Network meta-analysis

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7248597/#:~:text=Network%20meta%2Danalysis%20is%20a,Bayesian%20framework%20using%20example%20data.

Network meta-analysis (NMA) is a relatively recent development, which extends principles of meta-analysis to the evaluation of multiple treatments in a single analysis. This is achieved by combining the direct and indirect evidence. Direct evidence refers to evidence obtained from randomized control trials (RCTs); for example, in a trial comparing treatments A and B, direct evidence is the estimate of relative effects between A and B. indirect evidence refers to the evidence obtained through one or more common comparators.

For example, in the absence of RCTs that directly evaluate A and B, interventions A and B can be compared indirectly if both have been compared to C in studies (forming an A-B-C "loop" of evidence). The combination of direct and indirect evidence is called mixed evidence.

NMA can be used to answer comparative effectiveness research questions in which multiple interventions are available, or can be used for a given condition. In addition, network meta-analysis can estimate relative rankings of interventions

Pairwise meta-analysis is an established statistical tool for synthesizing evidence from multiple trials, but it is informative only about the relative efficacy of two specific interventions. The usefulness of pairwise meta-analysis is thus limited in real-life medical practice, where many competing interventions may be available for a certain condition and studies informing some of the pairwise comparisons may be lacking. This commonly encountered scenario has led to the development of network meta-analysis (NMA). In the last decade, several applications, methodological developments, and empirical studies in NMA have been published, and the area is thriving as its relevance to public health is increasingly recognized [1].

Network meta-analysis is a technique for comparing multiple treatments simultaneously in a single analysis by combining direct and indirect evidence within a network of randomized controlled trials. Network meta-analysis may assist assessing the comparative effectiveness of different treatments regularly used in clinical practice and, therefore, has become attractive among clinicians. However, if proper caution is not taken in conducting and interpreting network meta-analysis, inferences might be biased [2]

Organisations such as the National Institute for Health and Care Excellence require the synthesis of evidence from existing studies to inform their decisions—for example, about the best available treatments with respect to multiple efficacy and safety outcomes. However, relevant studies may not

provide direct evidence about all the treatments or outcomes of interest. Multivariate and network meta-analysis methods provide a framework to address this, using correlated or indirect evidence from such studies alongside any direct evidence [3]

NMA is a relatively novel methodology that allows the inclusion of indirect evidence to evaluate multiple treatments [4] [5] [6] [7] with recent examples in the neurosurgical [8] [9] [10] and general surgical [11] literature.

Several organisations, such as the WHO, have endorsed network meta-analysis (NMA) as a powerful tool in clinical decision making. NMA is a statistical method, which simultaneously compares multiple (three or more) interventions within a single framework, by synthesising direct and indirect evidence from multiple studies, addressing the same scientific question

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Network meta-analysis may assist assessing the comparative effectiveness of different treatments regularly used in clinical practice, and therefore has become attractive among clinicians. However, if proper caution is not taken in conducting and interpreting network meta-analysis, inferences might be biased. The aim of Rouse et al. in a paper was to illustrate the process of network meta-analysis with the aid of a working example on first-line medical treatment for primary open-angle glaucoma. They discussed the key assumption of network meta-analysis, as well as the unique considerations for developing appropriate research questions, conducting the literature search, abstracting data, performing qualitative and quantitative synthesis, presenting results, drawing conclusions, and reporting the findings in a network meta-analysis [12].

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