

The science and art of research on research

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ABSTRACT

Summary: Research on research, or meta-research, is a blossoming field following a rapid rise in the volume of research and advances in digital technologies that render research data widely available. The need to scientifically evaluate science itself is highlighted by increasing awareness of issues in generating, conducting, applying and disseminating scientific evidence, which hinder replication and result in research waste. Although various forms of meta-research are currently recognised, a systematic review of the evidence on the theme or topic in question with appraisal and synthesis of the evidence appear to be a common element. The speaker shares an example of meta-research series on neonatal jaundice that was germinated out of a need to answer a question related to the day-to-day care of newborn infants. The use of supplemental fluid for newborn infants, either intravenously or enterally to reduce serum bilirubin level and the risk of important clinical outcomes such as kernicterus spectrum disorder (KSD) has been a contentious issue. A Cochrane review developed to address this uncertainty finds that fluid supplementation modestly reduces serum bilirubin in some time points but not in others. However, none of the included studies evaluated important clinical outcomes such as KSD and other neurological manifestations. The authors went on to examine all neonatal randomised controlled trials (RCTs) included in Cochrane reviews that evaluated all interventions for neonatal jaundice. They found that only 4% of the studies evaluated important clinical outcomes like KSD, and there was zero cumulative incidence of KSD in all studies. The findings pointed to problems in the selection of population for the trials and the evaluation and reporting of outcome that matters. The findings were supported by a rigorously conducted systematic review that showed no strong evidence on the association between serum bilirubin level and the risk of KSD. An evaluation of a bigger dataset containing all neonatal RCTs included in Cochrane neonatal reviews showed that more than $\frac{3}{4}$ of the outcomes evaluated in neonatal RCTs were patient-important outcomes (PIO), with newer trials more likely to report PIO. This suggests that the issues seen in trials on neonatal jaundice may not be widespread. The speaker then highlights some challenges in meta-research in general. Evaluation of research is fraught with challenges as the generation, presentation and interpretation of research evidence become increasingly complicated, with evolving standards in the evaluation of the likelihood of bias, accuracy and integrity of presentation (spin) and availability of research data (publication bias).