Reviewer's report

Title: Daily activity during stability and exacerbation of Chronic Obstructive Pulmonary Disease

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Reviewer: Marilyn Moy

Reviewer's report:

General Comments
The rationale and justification for the study need more detailed development in the introduction. Why is it important to know what happens to daily activity around the time of an exacerbation?

Similarly, what is novel in this paper compared to what is already published is unclear.

The use of a pedometer in COPD appears to be novel and is brought up a few times through the paper, but there is little attention given to the pedometer. Was it worn with a validated device for comparison?

The decrease in activity at exacerbation is probably overestimated. How do we know subjects didn’t feel well so stayed in bed and didn’t wear the pedometer for the full day and then forgot to wear it when got out of bed, rather than that they wore it for the full day but was not active?

In my opinion the greatest value of this study is that one can monitor persons with COPD and track exacerbations prospectively. This has huge implications for early detection and early treatment of exacerbations. From your rich data in the community, is there any combination off step counts and symptoms that would alert when the patient should contact his provider now rather than waiting?

Overall, the conclusions were overstated based on the results. These are associations found in an observational study in analyses that did not adjust for any possible confounders. Even the strength of association of 0.56 for the relationship between change in step count and recovery time is moderate at best.

Abstract
Intro-rationale for study is unclear
Methods-for how long were subjects followed?
Results: how many of the 73 subjects were frequent exacerbators versus infrequent exacerbators?
Conclusion-it is unclear how the results support the conclusion that frequent exacerbators should be targeted for exercise programs. COPD exacerbations reduced physical activity—I am not sure you have shown this cause and effect. You have shown that frequent exacerbators have an associated reduction in physical activity.
Introduction
1. First 2 paragraphs. There seems to be general summary of COPD. A more focused look at physical activity monitoring in COPD and exacerbations is needed.
2. Again, the rationale for the study is unclear
3. How are frequent exacerbations ‘a stable feature’ of the disease when half your cohort did not experience an exacerbation?
4. The second paragraph about pulmonary rehabilitation is distracting and it is unclear how it contributes to the overall rationale of paper.
5. The third paragraph talks about pedometer versus accelerometer. Is this the point of the paper?

Methods
1. Were subjects enriched (on oxygen, had an exacerbation the year prior to study entry) to have an exacerbation during the study?
2. Time since last exacerbation should be reported.
3. Please provide reference for your definition of an exacerbation. It seems that your definition could easily misclassify the normal daily variation of COPD (due to secretions, air quality, humidity etc) as an exacerbation.
4. Is there any validation of the use of this pedometer in the COPD population?
5. The division of subjects into frequent and nonfrequent exacerbators is unclear. Was this based on number of exacerbations prior to study entry or number of exacerbations found during the 19 month of follow-up?
6. What are ‘changes in exacerbations’ on page 6?
7. How were exacerbations handled if they occurred close together in time-- were exacerbations counted as the same exacerbation or 2 different exacerbations?
8. Definition of recovery requires more explanation
9. The definitions of baseline, stable, and change and how the values for these time periods were derived from the daily step counts need to be made clearly.

Results
In general, the results are not novel and are completely expected.
Were step counts recorded for 17,161 days or for 14,653 days?
It is unclear when the entire cohort is analyzed and presented and when only a subset is being presented.
The data were subgrouped in many ways and this was confusing. Treated versus untreated. Frequent exacerbators versus infrequent exacerbators. Aren’t these both markers of severity?
Isn’t treated and untreated a marker of the severity of the exacerbation? It is not surprising that untreated exacerbations which are milder would have a smaller decline in
activity and a faster recovery.

Discussion:
Are the differences in step counts (370 steps per day) clinically important?

References:
Would discuss in context of Waschki paper on step counts predicting mortality and Moy PLOS One paper on step counts predicting exacerbations.

Legends:
Would put n values for each figure.

Fig 1. What are the predicted values?

Table 1.
Do you know how many participated in prior pulm rehab, how many participate in regular exercise?

Figure 1. Is time 0 study entry?

Figure 2. What are n's? The definitions of baseline, stable, and change and how the values for these time periods were derived from the daily step counts need to be made clearly.

Figure 3. What are n's?

Level of interest: An article whose findings are important to those with closely related research interests

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

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
'I declare that I have no competing interests'