Reviewer's report

Title: A large-scale assessment of hand hygiene quality and the effectiveness of the "WHO 6-steps"

Version: 1 Date: 25 July 2012

Reviewer: Dominik Mertz

Reviewer's report:

Szilagyi et al. aimed to qualitatively assess hand hygiene technique of staff at the National University Hospital of Singapore. They provided technique-training and assessed cleanliness by objective UV light assessment with digital photography documentation.

While I appreciate the work of the authors assessing quality of hand hygiene on a large scale, the manuscript in the current version does not convince the reader that a) quality of hand hygiene is important, and b) that the findings of this study may affect patient care and ultimately patient outcomes. I believe that the data itself may be important, but the manuscript needs major revisions to convince readers of the importance. Furthermore, there are methodological issues that need to be clarified in order to assess the validity of the findings.

Overview:

1. Is the question posed by the authors well defined?
   The research question is vague. The authors should clarify the question, and the goal of all the (subgroup) analyses they have conducted, and whether there were any hypotheses behind the subgroup analyses, e.g. that they expected that physicians would have lower pass rates than nurses based on the literature.

2. Are the methods appropriate and well described?
   The methods section is a mix of methods and results. The method section should incorporate a description of the setting of the study (currently basic information in the introduction section), of the intervention (appropriate in the current version), of the assessment (can currently partly be found in the introduction and partly in the methods section), and of the analyses (needs to be clarified, see detailed comments).

3. Are the data sound?
   I do not have any concerns about the data itself.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
   The authors need to rethink how they present the data. They provide the data on a very detailed level, but they need to help the reader focussing on what is important. Currently, the reader might be overwhelmed by the amount of data
with no guidance from the authors in terms of weighting the importance of the findings.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
The discussion is embedded in the results section and very basic. I would like to see more of a discussion of the findings. The conclusions are more of a summary of the study methods than of the actual findings and should be revised (see detailed comments).

6. Are limitations of the work clearly stated?
No. The authors need to add a section on limitations.

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
Yes.

8. Do the title and abstract accurately convey what has been found?
The title is okay, the abstract needs some minor revisions (see detailed comments).

9. Is the writing acceptable?
Yes.

Detailed review:

Abstract:
1. A few issues in the abstract are not clear to the reader, and it may be better not to mention these rather than providing insufficient information. E.g. ‘using novel technology’, ‘objective criteria for failure were defined’ or ‘further analysis of the data did not support many preconceptions regarding hand hygiene behaviour’. (minor essential revision)

Introduction:
2. The introduction is vague and does not support the importance of this study. Basically, the focus of this study is the assessment of the quality of hand hygiene. But the introduction starts with HAI, and many aspects should be moved to the methods section (e.g. setting of the study, how quality of hand hygiene is being assessed). The authors should emphasize the lack of research/focus on quality of hand hygiene, and should provide some evidence on the link of bad quality of hand hygiene with HAI (if they are aware of any) to emphasize the importance of assessing quality rather than just counting compliance with opportunities. (minor essential revision)

Methods:
3. Please rephrase first sentence. Not clear about the role of senior management. (minor essential revision)
4. Unclear who participated in this study. Was it mandatory for staff? How was
this impressive rate of 90% of staff participating achieved? (major compulsory revision)

5. Results should not be reported in the methods section (second paragraph of the data collection and analysis section). (minor essential revision)

6. Why was a p-value of <0.01 regarded as significant and not <0.05 as in the majority of bio-medical research? (minor essential revision)

7. Apparently, a large number of statistical analyses on a large number of subgroups have been performed (probably on the level of each single subgroup of sex, age group and profession). How many statistical analyses have been performed? Were all analyses predefined? If not, they authors need to clarify this and need to document that all statistical analyses are only exploratory in nature. Given the large number of analyses, a p-value of <0.01 may still not be sufficiently conservative. (major compulsory revision)

8. The authors should provide any validity and/or reliability data for the approach used to assess quality of hand hygiene. (major compulsory revision)

Results and discussion:

9. Table 1: can be omitted. Basic information on the age and occupation types in the text would be sufficient. (minor essential revision)

10. Table 2: again, I doubt that readers are interested in this level of information. Better to streamline the information in the table on what is important, i.e. what is mentioned in the text (pass rate according to sex, age group, profession). (minor essential revision)

11. P-values: reporting p<0.01 or <0.001 would be sufficient. (discretionary revision)

12. Please report risk estimates (OR, CI +/- p-values) for each comparison. (major compulsory revision)

13. The authors should provide a kappa or any other estimate of concordance between the on-site team and the elective re-evaluation. (major compulsory revision)

Conclusions

14. The current conclusion section is a summary of what was done, but should be a summary of the take home message, which could e.g. be which particular sex/age groups/professions had the worst results and should be primarily addressed with hand hygiene training. (major compulsory revision)

15. Conclusions should be limited to findings of the actual study. The first sentence should therefore be omitted. (minor essential revision)

Level of interest: An article of limited interest

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