Author's response to reviews

Title: Challenges and Opportunities for Effective Adoption of HRH Information Systems in Developing Countries: National rollout of HRHIS and TIIS in Tanzania

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Author's response to reviews: see over
Dear Editor of the Human Resources for Health,

We hereby submit the revised manuscript of MS: 1098646867147561, “Challenges and Opportunities for Effective Adoption of HRH Information Systems in Developing Countries: National rollout of HRHIS and TIIS in Tanzania”, based on the instruction from the Journal Editorial Office.

We hope that the revised manuscript covered all requirements for peer review process.

Thank you for your consideration of the manuscript.

Sincerely,

Hisahiro Ishijima
Response to the comments on HRHIS/TIIS Manuscripts Resubmission

1. Under data utilization training (DUT) there is a mention of "effect size". This term is not clear and well defined and the statistics related to it also needs clarity. I wonder how this relates to models of measuring training effectiveness such as Kirkpatrick's model.

Added the following sentence, and references:
“Effect size” (d) is calculated from the average of the post-training assessment scores minus the average of the pre-training assessment scores divided by the standard deviation of the two conditions (Thalheimer and Cook, 2008; Becker, 2000).


2. Under maintenance phase there is mention of interoperability but the relation of HRHIS and TIIS to the overall health information system (HIS) is not described and there is no reflection on this in the discussion section. In several countries, integration of the HRHIS into the HIS proved to be a daunting challenge and the weakness of the latter often jeopardize the effectiveness of the former.

Currently, MoHSW is strengthening its HMIS, which includes the adoption of District Health Information System (DHIS2) software as the national HIS data warehouse. All routine health data from health facilities are reported through the national DHIS2 server at the district level. Since all systems are centralized at the MoHSW server, DHIS2 software is linked to HRHIS to import aggregate data for calculation of HRH related indicators based on HMIS data. The interoperability mechanism between these two systems is designed from the begging since they are developed and supported by the same technical team. Moreover, HRHIS and TIIS are also developed on the same platform and designed to communicate with each other from the beginning of the project. Therefore, in our case it will not jeopardize the effectiveness of HMIS. To avoid the complication of data sharing among the existing system and other that might be developed in the future, TIIS and HRHIS have special module for data exchange using Application Programming Interface (API), which does not require the knowledge of how the other systems coded prior to data exchange.
3. Under discussion section there is mention of the effects of HRHIS and TIIS on planning and decision-making. However, an elaborate description of the impact with some illustrative examples on benefits of HRHIS and TIIS is lacking. What practical changes in HRH or health system resulted from the application of the system??

Due to the decentralization of the country, planning of health sector is done at each level of the health system. Each year CHMT must develop “Comprehensive Council Health Plan”; RHMT must develop “Regional Annual Health Plan”; and the Central level must develop “Midterm Expenditure Framework”. All health plans at different level has the component of HRH recruitment, which are informed by the data generated from these system. Likewise, HRHIS has made it possible for each CHMT to realize its actual HRH personal needs; allocate and reallocate personnel to health facilities based on demand and expertise; and to manage day to day HRH activities based on valid information. Reporting of HRH information to the MoHSW and the POPSM is done annually and has been a very time consuming, costing and tedious job to do every year. Yet, the information submitted has been of low quality and difficult to assess on its manual system. The HRHIS has simplified and improve the reporting process and the data can be validated centrally.

4. Under the development phase and later in the discussion, there is no mention of the contents of the HRHIS and TIIS e.g. the minimum data set developed and agreed by the stakeholders. This is an essential aspect and readers might want to know how the data set was developed and agreed and how challenges of harmonization were addressed

The first version of HRHIS was piloted with 17 fields as a minimum dataset. However, since the system had been developed and deployed using user participation and iterative approach the dataset has been periodically revised and improved to the current one with 32 fields. These data include employees’ personal details; education and professional details; contacts information; employers information; employment history and status; in-serving trainings; salary scales; and duty post.

5. Although some literature was referred to in the paper, one feel that important literature was not adequately reflected especially in relation to experience of some developing countries with HRIS and the challenges involved. More than half of the references referee to reports from ministry of health. The paper could have benefited from a comparison and contrast with similar country experiences.
We added some more literatures, studied in developing country settings. However, papers related with national expansion of HRH information system in African settings is very few, and those are written on piloting their system in limited areas, not national expansion of the information system. Additionally, many of them were written on Health Management Information System (HMIS), not HRH information system. HRH information system could be a part of HMIS but characteristically different form HMIS. That is why need to establish separate information system apart from HMIS.

