Author’s response to reviews

Title: The link between mental health and safe drinking water behaviors in a vulnerable population in rural Malawi

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Version: 1 Date: 18 Oct 2018

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Response to Reviewers

PSYO-D-18-00080

The link between mental health and safe drinking water behaviours in a vulnerable population in rural Malawi Jurgita Slekiene, MSc.; Hans-Joachim Mosler BMC Psychology

Reviewer reports:

Robert Dreibelbis (Reviewer 1): The link between mental health and safe drinking water behaviours in a vulnerable population of rural Malawi

This article presents the results of a mediation analysis assessing the relationships among behavioural determinants of safe water practices, mental health, and self-reported behaviours. While the article presents an important contribution to the field, I think it could be significantly improved by restructuring the introduction, providing more details in the methods, and providing more details in the results.

Introduction

The introduction goes back and forth between presenting the overall argument for the study, presenting details of the study, and presenting the background of the conceptual models underlying the analysis. The challenge, however, is that details of the study are presenting intermittently throughout the entire introduction. For example, line 54 presents details on the aims of the study - but sentences before and after are all focused on the burden of mental health illness. Study is again presented at line 81, and then information on the links between mental health and behaviours in the same paragraph. Would strongly recommend streaming and re-
organizing to present on 1) the background and scope of the problem, 2) how the current study will address the issue, and 3) the conceptual background of the study.

→ We reorganized the introduction as suggested above

Methods

Details on sample characteristics are more appropriately presented in the results section (perhaps this a PH convention and psychology works differently)

→ Details on sample characteristics are now presented in the results section (line 181-186)

Please specify how variables such as hunger, diarrhoea, anxiety, wealth index, etc were all collected as part of the study, analysed,

→ We specified how following variables: hunger, diarrhea, anxiety, wealth index were collected and how those variables were analysed (see table 1, line 160, contextual factors)

Please make sure that your primary outcome measures are clearly defined and described in this section. For example, drinking water collection is not well defined and it's not clear how this was defined in relation to general water collection, how it was collected, etc. Make clear what is self report and what is a primary outcome that was observed. Safe transport and storage with a lid seems to be a composite variable of both self report and observed data?

→ We clearly defined our primary outcome measures and described them in a methods section. (see line 149-152)

→ For safe transport and storage, first we did observations (availability of specific water container with lid) and only owners of specific containers with lid for safe water collection, transportation and storage were asked (self-reported) how often they transport water in a specific container with lid. That’s why we have different samples for water collection behavior (all participants included in a sample) and for safe drinking water transportation and storage behavior (only owners of as specific container with lid).

As a mediation analysis, please provide more details on the methods used here. It's difficult to understand how the methods can be interpreted without adequate description of what the mediation analysis actually does. Even if this is provided as a annex, more details are needed beyond just a macro.

→ We provided more details on moderation analysis (line 170 to 179).
When the authors say that the cut off point for validation was >7, does that mean you defined a binary variable for good and poor mental health based on this score? If so - suggest just making the variable definition explicit.

→ Yes, we defined the binary variable for good and poor mental health based on score 7 (more or equal to 7 = poor mental health, above 7 = good mental health). We made variable definition explicit (see line 157 to 159)

Results

Water collection: why is the N different for each of the variables in Table 3? It's unclear why there would be a different number of respondents for each of the questions here. If collection is self report, this looks like a potentially skewed distribution. While I understand that ANOVA is an easy approach with Lichert type variables - have the authors considered alternative approaches that more appropriately reflect the categorical / count nature of the data.

→ For water collection from safe water source we assessed all sample included in our study (there are some missing data), for transportation and storage we performed observations and only owners of a specific container with lid (N=171) were asked how often they transport and storage water in a specific container with lid (see Table 3, line 219). The results in Table 3 now are represented more clearly.

→ Yes, we used ANOVA mean comparison analysis method to compare two groups: poor versus good mental health. It is a limitation of a study.

