Author's response to reviews

Title: Knowledge and Attitudes of Doctors towards E-Health Use in Healthcare Delivery in Government and Private Hospitals in Northern Uganda

Authors:

Geoffrey T Olok Mr (go.tabo@gmail.com)
Walter O Yagos Mr (yagos.wo@gmail.com)
Emilio Ovuga Prof (ovuga@gmail.com)

Version: 3 Date: 25 July 2015

Author's response to reviews: see over
CORRECTION FOR REVIEWERS COMMENTS [REVIEWER 1] AND [REVIEWER 2]

Review comment: an introduction section should be added before background. In the introduction, the authors have to add the main contributions of the paper, the objectives and the point to treat in the next sections.

Introduction: introduction section was added following reviewer comment as below: it contained the main objective, specific objectives, contributions of the study and points to treat in the next sections.

The main objective of this study was to determine the relationships between health professionals’ attitudes towards e-health, level of ICT skills and e-Health use in healthcare delivery in government and private hospitals in northern Uganda. The current study focuses on examining healthcare professionals’ attitudes towards e-health attributes, establishing the levels of ICT skills and levels of ICT usage among healthcare professionals. This study provides valuable insight about the status of healthcare professionals’ attitudes towards e-health, levels of ICT skills, levels of ICT usage and it provides insight about factors which influences adoption of e-health. The remaining sections in the study discussed the background, study methods, results, discussion, study limitations and conclusions.

Review comment: authors have added more future research as below.

1. The small number of healthcare professionals who participated in the study threatens the validity of the results, which should be validated with a larger sample probably distributed through a larger geographical area.
2. Future research should focus on examining healthcare professionals’ attitudes toward a single innovation or closely related ICT rather than all the ICTs in hospitals.
3. We also recommends the use of qualitative method for examining factors that influence adoption of e-health, especially study which will consider using Diffusion of Innovation Theory (Zhang et al, 2015) [see limitations section]

Review comment: some references should be updated for example (24) and (25).

References number (24) and (25) have been updated with the new references below:


Review comment: Table 4 and 5 should be more explained using illustrations.
For Table 4, under access to computer and internet by healthcare professionals, figures and illustrations were added in the results as in the descriptions below.

**Access to computer and Internet by doctors**

In total, 39 healthcare professionals accessed computer (57.4%) and 29 (42.6%) do not. Further, 33 (48.5%) accessed Internet while 35 (51.5%) do not have access to Internet in hospitals. Proportionate to the number of response by gender, more female 10 (62.5%) than male at 29 (55.8%) have access to computer. Though there were three times as many male doctors as females, in the results, it appear that female 10 (62.5%) healthcare professionals have access to Internet in the hospitals slightly more than their male 23 (44.2%) counterpart. It is also noted that the use of computer 20 (60.6%) and Internet 17 (51.5%) in the hospitals are widespread among relatively young healthcare professionals with age range between 21 - 40 years, followed by age group 21-30 years where 16 (55.2%) used computer and about 14 (48.3%) used Internet. Surprisingly, healthcare professionals above 50 years of age, all used computer 2 (100%) and Internet 2 (100%). Healthcare professionals falling between 41-50 years rarely use computer 1 (25%) and Internet 0 (0%). Majority of medical officers have access to computer 17 (73.9%) and Internet 18 (78.3%), followed by medical officer special grade where out of three healthcare professionals, 3 (100%) accessed computer and 2 (66.7%) accessed internet. Surprisingly, majority of Interns doctors do not have access to computer 17 (60.7%) and Internet 20 (71.4%) in the hospitals. Internship is a period of intense practical and theoretical learning, and a time when to read widely. Lack of access to computer and Internet facilities is surprising and potentially undermines the quality of effective training and learning during internship. It is curious that more female doctors have access to computers and Internet facilities than male doctors. It is not clear if this is a function of interest or ownership of e-health facilities. The data also revealed that there is somewhat chance that access to computer and Internet relates with rank of healthcare professionals. It also appear that access to computer and Internet may increase with the level of seniority in hospitals.

For Table 5, a summary Table was added and readers referred to details in Appendix A. Interpretations of the data are presented for each attributes for clear illustrations as in the descriptions below.

