Reviewer’s report

Title: "OPTImAL": an ontology for patient adherence modeling in physical activity domain

Version: 0 Date: 22 Jul 2018

Reviewer: Zhe He

Reviewer's report:

In the management of chronic conditions, adherence to treatment or physical exercises, which is an important aspect, has not been adequately addressed. This is an important and well-written paper. The introduction section is informative and insightful. The authors did a good job focusing on physical activity and exercise adherence in patients with heart disease and provide a good reason for developing an ontology for CVD patients adherence to physical activity and exercise. The method is appropriate and grounded. The authors searched the related ontologies and identified the gaps in these existing ontologies. The evaluation of the ontology consisted of automated validation by an ontology reasoner HermiT and manual evaluation by domain experts. The reviewer has found a few issues of the paper to be addressed:

Major issues:

1. A recent JBI paper "Amith MF, He Z, Bian J, Lossio-Ventura JA, Tao C. Assessing the practice of biomedical ontology evaluation: Gaps and opportunities. Journal of Biomedical Informatics. 2018:80:1-13" provided a comprehensive review of the existing ontology evaluation methods. For example, Brank et al. "A survey of ontology evaluation techniques, in: Proceedings of the Conference on Data Mining and Data Warehouses (SiKDD 2005), 2005" included a few evaluation methods that may be applied here, e.g., the application-specific ontology performance evaluation and data-driven evaluation. The authors used 4 queries corresponding to 4 evaluation questions. The reviewer is wondering if the evaluation of the ontology can be strengthened.

2. An important feature of an ontology is domain completeness. How was domain completeness evaluated? The reviewer understands that this work built upon a previously conducted literature review [25]. However, as a journal paper should be self-contained. The reviewer is wondering if the authors can elaborate on the findings of the literature review to ensure the domain completeness of the ontology.

3. A very important principle for ontology development is class reuse. It seems that the authors identified a few ontologies that are related to OPTImAL but little is discussed about what classes from which ontologies were reused in OPTImAL. The authors should probably
provide a table to show the number of reused classes from each of the relevant ontologies. Another question is: why were upper level ontologies such as BFO not used in OPTImAL?

4. I am not sure what does "Additional file 2-5" refer to. I could only download and view the Additional File 1.

5. In the section "Validation of the ontology consistency", the authors used HermiT to determine if the ontology is consistent. But there is no mention about the results of the validation.

6. The authors mentioned that the cardiologists assessed the appropriateness of the ontology to be used in planning patient recommendation for a specific regimen. This is sort of vague. More details should be given.

7. Page 12 Line 9: it's not clear what the "abstraction network" refers to. In medical informatics, "abstraction network" of ontologies have other meanings (e.g., https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4742053/). The authors should provide a clearer definition of the abstraction network before using it.

8. Has this ontology been deposited into BioPortal? What is the dissemination plan for OPTImAL? A related question is about the future maintenance of the ontology. Do you plan to incorporate feedback from the research community to improve the ontology?

Minor issues:

1. Page 15 Line 43: "... as many terms synonyms as possible ...." should be modified as "... as many synonymous terms as possible ....

2. Page 10 Line 51: "studies population": should it be "study population"?

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes
Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

Not relevant to this manuscript

Quality of written English
Please indicate the quality of language in the manuscript:

Acceptable

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