Reviewer's report

Title: SMART: Physical activity and cerebral metabolism in the elderly: a randomised controlled trial

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Reviewer: Martin Dennis

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Abstract
I am not entirely clear I understand the method of randomisation as described in the abstract.

Introduction
OK

Methods
It is clear that residents in the assisted living facilities are invited to participate. It is unclear how widely distributed the newspaper adverts are and whether the participants will differ between the two sources of recruitment.

I am unclear whether the group of 5 undergoing pre randomisation measures are individually randomised or randomised as a cluster to one or other intervention – this needs to be clearer. From the description the five patients seem to be allocated to the same treatment group – this in effect a cluster randomisation which has a significant impact on any power calculation. There are only 12 clusters! This does not seem to be acknowledged in the power calculation. Of course if the investigators are simply exploring the effects of exercise on a wide range of physiological parameters then a power calculation is of limited value.

It is unclear how soon after the last exercise session patients will have their outcomes measured. Does this matter? Might exercise simply have a very short term effect lasting hours, or does its effect last days or longer.

This point may be worth discussing

The protocol includes measurement of all the parameters at baseline, after the INT group have completed 12 weeks exercise, and then again after the CON group have completed 12 weeks of exercise. It is unclear what analyses will be performed on the outcomes collected at 3a. If inter group comparisons are made at that point then this would be better described as a cluster randomised crossover study. The issue is then how long any changes resulting from exercise persist. There is no wash out period to account for a persistence of any effect. I think the investigators need to be clearer about what comparisons they will make.

They are collecting a huge amount of data on each patient. They will be making a huge number of statistical comparisons and are therefore inevitably going to identify a lot of statistically significant differences at the 95% level. Whilst the
investigators acknowledge that this study is exploring the effects of exercise on multiple measures, I think this limitation needs to be discussed.

There are several phrases which don’t make sense to me:

• What is “pain catastrophizing”
• What does “This has been shown to extendedly impair objective neuropsychological functions” mean?
• What is meant by “every-life” confounders?
• Voluntariness is not a word I recognise
• What is “regular mental capacity”?
• Instable should be unstable
• Aortal should be aortic
• Not sure what cardiac malformations refers to
• What does “poseyed” mean?