

Department of Health Sciences
M.Sc. Module: Systematic Reviews

Exercise on meta-analysis: multivitamin supplements

This is intended for anyone who would like a bit of extra practice in reading meta-analyses.

Read the attached paper 'Role of multivitamins and mineral supplements in preventing infections in elderly people: systematic review and meta-analysis of randomised controlled trials' (*BMJ* 2005; **330**: 871). Answer the questions. All questions carry equal marks.

1. How is the research question framed in terms of population/condition, intervention, control, and outcome?
2. Why did the authors use so many data-bases in their search?
3. The authors say that they had 'intended to use funnel plots to assess the possibility of publication bias, the relatively small number of studies reporting each outcome precluded such an assessment.' What is a funnel plot and how can it assess publication bias? Why did the small number of studies lead the authors not to do this?
4. In Table 1 the Jadad score is given. What is the Jadad score and how can we interpret the scores in Table 1?
5. What sort of graph is shown in Figures 2, 3, and 4? What do the squares, horizontal lines, and diamond shape? represent?
6. Why is the scale in Figure 2 a natural scale and in Figure 3 a logarithmic scale?
7. The authors say 'We used random effects models to perform meta-analyses if the heterogeneity between studies was estimated to be greater than zero; otherwise we used the model reduced to a fixed effect model.' (Quantative (sic) data synthesis.) What is the difference between random and fixed effects models?
8. The authors say that 'Although the direction of results [in Figure 2] is consistent, studies are heterogeneous (the I^2 statistic, which indicates the proportion of variability in the weighted mean differences attributable to heterogeneity, is estimated to be 97.3%, which is considered (very) large)'. What is 'heterogeneity' and how does the I^2 statistic measure it?
9. The diamond shape in Figure 2 is much wider horizontally than the horizontal lines and the diamond shapes in Figures 3 and 4 are much narrower horizontally than the horizontal lines. Why is this?
10. The authors state their conclusions in the abstract as follows: 'The evidence for routine use of multivitamin and mineral supplements to reduce infections in elderly people is weak and conflicting. Study results are heterogeneous, and this is partially confounded by outcome measure.' What in their results leads them to these conclusions and do you agree?