newly introduced drug case we started. In that case, new vaccine (let us start with the case of iNCOVACC), its cost is of only 5 lakhs whereas the benefit (if it is derived) is 20 crore, ignoring the another one. Since, we are dealing with the partial economic analysis, we can interpret or find and derive the finding, that is the benefits of new vaccine, especially its monetary evaluation. The monetary value of its health benefits outweighs its cost, so favoring its use.

Then in case of full economic evaluation, we go by the new vaccine iNCOVACC as well as the COVAXIN. We start with the same comparison, but we will also check the comparator that is COVAXIN. So, with the cost of 3 lakhs and benefit of 30 crore. Hence, in consequence, we derive that the new vaccine when compared to the current standard vaccine in use, that is the comparator, shows that the new vaccine is less effective and more expensive than the current vaccine, that is leading to opposite policy recommendations. So, it is very clearly spelled. So hence, the partial equilibrium analysis suggested a favoring use, whereas the second one is deriving opposite policy recommendations. So, the full economic evaluation is giving a better direction. Hence, what we derived in our conclusion, out of this is that we have to choose the full economic evaluation for health economic analysis. Especially when the relevant alternative policy options are ignored, the economic analysis can generate a misleading result. That is why in the initial case, we simply go by the nasal based vaccine (that is here, iNCOVACC), we have derived that this is favorable, but indeed, as per the full economic analysis by emphasizing the comparator (the COVAXIN) which was initially introduced. We find that the new one has led to a misleading result.

Now answer what we have understood so far? There are cases A, B, C. Comparing the cost of cervical cancer screening to the recently introduced papilloma virus vaccine. Another case, analyzing the cost and benefit of cervical cancer screening. And the third one, comparing the cost and benefit of cervical cancer screening to the recently introduced papilloma virus vaccine. Out of these three cases, which one or which statement is true? So out of these three options, which one is correct? First, B is partial, but A and C are full economic evaluation. And second option is B and C are partial and A is full economic analysis. Third option A and B are partial, and C is full economic analysis. This you may consider as a MCQ type of question. You have to choose the best option that is really relevant in these three cases.
So in this case, you can easily see that the third case where we can derive the result as per the discussion. So, you have to give this answer. I have already given the hint. You can give the best answer. If it is still not dealt, you can discuss with us in a 'ask a question session' or in a 'query session'.

So, we learned that full economic analysis or economic evaluation analysis are more optimal way to approach health economic analysis. However, there are differences within the full economic evaluation itself. One should note that efficiency and equity are the criteria that are the focus of economic evaluation as well. While in private healthcare market efficiency is largely left to market forces, economic evaluation concerning public healthcare services requires extra efforts, as there are limited or no market forces that generate information like prices and profit to enable efficiency judgment. This has led to the development of different sets of evaluation techniques.

Type of Analysis	Cost	Output/ Consequence	Formula
Cost-Benefit Analysis (CBA)	Money	Valued in terms of money (WTP*)	Net ▲C/ ▲B
Cost-Effectiveness Analysis (CEA)	Money	Qualitative non-monetary units (E.g.- Life years gained (LYG))	▲C/ ▲E
Cost-Utility Analysis (CUA)	Money	Valued in terms of utility (E.g.- QALY**)	▲C/ ▲QALY
Cost-Minimisation Analysis (CMA)	Money	Identical in all aspects	▲C (least cost alternative)
Cost-Consequence Analysis (CCA)	Set of Costs	Set of Consequences	Disaggregated evaluation approach

*= Willingness to pay (WTP), **= Quality adjusted life years (QALY)

Here, we emphasize the type of analysis through their cost or their output or consequence and we also, emphasize the formula.

Out of those five indicators, first three (CBA, CEA and CUA) are mostly used and we will also clarify the approaches. In the cost-benefit analysis (CBA) approach, the measure of cost is through monetary terms, and the output is usually measured through the willingness to pay approach (WTP), valued in terms of money, and their formula is $\Delta C/\Delta B$ (the cost and the benefit).

Then, there is the cost effectiveness analysis. So far as cost is concerned, it is in terms of monetary valuation. Then, for output, we go by qualitative non-monetary units, like- life years (Example- Life years gained (LYG)) and is defined through $\Delta C/\Delta E$. The third case is of cost utility (CUA), where we are supposed to link it to the utility (i.e., through QALY). QALY is basically quality adjusted life years. So, formulated as $\Delta C/\Delta QALY$.

Last two are less utilized, but its monetary evaluation is made. And usually, identical in all respects (so far as the output is concerned). And here, the least cost alternative (ΔC) are checked. Cost Consequence Analysis (CCS), this is, so far as cost is concerned, it is calculated through the set of cost and their set of consequences and the formula is considered as disaggregated evaluation approaches follow for the measurement.

Each of these types their advantages and disadvantages along with applied example is discussed in upcoming lectures. We will carry it to its respective lecture. Given these five techniques (in most books you will find only three or maximum four), regarding how to decide which one is to use? The answer to the above question requires answering a broad range of other questions.

The questions can be as follows- Are there enough evidence on the outputs of the interventions being compared? If it is yes or if it is no, accordingly we will decide. If it is yes, then, does the output or effect within each intervention are disaggregated in a range of multiple outcomes that are not summarized as a single measure? If it is no, then of course, we are going by a partial economic evaluation that is only through the costing study. Then, does the output (as I already said), does the output or effects within each intervention are disaggregated in a range of multiple outcomes that are not summarized as a single measure? If it is yes, then we will check their CCA (cost consequence analysis).

If it is no, then output is summarized in a single unit only. Hence if it is no, then we have another follow-up question. Are the outcomes of both or all the intervention identical in all respects? Again, there are two follow-up questions. If it is yes, then we will follow CMA approach that is cost minimization analysis. If it is no, so if they are not similar, can the outcomes of these interventions be valued in monetary terms?

This question again asked with yes and no. Again, if it is yes, of course, the standard technique that is CBA (cost benefit analysis) is followed. If it is no, then another follow-up question is required. If not in monetary terms, is it valued in single natural unit which we discussed or generic measure of health status is used (that is through utility called quality adjusted life year or daily adjusted life year).

If this has single natural unit or generic measure of health. The single natural unit is called cost effective analysis, whereas the other one is called cost utility analysis. So, after saying all these details, I hope you must have got the principles, the steps and their types are clarified through the steps to understand the context.

Broadly, there are two types of economic evaluations, one is partial and full economic evaluations. Partial economic evaluation provides useful information. However, the information is not enough for decision making that might give misleading result (which we have already clarified in the context of two vaccination programs which into the India recently followed, especially during COVID-19. In full economic evaluations, there are five techniques CBA, CEA, CUA, CMN, CCA. First three are considered to be the mostly used evaluation techniques and each of these techniques differ from each other in some way or the other in their applications.

So what is there in the next lecture? We will discuss the full economic evaluations and we will identify their features and with their important example, the most important example and the example in practice. Also discuss the advantages and disadvantages. And we also enable appropriate use of each of these tools or techniques and will interpret for health policymaking. So, these are the standard readings to follow. We have also cited some of them in between. I think it will really clarify to understand health evaluation and we have tried our best to get the best tools from the latest available sources.

So these are all. I must thank you for your patience listening. I look forward to your next lecture participation. Thank you. Thank you very much.