Relevance Weighted Likelihood in Meta-analysis

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In medicine the greatest challenge of meta-analysis lies in the integration of the qualitative and quantitative assessments of given information (scoring of quality, weighing of the effect size by quality score, etc.). Contrary to many other fields of research, variables of interest, in medicine, such as methodology, health problems, target populations and etiological factors are considerably diversified and heterogeneous. So it is important that an adequate assessment of the quality of original studies must be made before performing a quantitative meta-analysis. There are so many scales which assess the quality of randomized controlled trials but little empirical evidence supports any scale as the best. In this study different scales would be investigated to make a critical review of different scales developed so far for assessing the quality of randomized controlled trials such as Oxman's scale[2], Chalmers's scale[1], Jadad's scale[3] and Muncer's scale[4]. The best scale would be identified to assess, numerically, the quality of each trial included in the meta-analysis. The numerical value of the quality of each trial would be incorporated in the quantitative meta-analysis using relevance weighted likelihood (RWL) proposed by Hu and Zidek[5] and in this method each sample is exponentially weighted with some weight p, where $0 \leq p \leq 1$. In constructing a conventional likelihood it is assumed that all the samples are identical and statistically mutually independent. But in practice, usually the samples can be found as independent but all the samples are identical is rare. Hu and Zidek[5], to adjust the likelihood with reality, have defined each sample as exponentially weighted with some weight p, where $0 \leq p \leq 1$. If in one extreme it is found that $p=0$, for any sample, then that sample can be considered as outlier and hence will not appear in the likelihood. And in the other extreme if $p=1$ then that sample will appear in the likelihood with full information and if the weight, p, lies in the range, $0<p<1$, then that sample will be weighted exponentially with the numerical value of weight p. The weight or quality, p, can be estimated for each trial of meta-analysis from internal and external sources. The weight estimated from external source usually depends on the inclusion criteria and assess the quality, numerically, lies between 0 and 1, of each trial in uniform, systematic and complete manner. And on the other hand, internally, the p's are estimated from the data obtained from each trial. In this study three different types of weights would be investigated such as non-dominating weight proposed by Hartung and Knapp[6], weight proposed by Wang[8] and cross-validated weight proposed by Wang and Zidek[7]. A comparison would be made between the results obtained from the RWL method and than that of other methods of meta-analysis.

Literature

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