Analysing continuous data: what can I use?

Depending on the statistics reported in your included studies, you may be able to obtain the data you need for your meta-analysis. The formulae below can be used to calculate means and standard deviations from other reported statistics. They should be used in conjunction with Section 6.5.2 of the Cochrane Handbook, where more information and advice are available.

1. Standard error (SE) of each intervention group mean

$$SD = SE \times \sqrt{N}$$

2. 95% confidence interval (CI) of each intervention group mean

$$SD = \sqrt{N} \times (\text{upper limit} - \text{lower limit}) / 3.92$$

For 90% CI, replace 3.92 with 3.29. For 99% CI, replace 3.92 with 5.15.
Note: These values assume large sample size (>100) and that CI is symmetrical about the mean.

3. Median and interquartile range

$$\text{Mean} \cong (\text{median}) \qquad SD \cong (\text{interquartile range}) / 1.35$$

Note: These formulae are only appropriate if data are not skewed, although reporting as median and interquartile range may indicate that data are skewed.

4. Range

Range should not be used to estimate SD.

5. Combining separate data for two subgroups

(where N_1 and N_2 are the sample sizes of each subgroup, M_1 and M_2 are the means, and SD_1 and SD_2 are the standard deviations)

$$N = N_1 + N_2$$

$$M = \frac{N_1 M_1 + N_2 M_2}{N_1 + N_2}$$

$$SD=\sqrt{\frac{(N_1-1)SD_1^2+(N_2-1)SD_2^2+\frac{N_1N_2}{N_1+N_2}(M_1^2+M_2^2-2M_1M_2)}{N_1+N_2-1}}$$

6. SE, 95% CI, t value or P value of the mean difference

From a P value obtained from a t test:

- obtain the corresponding t value (see Handbook Section 6.5.2)
- exact P value is preferred (e.g. P = 0.037), but if only the level of significance is reported (e.g. P < 0.05), can use the limit (e.g. P = 0.05) as a conservative approach.

From the t value: $SE = MD / t$ (use the absolute value of the ratio MD/t)

From the 95% CI: $SE = (\text{upper limit-lower limit}) / 3.92$ (or replace 3.92 as per formula 2 above)

From the SE: (where N_E and N_C are the sample sizes of each intervention group)

$$SD = \frac{SE}{\sqrt{\frac{1}{N_E}+\frac{1}{N_C}}}$$

This SD is the average of the experimental and control arms – use the same SD for each group.

Higgins JPT, Li T, Deeks JJ (editors). Chapter 6: Choosing effect measures and computing estimates of effect. In: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.1 (updated September 2020). Cochrane, 2020. Available from www.training.cochrane.org/handbook.