

IVR in healthcare in rural Africa: challenges and opportunities

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1 Introduction

In Low- and Middle Income Countries (LMIC), pressure on healthcare is very existent. In the very specific case of cancer, they bear the largest share: 60 percent of the global cancer burden is situated in LMIC. Another problem is that healthcare in these countries is very expensive: while it could be that it is free to give birth, people still need to pay for transport to the hospital, in-hospital care after, or any other costs related to this and other healthcare issues [5][2]. This leads to many people being left out of healthcare that they might need, simply because they cannot afford this.

Besides the issue of not having enough money to pay for healthcare, many people in Africa cannot understand medical explanations. This is mainly because the literacy rates in these countries are very low [4]. Therefore, some people cannot access the healthcare they need because they do not understand written documentation of their issues and care instructions.

LMICs have been investigating different options to improve this healthcare situation. One of these options is IVR: Interactive Voice Response systems. These systems make use of interactive designs that a user can reach through a mobile phone. That is one advantage of LMICs: many people do make use of a mobile phone [1]. IVR has two ways of functioning: the first being speech-enabled in which humans can input commands, and the second being dual-tone multiple frequency (DTMF) in which telephone keys are used as input [6]. IVR systems have been widely explored in LMICs to see whether or not they work and are accepted by the user. It has already been successfully used in some applications in Ghana, Africa [2]. However, the use of IVR systems has not been broadly used in healthcare yet.

In this paper, I will focus on opportunities and challenges regarding IVR in healthcare use, especially in rural areas of Africa. I will do this by investigating existing literature on this topic, combined with materials from given lectures in the ICT4D course at the VU. Therefore, my research question is:

RQ: What are the challenges and opportunities regarding IVR in healthcare, particularly in rural areas of Africa?

By investigating this, I hope to gain new insights for hospitals to use so that their healthcare will be more easily accessible.

2 General benefits of IVR systems in Africa

Mainly in the rural areas of Africa, literacy levels are shockingly low and the people there would benefit the most from accessible and understandable healthcare. One benefit of IVR systems is that they do not require high literacy levels, since they are based on DTMF or speech input. The output is also speech-based [5]. Therefore, no written literacy is necessary in understanding the information given by IVR systems. Moreover, the languages that the application is accessible in, are often languages that are spoken by the communities in these countries [6].

Another, more general benefit of IVR systems is that mostly, the design is done in very close collaboration with the end-user. This ensures that the system meets the needs of the end-users, and eliminates problems

early in the design phase [6]. This makes the system cheaper by not having to identify issues later in the design phase, but also directly accessible after the design is finished since end-users are already involved in the process.

Moreover, most IVR systems specifically designed for rural areas do not require an internet connection in order to use the system. Many people in LMICs do own a mobile phone but do not have access to modern technologies such as 3G or 4G, or an internet connection [7]. Therefore, needing to connect to a system using such a connection would be impossible for people living in these countries. Since IVR technologies are designed to be used only by dialing a number and putting in some DTMF or speech, this can be used in LMICs.

3 Benefits of IVR specific in the healthcare section

While the people in Africa, as mentioned above, need to be able to connect to the IVR system without having to read too much or having to connect to the Internet, there are also benefits to IVR systems specific to the healthcare industry in these regions. The literacy levels were already mentioned above, but they are also a great benefit specific to the healthcare sector: people are not obliged to read their medical dossiers anymore because this is read to them. This makes their issues comprehensible and more easily heal-able since they know what care they need.

Another benefit of IVR systems specific to healthcare is that it saves time. Normally, to obtain the care you need, a hospital or at least a doctor's visit is necessary. With IVR systems, this can be done remotely. Following this is the accessibility of healthcare: without IVR systems, many people could not access the healthcare they need because they were unable to go to a hospital or unable to read the information (literacy). Now, this information can be accessed without a trip to the doctor or hospital which makes the barrier to accessing it much lower [2][6].

Moreover, being able to access health information through IVR systems is a huge cost reduction for many people in LMICs in Africa. The main costs they normally have for healthcare, think of transportation costs to go to the hospital or the costs for the healthcare itself by experts, are very much reduced when using a remote system that is reachable by mobile phone. In addition to that, the time needed to access the health information is reduced [2].

Finally, people found IVR systems very helpful in individual child health performance. When using the system, they could see in which state the child's sickness was, what measures they should take, and how to discover the sickness earlier on than they normally could [3].

4 Challenges to IVR systems

While there are many benefits to the IVR systems in healthcare implementation, there are also barriers for people to use these systems. Firstly, people are scared that the system might cost them a lot of money [2][3]. While they save a lot of money by not having to go to the hospital, they still need to dial the phone number which can cost a lot of prepaid.

Another challenge is that the problems that users have might be too complex for the system [2][3]. This goes together with the fact that IVR systems lack the soft-touch and complexity of in-person surveys [8]. In a hospital, an expert is sitting in front of you that knows all about your issues and can see how you behave. This expertise lacks in the IVR system. All this is combined with the issue of the lack of human contact in IVR systems. Some people found it uncomfortable talking to a phone instead of having someone there to reassure them and see their emotions [2][3][8].

Furthermore, people that are willing to use the system are still scared of using too much credit. While work is done to make IVR systems free and thus no credit is used, still a call needs to be made and people are hesitant because of this. Moreover, they are worried that they might make a call too easily since it is easily accessible [2].

An issue that could easily be worked on is the communal issue. People found that the system was not integrated enough in the community: there was a lack of introduction to the system and training how to use the system. Besides that, there was a lack of announcement of the system and therefore, people did not know the system even existed [3]. These issues can easily be worked around by training people and having these trained people train others, and announcing the system properly.

The final issues are technical issues. These issues are hard to work around, since they rely on the options available in these rural areas. These issues include network issues: no network available in certain areas or the network is failing; phone battery that is dying and nowhere to charge the phone; or challenges in operating the phone in general [2][3]. The latter issue can be solved again by training the people.

5 Conclusion

To conclude, people in rural areas of Africa are very willing to use IVR systems in the specific context of healthcare. However, there are some challenges to using the system which include concerns about costs, complexity of their healthcare issue or concerns about using the system. Some of these barriers can easily be worked around while others are harder to overcome.

Besides the barriers to adopting and using the IVR systems, there are also great benefits. These benefits include reduction of transportation and healthcare costs in general, not being obliged to have an internet connection and therefore being able to access the system remotely, no need of having high literacy levels as the system uses speech or DTMF input and speech output.

Overall, the people in rural areas of Africa were very willing to adopt the system and therefore, the implementation could be up-scaled in the LMICs.

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