Table 5 shows attitudes of healthcare professionals towards e-health attributes (see details in appendix A). In the results, healthcare professionals’ mean attitude scores revealed that healthcare professionals had positive attitudes toward ICT relative advantage (mean 4.3), somewhat positive attitudes towards ICT compatibility (mean 3.8), trialability (mean 3.2) and observability (mean 3.5).

<table>
<thead>
<tr>
<th>e-health attitudes</th>
<th>Total mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5 Attitudes toward e-health attributes
ICT Relative advantage | 4.3
Compatibility | 3.8
Complexity | 2.9
Trialability | 3.2
Observability | 3.5

Based on the scale and questions asked for complexity, health professionals also had somewhat positive attitudes toward ICT complexity (mean 2.9). When strongly agree and agree scales for relative advantage were combined, there were agreement on some important encouraging themes that using ICT improve job performance (95.6%), enhance effectiveness on the job (92.6%) and that using ICT make them do medical work easily (89.3%). For relative advantage, about 72% – 95% of healthcare professionals had positive attitudes towards ICT relative advantage. When strongly agree and agree scales were combined for compatibility, healthcare professional generally agreed that ICT fits well into their work (80.9%), fits well with the way they like to work (77.9%); completely compatible with current situation (67.6%) and it is compatible with all aspects of their work (64.7%). Complexity contained negative questions and when strongly disagree and disagree were summed, it clearly indicates that healthcare professionals do not consider using ICT as cumbersome (66.1%), require lots of mental efforts (60.3%) and frustrating (51.5%). For trialability, healthcare professionals agreed that they always tryout ICT applications before using it (66.1%) know where they can go to satisfactorily tryout ICT (55.8%) and have opportunities to tryout ICT applications (53%). Similarly, healthcare professionals agreed that they see what other hospital staff do with ICT (79.4%), see how ICT is being used for many tasks (72%) and that it is easy to observe people using ICT in hospitals (55.9%).

**REVIEWER 2**

**Comment:** Insignificant contribution of relative advantage

In the descriptive analysis (see Table 5 and appendix A), majority of healthcare professionals generally had positive attitude towards e-health attributes. These include positive attitudes toward relative advantage, compatibility, complexity, trialability and observability. Despite results of descriptive analysis, regression analysis showed that all these variables insignificantly contribute to e-health usage. Instate, ICT skills which was added to the model appeared to be the most important and significant predictor of ICT usage by healthcare professionals in hospitals. In this regard, we acknowledged the limitations of using quantitative data in this type of study and recommended use of qualitative method for examining factors that influence adoption of e-health, especially study which will consider using Diffusion of Innovation Theory [47]. We hope this will improve the influence of innovation attributes on level of e-health usage. We also advanced in our discussion that the insignificant contributions of e-health attributes may link to inadequate exposure to ICT and having inadequate knowledge and skills which barred healthcare professionals in northern Uganda to mentally evaluate
effectively the various ICT attributes for proper decisions of whether to adopt or reject e-health application

**Comments:** Clearly show the relationships within the model you used and showing the ICT skills question. The authors hope the explanation below explained the relationships between the variables and model used in the study and indicate the skills questions.

Our study adapted the five characteristics of innovation that individuals can use to evaluate the innovation before making any decision to accept or reject the innovation. In this particular case, the innovation is e-health. In addition to the five characteristics of innovation proposed by Rogers, healthcare professionals’ ICT skill was added in the model. It is expected that the level of ICT skills will influence positively the adoption of e-health. In this model, we considered innovation attributes of relative advantage, compatibility, complexity, trialability and observability as the independent variables. In addition, ICT skill was added in the equation as part of independent variable. The only dependent variable in the model is level of ICT usage.

**Comments:** the literature study fails a good line of reasoning. Discussion is more or less a second literature study.

The authors have re-discussed the literature (see discussion section). The discussions now include clearly the implications of results, practical consequences, similarities between findings and justifiable commentary on the importance of findings. We also discussed the contributions of the study under conclusion section. We hope this will make the structure easy to follow.

**Comment:** need some language corrections before being published.

Correcting language, spellings and sentence constructions were done throughout the document by the three authors.