Author's response to reviews

Title: Hospital process orientation from an operations management perspective: development of a measurement tool and practical testing in three ophthalmic practices.

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Author's response to reviews: see over
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Concerning: submitting 2nd revised manuscript

Dear Miss Natalie Pafitis MSc

On behalf of the authors, it is my pleasure to resubmit to you the manuscript entitled ‘Hospital Process Orientation from an operations management perspective: development of a measurement tool and practical testing in three ophthalmic practices’ for consideration by the BMC Health Services Research Editorial Board (submission no.: MS: 2810215729029190).

We would like to thank the reviewers again for their constructive and detailed comments, which have led to many improvements to the manuscript. We believe that we have addressed all the comments from both reviewers and hope that you will find the revised manuscript suitable for publication in BMC Health Services Research.

A detailed response to all referees’ comments is appended after this letter. We have written a point-by-point response to the concerns. The changes we have made are beneath each comment of the reviewers in italics.

We look forward to hearing from you.

Yours sincerely,

Marie Louise Hagenbeek

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Referee #1

1. Table 1 is very instructive to understand how OM and QM contributes to the further development of the HPO tool. One suggestion is to make the OM references and QM references more specific. In fact there are 4 categories of references: (1) the items developed in previous BPO/HPO studies (2) OM references (3) QM references and (4) Process Management literature (or another category?). The column names have been modified to: 1. Previous BPO/HPO studies, 2. Operations Management in healthcare, 3. Quality Management in healthcare and 4. Process Management. Furthermore, we provided each column with literature references.

2. Processes can be studied from an organization, division or department perspective. Do the authors believe that their tool (which was tested on a department level), also can be used on a hospital level? This could be clarified in the discussion or limitations. This discussion point was added on page 29. We believe that our measurement tool can be used on a hospital level if the three following variables are included and are dealt with in the study design. The three variables, which play according to our study an important role, are: 1. Type of hospital (academic hospital or not), 2. Discipline (the further away from the care process, the higher the PO score) and 3. Specialty (differentiate between specialties with standard and routine processes and less interaction with other specialties from specialties with non-routine processes and more interactions and collaboration with other specialties).

3. The idea of developing more specific metrics for each dimension (as suggested in the practical implication) is the only way to develop a more objective framework to verify the perceptions of the respondents. The thirteen indicators in this study are not really used for this kind of verification. So I would only state that they are collected for contextual understanding and keep the suggestion to further develop more specific metrics per dimension. We thank the referee for carefully reading our manuscript. Indeed, we have found two sentences on page 26 which suggested the use of the thirteen indicators for testing of the respondents’ perception and acting as a counterbalance for interpretation of the perception. Both sentences were removed.

4. One remaining question is to what extent the tool can be more generalized to other (complex) pathologies with non-routine processes?

First of all, we did not distinguish pathologies. We included all care processes of each ophthalmology department and did not make any exceptions here. As already mentioned in our response on the second comment, we believe that the measurement tool can be used in departments with non-routine processes, or as we called it care processes that are realized and fulfilled after interaction with other specialties. These specialties will have to be treated separately from specialties with routine processes that do not have much interaction with other specialties.

Some other minor remarks:
1. p.17 I am still not convinced that using a 4-point likert scale in the exploratory stage of the study is a good idea, but I accept the argumentation of the authors.

*We thank the referee to accept our argumentation. The focus of this study was on the development of a new and improved measurement tool, to practically test the items in the measurement tool and to give recommendations for further research and development of the tool. Our objective was not to build or express predictions or affirmations based on statistical analyses.*

2. p.21 “In addition, financial and production performance come from the results of management actions and organizational performance. They are not the results of the core processes in healthcare, the clinical interventions”. Are clinical interventions, more specifically the perceived quality of these interventions, not important for the future success of a hospital?

*The use of ‘in addition’ suggests that we are adding a variable which is also important for hospital success. Since this was not clear we adapted this section (page 20-21): “Hence, these indicators do not measure the performance of begin-to-end care processes and have little input for the improvement of internal care processes as both measures are not able to predict the results of the care processes. Financial and production performance come from the results of management actions and organizational performance. They are not the results of the core processes in healthcare, the clinical interventions.”*

*And we added the concern to the discussion (page 27): “Another issue for future research is the complexity of measuring hospital performance, since hospital success and continuity is not only dependent of clinical interventions and financial and production objectives, but also of how well the organization adapts to their external environment or the service level it offers to its clients.”*

3. p.24 The authors write more than a ½ page on a plausible explanation for the fact that the average score of the team leaders in the university hospital was often lower than the average score of the healthcare professionals. I do not find this discussion very relevant for the paper. I would reduce the length of this paragraph.

*The paragraph has been shortened, but we did not opt to remove this explanation because it is important for our discussion about the use of our measurement tool in different types of hospital.*

4. p.28 I would not add the last paragraph (starting with Lillrank and Lukko, 2004). If you want to keep this paragraph in the paper, I would not use it as the last one in the paper. It is not a strong end of the paper.

*We thank the referee for his comment. It is indeed not a proper way to end the paper. The discussion section “Practical implications and future developments (p.26-29)” was substantially amended. The paper does not end with this paragraph anymore.*
1. Authors react to my suggestion (cf. point 3 of my first report) in a good manner. In my opinion, however, one additional and necessary argument on how the link between organizational strategy and implementation is supported by process orientation is missing. How does this work? For example, considering the argument of process orientation being related with more flexibility, an increased reaction speed (to a changing environment) or other operations management; are these even relevant issues?

