Reviewer's report

Title: Comparison of serious inhaler technique errors made by device-naive patients using three different dry powder inhalers: a randomised, crossover, open-label study

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Reviewer: Vanessa McDonald

Reviewer's report:

This study compares inhaler technique errors made with a number of devices, new and old in a group of patients with asthma and COPD. With the emergence of new devices for the management of asthma and COPD studies comparing the efficacy and use of new devices are needed. In this manuscript the introduction and discussion are sound but the methods and results could benefit from review. My specific comments are:

Major Compulsory Revisions

Can the authors be specific about what an asthma and COPD related review of lifestyle is, and is this needed as it appears there are no data reported relating to this? Similarly, a medication review and spirometry assessment were conducted but not reported. Can this data be included in the baseline characteristics? The severity of airflow limitation is known to effect inhaler technique adequacy as does the number of devices prescribed, as such these data would help to better understand the population.

The author should consider rewriting their description of the trial design in particular the description of the cross over design on page 7. Currently lacking detail. Similarly the method for the electronic inhalation profile recorder requires a better description.

The population was recruited from a primary care setting, how was asthma, COPD and overlap defined, was this dr defined or objectively measured? Patients were included if they were using ICS or fixed dose combo, however ICS and FD combo are only recommended in more severe COPD with frequent exacerbations, the proportion of patients with an exacerbation was low, so why was this criteria included and how did this impact the exclusion of COPD patients?

Line 214-244, is difficult to interpret, perhaps consider 'an absence of nurse-observed errors"

LINE 266 - remove 'and trends as 0.05...'

Tables 3 and 4 report the data for the patient errors using the leaflet alone and the leaflet and video. I am unsure why the whole cohort is included in the results
for the leaflet and video, when the methods indicate that those that did not have any errors did not progress to the video.

In the sensitivity analysis the authors report very low preparation errors for the pulmojet, however in terms of the primary end point analysis the pulmojet use resulted in more preparation errors than the diskus, please comment on these findings.

I would like to see mention of what this means for practice, is the pulmojet currently available? What preparations are available in this device, does it have the potential to reduce the number of devices used in both disease?

Minor Essential Revisions
The introduction (line 82) states that breath hold is a common requirement of all devices, however the product info for many devices (DPI) do not require breath hold, I suggest this be removed.

I have concerns about the definition of nativity of device use, I recognise that the authors have pointed to this in their limitations. However, based on this definition, any patient may have had years of experience with one device, but just not in the last year. I wonder if they would reconsider the table of 'naive'.

Please clarify better what the full analysis set means.

Discretionary Revisions
Line 286-288 Awkward language, consider rewriting

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests: Nil