Reviewer's report

Title: Neuroleptic-induced movement disorders in a naturalistic schizophrenia population: diagnostic value of actometric movement patterns

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Reviewer: Michael P Caligiuri

Reviewer's report:

General

This concisely written report describes specific movement patterns derived from actometry in patients with neuroleptic-induced movement disorders (NIMD). The authors emphasized differences among groups with and without akathisia. Quantifying the objective features of akathisia has been a challenge in the past and the present study appears to demonstrate that actometry is a reliable and sensitive method for differentiating subforms of this condition. To the extent that these findings generalize to other settings or lead to improved clinical management of neuroleptic-induced movement disorders, it is important work.

Overall, this manuscript reflects a strong clinical research. The presentation of its findings could be improved by providing more details, specific prevalence data, and more information about the analytic process to back-up the author’s conclusions. The authors need to provide more justification for why they believe actometry is a useful method for differentiating NIA from other NIMDs, particularly in light of their last statement of the abstract: “Careful questioning of patients is a useful method of diagnosing NIA in a clinical setting.”

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

As noted above, the authors do not develop the rationale for this study, assuming only that it is important to differentiate various types of movement abnormalities. The manuscript could benefit from a stronger clinical justification and development of potential applications of actometry in the clinical management of NIMD. For example how would an accurate differential diagnosis benefit the patients affected with an NIMD? Could actometry data drive important treatment decisions?

The actometry procedure itself is briefly described. Sample waveforms or a photo of the device attached to a subject’s ankle would benefit the reader. It is puzzling that given the technology available to the authors, that “raters” still had to make judgments about the existence of activity, the duration of activity, and the existence of rhythmic activity. It would seem that all of this could be easily automated with minimal computer programming. Why do the authors rely on human judgments? This diminishes the usefulness outside of the research
setting. Also, two of the three actometry output parameters are dichotomous variables (presence or absence of activity and presence of rhythmic activity), while a third could be a continuous variable (duration). As described, it is unclear whether the study utilized duration of activity as a continuous variable.

The authors state “patients with severe somatic illness or neurologic illness were excluded”. This implies that some patients with mild-moderate neurologic disease were included. If so, how many, what type of disease did these patients have overt movement disorders and could they have biased the findings in anyway? Is the actometry method capable of differentiating drug-induced from idiopathic or degenerative neurologic disease?

The results section lacks important information to assist the reader in evaluating the generalizability of this research. The data presented in Table 2 should also include the percentages of patients who met versus did not meet criteria for abnormal levels of activity or rhythmic movements (not just the statistical result). I could not locate any summary of findings for activity duration. The ROC curves are confusing as presented. First, the authors use the term lower limb activity index. What is this index and how is it calculated? Second, the ROC curves are seemingly based on a cut-point above or below which patients are classified as normal or abnormal. What are the cut-points for the index, the other three actometry variables, or subjective questionnaire? Is there a threshold that is associated with greater sensitivity (at the cost of reduced specificity) or vice versa? The AUC values presented in the manuscript are unclear. What is being compared? The subjective questionnaire versus actometry? And if values >0.80 indicate acceptable discrimination, then it would seem that actometry offers no advantage over subjective questioning for NIMD, NIP, TD, or PsA and is only useful for NIA. Is this interpretation correct? If so, this should be emphasized in the results, discussion and abstract.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
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What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

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

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a
statistician.

**Declaration of competing interests:**

I declare that I have no competing interests