The comment of the referee has been addressed by adding a new sentence after the sentence “PO has the capacity to function as the foundation for the achievement of operational effectiveness.”

New sentence on page 6:
“This foundation is based on the translation and implementation of organizational strategy into operations (processes) by designing the organization around the core processes and rethinking and redesigning the planning and utilization of organizational resources (Hammer & Stanton 1999).”

Furthermore, we added other effects of PO to the sentence on page 6:
“The design and arrangement of the organization along horizontal workflow processes aiming at linking organizational capabilities to customers and suppliers will improve internal coordination & communication, speed (cycle time), quality, internal & external transparency, financial performance and increase customer satisfaction (Anand & Daft 2007, Kohlbacher 2010).”

2. I accept that authors do not provide a statistical test for a validation. Instead, however, they should provide a clearer description of how such a validation should be conducted in further research. What are the relevant objective measures for the dimensions, beside the already used number of “well-defined care processes” (cf. table 3), that should be considered for validation.

Relevant objectives measures were added to the manuscript. On page 26:
For the PS dimension: ‘the percentage of care process ownership (% of care processes assigned to a process owner)’.
For the PJ dimension: ‘teamwork evaluation’.
For the PMM dimension: ‘access time’, ‘amount of medical errors’ and ‘patient experience’.
For the PVB dimension: ‘internal transparency of objective realization progress’.

On page 27: we described the priorities for validation: “Future studies on the statistical validation of the HPO measurement tool should focus on the reliability, construct validation and convergent & divergent validity of the instrument. This is only possible by examining and assessing the variability and internal consistency of the measures with a much larger sample size. Chen et al. (2004) provided an integrative framework for multi-level construct validation, which can be used as a guide through the statistical validation process.”
3. Based on the fact that the consideration takes place on the departmental level, the departmental level of process orientation is calculated as an aggregation of perceived values of individuals. Using statistical measures (ICC1, ICC2; James measure etc) it is possible to check whether this aggregation is admissible or not. Providing this information would be helpful.

<table>
<thead>
<tr>
<th>University Hospital (N=9)</th>
<th>Eye Specialty Hospital (N=9)</th>
<th>General Hospital (N=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICC(1)</td>
<td>ICC(2)</td>
<td>ICC(1)</td>
</tr>
<tr>
<td>PV</td>
<td>0.337</td>
<td>0.604</td>
</tr>
<tr>
<td>PS</td>
<td>-0.23</td>
<td>-1.282</td>
</tr>
<tr>
<td>PJ</td>
<td>-0.037</td>
<td>-0.121</td>
</tr>
<tr>
<td>PMM</td>
<td>0.015</td>
<td>0.045</td>
</tr>
<tr>
<td>PVB</td>
<td>0.073</td>
<td>0.19</td>
</tr>
</tbody>
</table>

Both intraclass correlation coefficients are included in the table above. The ICC(1) provides an estimate of the extent to which one participant from a group (in our case a hospital) may represent all the participants within the group. The James rule (1982) for ICC(1) is: the larger the ICC(1) the more alike the participants are. In samples of smaller groups (applicable to our research), ICC(1) provides much smaller estimates of between-unit variability (Bliese & Halverson 1998).

The ICC(2) is essentially a value for the reliability of the group (Bliese 2000). The ICC(2) rule: the larger the group size, the larger ICC(2) (Bliese 2000).

In conclusion: sample size has an effect on both intraclass correlation coefficients.

Regardless of the sample size, the practical testing of the measurement tool already concluded that the items in the measurement tool were not always specific enough to the participants. The difference of conception about the item in the measurement tool between participants may have had an effect on the ICC(1) and ICC(2) too.

For this reason, we cannot include the ICC(1) and ICC(2) statistics to the article. There is no statistical power (small sample size) and the formulation of the items used during the practical testing was not specific enough to be assessed for intraclass correlation.

We want to thank the referee for his comment. Thanks to the intraclass correlation coefficients, we now have more indication that the measurement tool performed better in the hospitals where there were few comments and discussion about the items.
4. Authors state – based on a comment of referee 1 – that the term “hospital process orientation” has first introduced by Gemmel et al. in 2008. However, in Vera & Kuntz (2007) this formulation had already been used several times as a synonym for “hospital based organization”, i.e. not at the departmental level. So I suggest a weaker formulation.

We provide a weaker formulation now, and we also give recognition to the other authors and terms they used (page 9). “Andersson (2003) referred to the healthcare organizations that have adopted PO as ‘process-oriented organizational configurations’, Vera & Kuntz (2007) stated that hospitals should implement a ‘process-based organization’ to improve their efficiency and Gemmel et al. (2008) were the first to use the term ‘hospital process orientation’.”

5. I am not fully satisfied with the response to my point 7 (implication); authors should describe more concretely what the potential improvement of hospitals is that also know the process orientation of their departments.

We gave further explanation and hope that the referee will be satisfied with the additions. “Many hospitals are in the process of restructuring and introducing new coordination and skill mix mechanisms in order to integrate units (clinical integration), introduce multidisciplinary teams and resource pooling, which are the basis of process orientation (Lega 2005, Vos 2011). By applying this measurement tool hospitals can classify the perception of process orientation within their organization on the basis of mean values. Consequently, hospitals will be able to identify strong areas of PO within their organizations and areas for improvement. In this manner, the application of this measurement tool enables hospitals to measure the effects of the change processes they applied to become more process-oriented and evaluate how they are evolving towards a process-oriented care delivery.”