6. Use of abbreviations needs to be revisited e.g. some abbreviations are not spelled when first appearing "RHMT??" and some like SS for supportive supervision might not be appropriate.

   - Found first appearing points and retyped as “Regional Health Management Teams (RHMTs)”
   - “SS “ is retyped as “supportive supervision”

7. I suggest that, the section under Discussion and Evaluation be restructured to address Discussion only. I see that if you want to discuss the Evaluation of the two systems then you better put it as another phase after the Maintenance phase. If this is not appropriate then just delete it as I don't see much content on it!

   “Evaluation” is deleted.

8. This is a very descriptive piece of work and a lot of detail has been incorporated. However, one of the critical issues of data collection and data entry is data quality and validity check. Not much has been mentioned of this critical aspect of the workflow. I recommend enriching the readers with the experience faced in validating the data and detailing the quality control checks put in place to address the same.

Integration of system application and making one system was not realistic approach as expectations of funder of the system, custodian of the system, and system developers were different. Therefore, communication among information systems and integration of data collection forms to cover all data sets for all information system was thought and implemented for “one entry, multiple exit (sharing data sets among different information systems)” strategy.

Validating the data was one of the key areas to establish functional HR information systems. HRHIS and TIIS have a function to validate entered data with key data sets for reducing duplication and mistakes of data entry.
Another way of validating the data is communication with other systems, especially on public servants information with Human Capital Management information system (HCMIS), which is owned by President Office-Public Services Management. HRHIS communicate with HCMIS.

9. Following on the point above, and referring to the last para of the Introduction section "The authors think it is better that “success” of the information system is defined as “the information systems are understood, adopted, and utilized by the users at each level”.". The authors’ views on agreed standard of data quality and how is this addressed in the development, rollout and maintenance phases.

Based on the literature on the success of information systems, system and data quality has been identified as been key contribution criteria. (33, 34) HRHIS was developed and implemented with this aspect in mind. System quality was ensured through iterative and use participation approach, which made sure the systems, works and communicates as per users’ expectation. Through users feedback a number of improvements were done to ensure friendliness and simplicity in usage together with incorporating new requirements introduced by users. The system was made more dynamic and flexible to allow changes without technical difficulties like adding new facilities, missing options fields, and defining indicators. Likewise the system was centrally installed as a means of synchronizing requirements and changes with minimum efforts.

In terms of data quality, a number measure were implements both in the technical and user aspect of the system. Users were given refresher training to ensure the collect and enter correct and relevant information; most of the entries were provided to users as drop-down options and some restrictions were implemented like unintentional deletion of data. A separate data quality checks module was introduced which checks validity of entered recorded based on pre-defined criteria. For example, to avoid double entries, salary number were made primary key; to avoid using same name with different salary numbers, name comparisons were made and alert given; and to ensure proper recoding on data of birth, date of employment and promotions, these field were compared and differences calculated.

10. Data elements- I recommend including an overview of the 'agreed data elements' to elaborate the scope of the data and the information systems.

Add List of data elements for HRHIS: first name; middle name; surname; date of birth, sex, marital status, nationality, religion, basic education level, Professional education level, number of children/dependents, district of domicile; Check number Employer’s file number, registration number, terms of employment, profession, present designation, superlative substantive position, department, salary
scale, monthly basic salary, date of first appointment, date of confirmation, date of last promotion, employer, employment status, registered disability, employee contacts, next of kin, relations with the next of kin and contact of the next of kin

11. Please elaborate on the statement in the Pilot phase section “In addition, some basic data elements were not always needed for HRH management at district level, while other elements were demanded.”

Add example of data elements that are not always needed and add example of data elements that are demanded by users

12. It would be beneficial to include some explanation on the profile of those involved/assigned to the various teams mentioned throughout the text.

The reason for targeting CHMTs and RHMTs is because CHMT is responsible for recruiting and management of HRH and social welfare staff for district level health facilities. RHMT is responsible for recruiting and management of HRH and social welfare staff for regional referral hospital.

13. In Maintenance phase section- criteria for student selection to undergo the training program-Health Systems Management degree?

There are no selection criteria as “all students who are studying in Health Systems Management degree “ are trained on HRHIS and TIIS operation as well as data utilization of the two systems.

14. In addition to the illustration, it would be beneficial to include a screenshot of the system or perhaps a graphical overview of the core data.

Add screenshot of HRHIS and TIIS as figures
http://hrhis.moh.go.tz/hrhis3/login
http://tiis.go.tz