Intelligence in meta-analysis tools should be embedded for detecting publication bias and skewed data in order to avoid misleading conclusions

Yoshiyasu Takefuji

Jop de Vrieze wrote an article entitled "The metawars" (1). Researchers must be aware before relying on the data and statistics (2). The major problem in meta-analysis lies in the potential for publication bias and skewed data. If the meta-study is restricted to research with positive results, then the validity of the entire endeavor is compromised (2). Using bias or skewed data, the result of meta-analysis may mislead the conclusion.

In a normal distribution, the mean and the median are the same number while the mean and median in a skewed distribution become different numbers. The "mean" is the "average" where you add up all the numbers and then divide by the number of numbers. The "median" is the "middle" value in the list of numbers. Therefore, visualizing data enables us to detect and identify bias and skewed data.

According to Wikipedia, statistical bias is a feature of a statistical technique or of its results whereby the expected value of the results differs from the true underlying quantitative parameter being estimated. In order to avoid misleading conclusions by meta-analysis, we have to eliminate the following biases from data: Funding bias, Reporting bias, Analytical bias, Exclusion bias, Attrition bias, Recall bias, and Observer bias.

We cannot assume that all users have enough knowledge on meta-analysis for avoiding bias and skewed data. Therefore, intelligence in meta-analysis tools should be embedded for automatically detecting publication bias and skewed data in order to avoid misleading conclusions. However, we may still mislead the wrong conclusion by meta-analysis with forged data.

References:
1. Jop de Vrieze, The metawars, Science 21 Sep 2018: Vol. 361, Issue 6408, pp. 1184-1188
2. https://explorable.com/printpdf/meta-analysis