Suggest a more quantitative discussion of the results from RQ1, rather than just higher and lower. Your betas would be average increase in the self-reported water collection practices, correct? Results are described as collecting more safe drinking water - however, this is a bit tricky since more could be defined both in terms of quantity and frequency. Rather than "collect more" would it not be more appropriate to say they report collecting more often from a safe source? ‘Report collecting more often’

→ We added more quantitative discussion for RQ1 (see line 257 to 261).

RQ2: what was the actual observed difference here? Why was a different modelling strategy used than RQ1 since it was the same outcome measure, correct?
For RQ1 we included all study participants irrespective their mental health condition, mental health was not included at all in to analysis (see line 230 to 231), and for RQ2 we tested the relationship between mental health (binary variable) and water collection behaviors.

RQ3: results from the mediation analysis are not fully articulated. Please provide a more quantitative description of what these results mean and how they should be interpreted. Please double check that the factors described in the text align with the factors presented in the table (for example - severity for table 7 has the information associated with other's approval). In general, I'm not sure if there is a need for more information on the methods earlier or more information here to make the results here a bit more digestible.

We added more interpretation as suggested (see line 329 to 333 and 364 to 368).

We did a corrections, e.g. severity and other’s approval descriptions are in line with numbers in table 7 (line 338). Thank you for your advise.

We added more description in methods (line 170 to 179) and in results sections (line 296 to 308).

Reviewer 2 (Reviewer 2): PEER REVIEWER COMMENTS: To view the full report from the academic peer reviewer, please see the attached file.

REVIEWER COMMENTS FROM REPORT: This seems like a study that was undertaken well - all the usual expectations of rigour seem to have been applied. The writing style is appropriate and the statistical analysis is good. So on first read, all the usual expectations are met. However, after reading the paper a couple of times, I found myself thinking 'so what?'. I did not really 'get' the point of the paper - the authors have undertaken a very thorough piece of research, but they did not articulate the possible mechanisms linking mental illness to water/sanitation behaviour (WASH). So whilst I could read the various statistical associations, I was left wondering what 'caused' what - in what ways are WASH and mental illness related - does one cause the other, is there some kind of negative feedback loop etc? Without having some ideas articulated by the authors, it's very hard to think of the public health implications - i.e. what would policy makers and practitioners do with the information in this paper? So whilst I thought the nuts and bolts of the research are good, the authors need to more fully explain the links between WASH and mental illness, to allow the reader to make sense of the findings and implications.

We added full explanation about the link between mental health and WASH (line 46-49, 67-70, 91-96, 468-472, 485-495)
REQUESTED REVISIONS:

I have outlined above the needs for the authors to explain the links between mental illness and WASH in the early sections of the paper (possibly on page 3) - both the direction of association and evidence for 'causation'. Based on this, there needs to be a clear set of public health implications in the Discussion section - will improvements in mental health services and mental illness prevention lead to better WASH outcomes, or should policy focus on WASH in order to improve mental health? These are the implications that policy makers need to think about.

→ We added set of public health implications in the conclusions section (see line 485 to 495).

When the authors first describe RANAS (page 4), its quite difficult to grasp, so maybe a diagram to show how the 5 blocks of factors link with the 3 context factors?

→ We reformed the description of the RANAS model in the introduction and hope that it is easier to understand (see line 77 to 90).

In Study Design (page 5), it is stated that the study had "sample statistical power" but there's no evidence provided for this - was a power calculation undertaken a priori to determine the required sample size (and was it achieved) - this requires explanation.

→ We added a priori sample size calculation explanation in study design section (see line 110 to 112).

The second sentence in Study Design does not seem relevant to that section (beginning with "Differences in health...."). There are multiple references made to "rapid spot-check observations" although these are never described - what are they and why are they important for this paper?

→ We deleted the second sentence in study design section.

→ We left only term ‘observations’ (observation of availability of specific water container with lid for safe water transportation and storage).

The actual sample size differs throughout the paper - 641 in some places and 638 in others - this needs to be made consistent.

→ We made the sample size consistent (N=638). Thank you for your advise.