

ENDGAMES

STATISTICAL QUESTION

Controlled trials

Philip Sedgwick *reader in medical statistics and medical education*

Centre for Medical and Healthcare Education, St George's, University of London, London, UK

The effectiveness of an interdisciplinary primary care approach for community dwelling frail older people in reducing disability and preventing further functional decline was investigated. A cluster randomised controlled superiority trial study design was used. The intervention was the so called prevention of care approach, which consisted of a multidimensional assessment and interdisciplinary care based on a tailor made treatment plan with regular evaluation and follow-up. The control treatment consisted of usual care.¹

In total, 346 frail older people (score ≥ 5 on Groningen frailty indicator) were recruited from 12 general practices in the south of the Netherlands. General practices were randomised to intervention or control. The primary outcome was disability, assessed at 24 months by means of the Groningen activity restriction scale. Secondary outcomes were depressive symptomatology, social support interactions, fear of falling, and social participation. Outcomes were measured at baseline and at 6, 12, and 24 months of follow-up.

No significant difference was found between the intervention and control groups with regard to disability (primary outcome) and the secondary outcomes. It was concluded that there was no evidence of a difference between the prevention of care approach and usual care in effectiveness.

Which of the following statements, if any, are true?

- The use of a concurrent control group minimised confounding, permitting the inference of causality between treatment and outcome
- Usual care is referred to as an active control
- It can be inferred that the interdisciplinary primary care approach is as effective as usual care with regard to disability (primary outcome)

Answers

Statements *a* and *b* are true, whereas *c* is false.

The purpose of the trial was to assess the effectiveness of a new interdisciplinary primary care approach for community dwelling frail older people in reducing disability and preventing further functional decline. It was important that the trial included a control group. The control group did not receive the new

interdisciplinary primary care approach but standard usual care. The purpose of the control group was to provide a comparator, against which the effectiveness of the intervention could be evaluated. Because a control treatment was included, the trial is referred to as controlled. The trial was designed as a superiority trial, described in a previous question.² By comparing the intervention with the control treatment, it was possible to establish whether the intervention was superior to usual care in the primary and secondary outcomes.

The control group was followed prospectively at the same time as the intervention group. During the 24 months of follow-up, participants received only the treatment allocated at baseline. The control group is therefore described as concurrent or parallel. It was important that controls were concurrent and not historical—that is, patients who had already completed treatment and been assessed before the intervention group began treatment. Many factors may affect the development of disability and functional decline. In particular, the characteristics of patients, plus the healthcare staff treating patients and their approach to treatment (usual care) may change with time. Therefore, any differences in outcome between historical controls and an intervention group followed prospectively may not be due to differences in treatment but potential confounding factors. In the above trial, participants were randomised to treatment, thereby ensuring similarity between groups in their baseline characteristics. Therefore, confounding was minimised, permitting the inference of causality between treatment and outcome (*a* is true).

The control treatment in the above trial was usual care and its effectiveness had already been established. Therefore, the control treatment is referred to as an active or positive control (*b* is true). When a control treatment has no known therapeutic effects—for example, a placebo—it is referred to as a negative control.

No significant difference was found between the intervention and control groups with regard to disability (primary outcome). It was concluded that there was no evidence of a difference between the new interdisciplinary primary care approach and usual care in effectiveness. Although the statistical null hypothesis of no difference between treatment groups in the

primary outcome was not rejected in favour of the alternative, it cannot be inferred (under the null hypothesis) that the new intervention is as effective as usual care (c is false). Although the trial did not find a difference between the treatment groups, this does not mean that one does not exist. The trial participants were a single sample from the population, and it is not obvious how representative they were. Another sample may give different results. To infer that the interdisciplinary primary care approach is as effective as usual care, a different type of trial would be needed—for example, a non-inferiority trial. Such trials will be discussed in future questions.

To assess the effectiveness of a new treatment, drug, or procedure, it is important that a clinical trial includes a control group as described above. When an intervention is a programme of care, as in the above trial, the control group will typically

receive usual care. More generally, in controlled trials the control group can receive no treatment, placebo, or standard treatment. However, comparison of a new treatment against no treatment or placebo when an already proved treatment exists raises ethical concerns. Obviously, it was not ethical or practical for the control group in the above trial to receive no treatment or a placebo programme of care.

Competing interests: None declared.

- 1 Metzelthin SF, van Rossum E, de Witte LP, Ambergen AW, Hobma SO, Sipers W, et al. Effectiveness of interdisciplinary primary care approach to reduce disability in community dwelling frail older people: cluster randomised controlled trial. *BMJ* 2013;347:f5264.
- 2 Sedgwick P. What is a superiority trial? *BMJ* 2013;347:f5420.

Cite this as: *BMJ* 2013;347:f5718

© BMJ Publishing Group Ltd 2013