Reviewer’s report

Title: A randomised controlled trial of an Intervention to Improve Compliance with the ARRIVE guidelines (IICARus)

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Reviewer: Miranda Langendam

Reviewer's report:

Research must be described in enough detail to allow users to critically appraise the study design and to assess the validity of the findings presented. To guide adequate reporting a range of guidelines have been published. The ARRIVE (Animal Research: Reporting of In Vivo Experiments) guidelines, published in 2010, are widely endorsed but compliance is limited. The aim of the study described in the manuscript is to determine whether journal-requested completion of an ARRIVE checklist improves full compliance with these guidelines.

As there is a need for effective interventions to improve reporting of research and adherence to reporting guidelines this study is highly relevant.

The paper describes a randomised controlled trial in which manuscripts reporting in vivo animal research submitted to PLOS ONE (March-June 2015) were randomly allocated to either requested completion of an ARRIVE checklist or current standard editorial practice. The main outcome was the proportion of manuscripts meeting all 38 ARRIVE guideline checklist items. Of the 1,689 randomised manuscripts, 1,269 were sent for peer review and 762 (control: n=340; intervention: n=332) accepted for publication. No manuscript in either group achieved full compliance with the ARRIVE checklist. The conclusion is that these results suggest that altering the editorial process to include requests for a completed ARRIVE checklist is not enough to improve compliance with the ARRIVE guidelines.

I have some concerns about the design of the trial and interpretation of the findings, and some questions about the rationale for certain choices in the design and analysis of the trial. The aim of this study was to test the impact on the quality of the published reports of a request to authors to complete the ARRIVE checklist when submitting a manuscript.

I miss a description of how the intervention might work, and what the intervention is. Is it the request itself, or the awareness by making the request that there is a reporting guideline, or the actual use of ARRIVE when reporting? These are all different levels, now 'packed' in one intervention. Completing the checklist before/during submission would mean that all items of the ARRIVE checklist are reported in the manuscript. In my opinion it would not be logical to add an incomplete checklist to a submission, i.e., with items left unreported. But looking at the results this is what has happened. By definition you would expect that adherence to the
intervention would lead to 100% adequate reporting (all items covered). Was the aim of the study to assess effect of assignment of the intervention or the effect of assignment and adherence to the intervention?

The complexity/black box of the intervention, and the feasibility issues (e.g. that manuscripts without a checklist could pass to the next stage) makes it hard to interpret the results. I think the conclusion needs to be more nuanced. Maybe altering the editorial process is not enough to improve compliance with ARRIVE, but it could also be that the outcome assessors were much more strict (and trained!) in when reporting was conform ARRIVE. In that case it's not about the editorial process but about training researchers in adequate reporting, and maybe ARRIVE is too complex.

The type of research is animal studies. Why did the authors select PLOS ONE for this trial? Are the findings generalizable to other journals?

Did the authors consider adding a study arm in which the content was checked against the manuscript?

Randomisation of manuscripts

Following the Cochrane risk of bias tool items: please describe random sequence generation and allocation concealment. Why was minimisation used for country of origin?

Outcome assessment

If I understand correctly, quality of the report is operationalised as full compliance with ARRIVE, meaning that all items are reported in the manuscript. Is there a difference between reporting, and adequate reporting (e.g. in enough detail to replicate the study)?

If items were not applicable, how were they scored?

There might be discrepancies between what authors and outcome assessors consider reporting according to ARRIVE. It could cause bias if this was different between the intervention and control group, but it might create an applicability issue. Did you consider, or investigate that (in a random sample perhaps)?

Secondary outcomes: proportion of publications / studies / manuscripts: I assume the unit of analysis is the submitted manuscript for all outcomes?

What is the rationale for adding the outcomes on Landis criteria?
What is the rationale for the outcome 'proportion of accepted manuscripts'? How is acceptance related to quality of reporting?

Tertiary outcomes: I would consider this as subgroup analyses. What is meant by experimental animal? Animal species? Why is this a relevant subgroup? Same for country of the corresponding author. Why is this relevant? Or is it about non-English versus English speaking countries (as ARRIVE is in English)?

Exploratory analysis (line 241): I don't understand the first bullet point and what is the difference of the second bullet point with the Landis outcome in the secondary outcomes?

Statistical analysis

Line 328: stratified randomisation; this is not mentioned in the Randomisation paragraph.

Why was logistic regression performed with country of origin?

Results

I miss the 'classical RCT table 1' with characteristics of the manuscripts. Why was outcome assessment restricted to the accepted manuscripts? Did you investigate Were the not-accepted manuscript different from the accepted manuscripts? The third secondary outcome (proportion of manuscripts accepted for publication, line 214) cannot be calculated.

Secondary outcomes: line 393: 'increasing significantly from 52.1% in the control group to 74.1% in the intervention group' suggests this was measured in the same manuscripts. More clear is using 'difference between intervention and control group'.

Tertiary outcomes: why only reporting results about mice and rat studies? What about the other species?

Table 1: unclear what post-randomisation and post-acceptance means, and why this distinction is made.

**Level of interest**

Please indicate how interesting you found the manuscript:

An article whose findings are important to those with closely related research interests
Quality of written English
Please indicate the quality of language in the manuscript:

Acceptable

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