Author's response to reviews


Authors:

David Gathara (dgathara@nairobi.kemri-wellcome.org)
Mike English (menglish@kemri-wellcome.org)
Michael B.V Hensbroek (mbvh04@gmail.com)
Jim Todd (Jim.Todd@lshtm.ac.uk)
Elizabeth Allen (Elizabeth.Allen@lshtm.ac.uk)

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Author's response to reviews: see over
22nd January 2015

To: The Editors,
    Implementation Science

Re: MS: 5780462951493814, Gathara. D & colleagues


Dear Colleagues,

Thanks you for reviewing our submission and for returning the reviewers comments. We have addressed each of these as outlined in the accompanying pages. We now provide an updated version of the manuscript. We have also proof read the manuscript and all typographical errors have been corrected

We trust these amendments are acceptable and look forward to hearing from you,

Best wishes,

David Gathara, on behalf of all authors.
Response to reviewer comments

Reviewer 1:
Thanos Athanasiou
Reviewer's report:

Thank you for the opportunity to review this manuscript this is a well written paper and I recommend acceptance following minor revision

My minor criticisms are the following:

1. The figure does not add any value
   Author's response
   We thank the reviewer for this comment and we have now excluded the figure from the manuscript.

2. The discussion will be benefit from a section describing the advantages and disadvantages of the study
   Author's response
   We thank the reviewer for this comment and we have now included sub-headings for strengths and limitations and expanded text to reflect this recommendation.
   Discussion, page 9
   “Strengths
   Our study provides ICC estimates for the acute illness episodes we examined at hospital level that are often lacking for low income settings. Availability of these estimates should help inform sample size and power calculations for appropriate study designs addressing a recognised challenge of extrapolating ICC estimates to different contexts.[29] [23] Secondly our sample of 22 hospitals is arguably large compared to other studies on quality of care assessment in low income settings. Finally by demonstrating the sources of variation, this study highlights the need to understand practice variation in-order to target interventions better.
   Limitations
   The data we report needs to be interpreted in light of the following limitations. Firstly, this is exploratory work based on a relatively small number of sites, observations and indicators. Paterson and Goldstein suggest at least 25 observations from 25 clusters[30] while Donner and Klar recommend at least 40 clusters[31] for meaningful interpretation. Our estimates from 22 clusters therefore need to be interpreted with caution and there are further challenges when attempting to estimate variability at the clinician level as 16% to 34% of the clinicians contributed just one observation per indicator. Similar challenges in reliably estimating variability have been reported by Fung[32] and Huang[33]. We also introduced hospitals as a random term although hospitals were not from a random sample. However, we tested the validity of this approach by undertaking a Hausman specification test[34][35] that provided evidence to support this approach across all outcomes.”

3. Some minor typo error in page 7 such a the word patents to be corrected to patients
   Author's response
   We thank the reviewer for this comment and we have now revised the text and corrected the typographical error.

Results, page 7
“........This suggests the clinician level also explains a sizeable amount of the total variability observed. Adjusting for patient level and clinician level covariates did not alter this interpretation on the sources of variability.”
Reviewer 2:
Sanjay Patel
Reviewer's report:

This study looks at the variability in adherence to pediatric guidelines across a large number of hospitals in Kenya. Although there is published literature on adherence with guidelines in low-income setting, there is a paucity of pediatric literature which tends to focus on HIV. Most studies tend to focus on adherence within a single hospital and few studies try to quantify the impact of both organisational and individual clinician variation. These aspects make this study unique and extremely interesting.

Major compulsory revisions

Minor essential revisions
Multi-level modelling techniques have been used to analyse the results of this study. Unfortunately, I am not in a position to comment on the validity of this analysis because of my lack of experience with this form of modelling. I would recommend that the manuscript is seen by a specialist statistician.

If they agree that the results and analysis are valid, I would have no objection to the manuscript being published with minor revisions

Includes interpretation of analysis section paragraph 3:-

"The XTMELOGIT procedure in Stata version 13 for binary outcomes was used for multilevel modelling. The ICCs were calculated using the latent variable method supported by Snijders and Bosker that converts the level 1 variance from the probability scale to the logistic scale on which level 2 (clinician) and level 3 (hospital) are expressed. The standard logistic distribution has a variance #2/3 = 3.29 and hence this can be taken as the level 1 variance. Since level 1, 2 and 3 variances are on the logistic scale, the following formula was used to estimate ICC at different levels:

- ICC hospital = variance hospital/ (variance hospital + variance clinician + 3.29)
- ICC clinician and hospital = (Variance clinician + variance hospital)/ (variance hospital + variance clinician + 3.29)

I cannot comment on this.

Author's response

We thank the reviewer for this comment and acknowledge the technical nature of this paragraph. We now provide a more simplified non-technical paragraph below to help the reviewer understand the computation of ICCs.

Methods, page 7

The ICC is defined as the ratio of the between-cluster variation to the total variance (both between and within clusters). So in our case we expect to have variation at the patient level (level 1), variation at the clinician level (level 2) and variation at the hospital level (level 3).

In binomial (logistic) regression models, the coefficients determine the variation in the dichotomous response, which is linked to the covariates by a latent variable (log odds of success). The approximate variance of this latent variable is \( \pi^2/3 = 3.29 \). This value of 3.29 is supported by the latent variable method by Snijders and Bosker which explains the process in which the level 1 variance from the probability scale is converted to (and approximates \( \pi^2/3 = 3.29 \)) the logistic scale. This rule also applies to multilevel models, but only to their level 1 latent
variable residuals because the variances at level 2 (clinician) and level 3 (hospital) are expressed on logistic scale. Therefore the level 1, 2 and 3 variation is now on the logistic scale (same scale) which allows us to estimate the ICCs or the proportion of variation explained at each level.

Methods – covariate definitions. Error in the data presented “For clinician characteristics, cadre was collapsed into the main cadres in hospitals; clinical officers (62%; 180/291) and medical officers (38%; 181/291 which included 3 clinicians with specialised paediatric training).” The proportion of medical officers is 38%; 111/291.

Author’s response
We thank the reviewer for this comment and we have now revised text as outlined below.

Methods, covariate definitions, page 5
“For clinician characteristics, cadre was collapsed into the main cadres in hospitals; clinical officers (62%; 180/291) and medical officers (38%; 181/291 which included 3 clinicians with specialised paediatric training). Similarly only 16% (46/290) of the clinicians had 2 or more years’ experience and therefore experience was coded as a binary variable representing internship (0-1 year, 244 (84%)) and post internship (2 or more years, 46 (16%)).”