Answer Key to Suggested Activity Questions for Part 6

Reading

Ivers NM, Taljaard M, Dixon S, Bennett C, McRae A, Taleban J, Skea Z, Brehaut JC, Boruch RF, Eccles MP, Grimshaw JM, Weijer C, Zwarenstein M, Donner A. Impact of CONSORT extension for cluster randomised trials on quality of reporting and study methodology: review of random sample of 300 trials, 2000-8. BMJ. 2011;343:d5886. PMC3180203.

Murray DM, Pals SP, Blitstein JL, Alfano CM, Lehman J. Design and analysis of group-randomized trials in cancer: a review of current practices. Journal of the National Cancer Institute. 2008;100(7):483-91.

Pals SP, Murray DM, Alfano CM, Shadish WR, Hannan PJ, Baker WL. Individually randomized group treatment trials: a critical appraisal of frequently used design and analytic approaches. American Journal of Public Health. 2008;98(8):1418-24. PMC2446464

Pals SL, Murray DM, Alfano CM, Shadish WR, Hannan PJ, Baker WL. Erratum. American Journal of Public Health. 2008;98(12):2120.

Questions

1. What is the CONSORT guideline as it relates to group- or cluster-randomized trials?

   "The CONSORT (consolidated standards of reporting trials) statement, originally published in 1996 and updated in 2001 and 2010, provides authors and editors with a checklist for a minimum set of recommendations for reporting the trial design, analysis, and results. …an extension for the original CONSORT guideline, specifically addressing the unique methodological features of cluster randomised trials, was published in 2004. In this extension, the authors altered the recommendations for 15 of 22 items on the original CONSORT checklist to emphasise the additional requirements for adequate methodological conduct and reporting of cluster randomised trials."

2. What was the purpose of this study?

   "Using data from a random sample of published cluster randomized trials from 2000-8, we examined trends in the reporting quality of these trials. In addition to investigating whether there was an improvement in reporting of certain items recommended by the CONSORT extension, we assessed whether there were improvements in essential methodological requirements for cluster randomised trials. To do so, we made a distinction between reporting in the manuscript (such as presence of a sample size calculation) and proper methodological conduct (such as accounting for the intracluster correlation in that calculation). Finally, we examined whether trends in trial reporting and methods varied according to characteristics of the study or journal."

3. What were the four methodological criteria examined in this review?

   "We abstracted four criteria related to the appropriate conduct of a cluster randomised trial:
   - Whether or not the sample size calculation (if reported) accounted for clustering. A trial was classified as meeting the sample size requirement if the sample size calculation was presented and clearly accounted for clustering (such as by using

the intracluster correlation, coefficient of variation, or cluster level summary statistics).

- Whether or not the analysis accounted for clustering. A trial was classified as meeting the analysis requirement if the method of analysis was reported and was clearly appropriate for the clustered design (such as by adjusting for the intracluster correlation, using a mixed effects regression analysis, or using cluster level summary statistics).
- Whether any attempt was made beyond simple (unrestricted) randomisation to attain balance at baseline—cluster randomised trials have a greater risk of chance imbalances at baseline compared with trials randomising individual patients because of the limited number of clusters that can feasibly be randomised in any one trial. Restricted randomisation (using stratification, pair matching, or minimisation) to limit the chance of baseline imbalances is therefore recommended.
- As in a previous review, we abstracted whether the number of clusters randomised per arm was greater than four as trials randomising fewer than four clusters per arm might be severely limited in their statistical power. Unlike each of the variables above, this criterion was not explicitly recommended in the CONSORT extensionfor cluster trials."

4. How did these criteria differ from those used by Murray et al. (2008) and Pals et al.(2008)?

   The first criteria on sample size calculation was the same as used in the earlier reviews. The second was similar, but Murray et al. (2008) were more explicit in their criteria for what constituted an appropriate analysis (cf. Table 1 in Murray et al. (2008)). The third criteria was similar, as the earlier papers also looked for evidence of stratification or matching. The fourth criteria was generally similar, in that Murray et al. and Pals et al. reported the number of units of assignment included in the studies they reviewed. But the earlier papers did not specify a minimum number of groups randomized, which Ivers et al. did. Ivers et al. set that minimum at 4, but that figure will often bee too small to provide adequate power. For ICCs of the magnitude often seen in public health and medicine (0.01-0.05), 8-12 groups will be required per condition for an intervention effect of 0.25 standard deviation units, which is 2 to 3 times the minimum value specified by Ivers et al.

5. What were the findings in this report regarding the methodological criteria?

   "We found no trend over time in the methodological criteria that we chose to abstract. Overall, 56% of trials used restricted randomisation, 70% accounted for clustering in analysis, 60% of those presenting sample size calculations accounted for clustering in the design, and 86% allocated more than four clusters per arm."

6. How do those findings compare to the findings in Murray et al. (2008)?

   Murray et al. reported that 60% of the trials they reviewed used some form of restricted randomization, similar to the 56% reported in Ivers et al. Murray et al. reported that only 45% of trials reported only appropriate analytic methods, while another 8% reported some appropriate analytic methods; those figures are appreciably below the value of 70% reported by Ivers et al. Murray et al. reported that only 18% of trials reported appropriate sample size calculations, where Ivers reported 60%. Murray et al. reported that 64% of trials allocated 6 or more groups per condition, compared to 86% reporting 4 or more in Ivers et al.

7. What was the main conclusion of Ivers et al. with regard to the methodological criteria?

> "We agree with the authors of CONSORT that explicit justification is important because cluster randomised trials involve unique methodological challenges that require special attention during the design and analysis. For example, the intracluster correlation must be accounted for in both the sample size calculation and analysis; failure to clearly report whether this has been done leads to questions regarding the validity of the findings. Unfortunately, we found no evidence of significant improvement over time in four key methodological criteria. Indeed, the methodological quality of cluster randomised trial reports after publication of the CONSORT extension remains disappointingly poor; this is especially true for trials published in specialty (non-general) medicine journals."