Reviewer's report

Title: Deciphering risk factors for blood stream infections, bacteria species and antimicrobial resistance profiles among children under five years of age in North-western Tanzania: a multicentre study in a cascade of referral health care system

Version: 0 Date: 02 Dec 2018

Reviewer: Michael O. Esan

Reviewer's report:

I would like to thank the authors for submitting this article for review. Determining the prevalence and antimicrobial profile of BSI in NW Tanzania is important to guide clinical management and improve patient outcomes, thus represents an important gap in current knowledge. However I do have some concerns about the study which I would like the authors to address before making my recommendations.

Major concerns:

1. Study design- to do an assessment of risk factors, you have to compare 2 or more groups and find out the relationship between an exposure and an outcome. This could be prospective or retrospective, such as case control studies. Your study design which is a cross sectional analytic study can only determine the prevalence of a problem, not risk factors. So by definition, the title of the study is misleading. The factors identified in your study may be associated with a higher prevalence of BSI's and mortality but cannot be labeled as risk factors for BSI's.

2. From your sample size calculation, a minimum of 106 per site and 424 in all 4 sites, however one hospital has a bed capacity of 88 and recruitment was disproportionately done from the different hospitals with over half of the total study population recruited from the tertiary hospital. Why was this the case? could another urban hospital (apart from NDH) with appropriate capacity (>106 beds) have been used based on the sample size calculation? why wasn't an equal number of children selected from the different hospitals per the sample size calculation?

3. Are the results of this study generalizable? the prevalence of mortality at the district (8.3%) and regional hospital (6.4%) are very similar to numbers quoted in previous studies, while more than 50% of your study population are from the tertiary hospital (BMC)- which is responsible for majority of your positive blood cultures and mortality, and also has the highest prevalence (20%). As alluded to in your discussion, line 403 states that the preponderance of BSIs attributable deaths among children at BMC may be
related to the fact that this hospital takes care of critically ill children as well as children with underlying risky conditions who are referred from other health care facilities for tertiary care. These results may not be a true representation of the prevalence of BSI's in NW Tanzania, as majority of the study population represents a higher risk group.

Minor questions:

1. Could a study diagram be included to show the recruitment process and how patients were excluded, etc.

2. Line 96: 58 were excluded due to incomplete information in questionnaires or clinical files- what other exclusion criteria were used?

3. Table 2: definition of underweight, normal weight and overweight using WHO charts- weight for age <3rd or 5th percentile? >97th percentile? this should be clearly stated in the paper.

4. Table 2: definition of malnutrition, prematurity, anemia? what kind of congenital anomalies were seen?

5. What is the relevance of domestic or pet animal at home as a demographic characteristic in table 2?

6. Table 2- was antibiotic use prior to admission?

7. How many children from your total N for each site had blood cultures done?
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

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

No

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

No

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.

I am able to assess the statistics

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