Author's response to reviews

Title: The Impact of Hospital Accreditation on Quality Measures: An Interrupted Time Series Analysis.

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Author's response to reviews: see over
Cover letter (20/03/2014)

Title: An Interrupted Time Series Analysis on the Impact of Accreditation on Hospital Quality Measures.

The following cover letter responds to the reviewers comments (in red).

Version: Date: 17 January 2014

Reviewer: Stuart Whittaker

Reviewer's report:
The article makes far reaching assumptions on the process of accreditation, which cannot be substantiated, based on the evidence provided by a study of a single hospital. Although the study is based on a single hospital, the strength of study lies in the following;
1. The large sample size (over 12,000 patient records were reviewed)
2. The variation and large number of quality measures (27 measures covering various dimensions of quality)
3. The study period is 4 years (48 months)
4. The single hospital provided a controlled environment which is necessary for the time series methodology and permitted the researchers to attribute changes in the quality measures to the intervention of accreditation.
5. The number of observations used in the study is unsurpassed in the accreditation literature. The number of observations in the study equate to 492,480 observations in total.

There was a significant increase in the percentage compliance to quality measures as the facility prepared for accreditation from 72% to > 90% which was maintained during the study period with small variations. It is not clear whether the small negative changes in quality measures were due to random variation, and what their impact was on patient care. However, the maintenance of high percentage compliance > 90% throughout the study period is a positive finding which was not mentioned.

This positive finding was mentioned in the study and documented on page 12 as “However, the figure shows that there is residual benefit from accreditation three years later with performance falling to 20 percentage points higher than the baseline level in 2009.” Although the actual drop in the performance was small in value, this was still statistically significant and therefore it was reported.

Based on the above comment, this sentence has been modified to clearly state this finding as follows “However, the figure shows that there is residual benefit from accreditation three years later with performance maintained at approximately 90%, which is 20 percentage points higher than the baseline level in 2009.”

The United Arab Emirates is a wealth country and cannot be compared to developing countries. Accreditation in a developing country may have a different impact. This study has not taken this into account.
The researchers have not made any comparisons to the developing countries. The study evaluated JCI accreditation which is a voluntary process and is applied in many parts of the world. Over 650 institutions are accredited by JCI as of March 2014 (JCI, 2014). However the researchers have noted this and added the study setting as a limitation.

Although the Interrupted Time Series method approach is promising, it needs to be applied in different settings with sufficient sample sizes to allow for meaningful analysis. In order to use interrupted time series analysis the study environment needs to be controlled during the study period. Therefore the use of multiple locations, multiple hospitals and multiple settings will be challenging for the methodology. Cross sectional analysis will not be applicable due to the study design being a snap shot analysis of accreditation and thus, not appropriate for the study a continuous improvement process such as accreditation. The researchers have added recommendations for the validity of the study to be tested in other settings.

**Level of interest: An article of insufficient interest to warrant publication in a scientific/medical journal**

Based on the literature, this is the first interrupted time series analysis on accreditation, using the large number of observations, quality measures over a lengthy study period. The main limitation being the single hospital study. However, the researchers believe that publication of the study will increase the knowledge on accreditation and furthermore encourage further exploration of the use of interrupted time series analysis when studying quality interventions such as accreditation.

**Quality of written English: Acceptable**

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

The feedback of the reviewer is appreciated. The researchers reaffirm that the statistical rigour and analysis is strength of this study and formed a component of a PhD dissertation.

**Reviewer 2: Marie-Pascale Pomey**

**Methods**

Well described. The only problem is related to the indicators chosen. They are closely linked to the accreditation standards and less on the impact on patient health. It would have been interesting to have a better mix of processes’ and outcomes’ indicators.

The criteria for quality measure selected include the link to a specific JCI standard as the objective of the study was to assess the impact on quality and compliance over the accreditation cycle. Outcome measures were selected and include 7 out of the 27 measures. The challenge with the inclusion of outcome measures is to isolate the change in the measure due to accreditation and not for example, the disease process, comorbidities, the competence of the healthcare professional and other related factors. Thus the seven selected outcome measures can
be directly linked and attributed to a JCI standard. However, the above recommendation was added in the conclusion to the study.

**Results**

It’s not easy to follow the results at the beginning (the first paragraph). I would have preferred to have this paragraph at the end of the results section.

This has been modified as recommended.

**Discussion**

The first paragraph is not relevant in this section. It would have been better to put it at the end of the results’ section as a wrap-up of the section. The results are not completely surprising. It was already known in the literature that they are “un effet soufflet” after the accreditation visit. What is interesting here is that it’s very well documented.

This has been modified as recommended.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

The reviewer’s comments are highly appreciated and all efforts have been made to address the recommendations. It is believed that this study will add value to the literature base on accreditation as it is the first study on accreditation to use interrupted time series analysis. Additionally, to the best of our knowledge, the study is also the first to evaluate accreditation throughout the accreditation cycle. The comparison of pre-accreditation and post-accreditation periods is unique, as it is frequently challenging to have valid and complete pre-intervention data that is consistently available throughout the study period. Thus, many researchers select for cross sectional designs which are limited in their ability to study time limited interventions and demonstrate causality.