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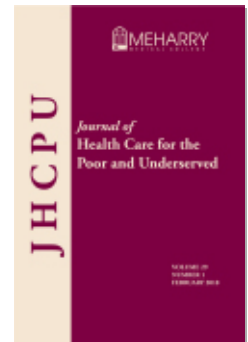
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One Message, Many Voices: Mobile Audio Counselling in Health Education

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Abstract: Health workers' use of counselling information on their mobile phones for health education is a central but little understood phenomenon in numerous mobile health (mHealth) projects in Sub-Saharan Africa. Drawing on empirical data from an interpretive case study in the setting of the Millennium Villages Project in rural Malawi, this research investigates the ways in which community health workers (CHWs) perceive that audio-counselling messages support their health education practice. Three main themes emerged from the analysis: phone-aided audio counselling (1) legitimises the CHWs' use of mobile phones during household visits; (2) helps CHWs to deliver a comprehensive counselling message; (3) supports CHWs in persuading communities to change their health practices. The findings show the complexity and interplay of the multi-faceted, sociocultural, political, and socioemotional meanings associated with audio-counselling use. Practical implications and the demand for further research are discussed.

Key words: Health education, health promotion, community health workers, sub-Saharan Africa, mHealth, global health, counselling.

This study problematises the role that audio messages can take in supporting community health workers (CHWs) to educate and counsel local communities in rural areas of sub-Saharan Africa, using the example of a project in Malawi. Against the background of Malawi's health worker shortage, CHWs are playing a central role in the provision of health care, especially in rural areas. After a three-month pre-service training course, they offer basic health and information services regarding hygiene and sanitation, immunizations, growth monitoring, antenatal care, family planning, disease surveillance and basic preventive and curative health services.¹ Community health worker programs have shown to be effective in improving the health status of rural and disadvantaged communities, for example, in the area of child health.² Through continuous educational and sensitisation activities they may also change the communities' health beliefs in the long term.²

Malawi, the setting of the reported research, is a nation with low human development³ and very high levels of poverty. Over half (50.7%) of the population is living on

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less than one U.S. dollar per person per day.⁴ Remarkable, health-related progress has been reported with respect to the reduction of child mortality (for example, with an infant mortality rate of 53 per 1,000) and the fight against HIV/AIDS, malaria, and other diseases. However, huge challenges remain in particular with respect to maternal health. The maternal mortality ratio of 601 per 100,000 in 2014 is widely known to be high and is clearly above the Millennium Development target of 155.⁴

A number of large development programmes and initiatives, such as the One Million Health Worker Campaign or the Millennium Villages Project,⁵ as well as numerous smaller projects are seeking to equip CHWs with mobile phone technologies and mobile health (mHealth) applications. Recent reviews synthesise the immature but growing body of evidence on the effects that such tools can have in improving the effectiveness of CHWs' work in underserved regions.^{6,7} In addition to data collection, decision support, monitoring and supervision functions, many mHealth applications include pictorial, audio, or even video-based materials that CHWs can use for counselling and education activities.⁸

Audio-counselling messages form an integral part in many mHealth campaigns in low-income and middle-income countries. For example, the Ananya Program, a cooperation between BBC's Media Action programme and the Ministry of Health and Family Welfare in India, has developed audio messages that 200,000 CHWs can play on their mobile phones in health counselling sessions with families. In the Ananya Program, the content was delivered in the authoritative yet sympathetic voice of a woman doctor.⁹ Despite its wide use, audio-based counselling has received relatively limited analytical attention in the extant literature. For example, a recent review on mHealth did not include mobile-assisted counselling.¹⁰ Research from high-income settings points to the conclusion that audio messages can lead to increased knowledge and can play a role in changing behaviour, for example, with nutritional practices.¹¹ In low-income settings, tentative evidence from a review suggests that providing images, audio, and video content on mobile phones during household visits can enhance the clients' experiences and facilitate the transfer of knowledge.⁸

Theoretical underpinning. The use of audio-counselling can be examined through different theoretical lenses. Basically, design and effects of mobile audio counselling can be explained by the transmission model of communication. The transmission model is a theory that does not pay much attention to context but conceives the key route of communication as the process of sending and receiving information from one mind to another, or the transmission of a message from a sender to a receiver.¹² The speaker whose voice was prerecorded acts as the distant sender and the household members can be thought of as the receivers. According to transmission-based views, optimizing communication would mean to streamline the delivery process and to improve the content and format of the message. However, transmission models have faced substantial critiques with claims that communication has evolved historically and is best understood in a broader context of cultural and intellectual history.¹² The situated notion of counselling is also reflected in Goss and Adebowale's¹³ work, authors who consider it within specific psychosocial, political, and relational milieux.

In summary, while tentative evidence suggests that mobile phone-based audio counselling can be effective, the underlying mechanism that makes it successful and the

meanings that users, such as the CHW, assign to its application in disadvantaged and rural communities in particular remain widely unclear. In addition, most evaluation studies focus on the use and impact of an mHealth app in its entirety but they do not often differentiate among its highly diverse functions, ranging from data capture to audio counselling. In light of this, this research seeks to understand the user's perception of the meaning of audio-messages when used in health counselling in the specific social and cultural contexts in which these technologies have been introduced.

Methods

To understand the phenomenon (the use of technology-supported health counselling by CHWs) through the meanings that the users (CHWs and their supervisors) assign to them, an interpretive case study approach was chosen.^{14,15} Interpretive designs represent an established approach to research on information and communication systems in health care.¹⁶ They seek to create and understand how humans make sense of information technology in a specific sociocultural and organisational context; and how information systems shape and are shaped by the context. The research question was stated as follows:

Do CHWs perceive that the use of audio-counselling messages supports health sensitisation and the education of rural communities in the context of the implementation of an mHealth application in sub-Saharan Africa; if so, how and why?

To address the research question, nine focus group discussions with 29 CHWs and three individual interviews with supervisors were carried out. These two data-gathering instruments can be well aligned with interpretive approaches because they can help to explore the participants' conceptualisations of and subjective meanings for the indicated media.^{17,18}

Study participants included community health workers (called *Health Surveillance Assistants* in Malawi) and their supervisors. The case study was part of a research project carried out in the setting of the Millennium Villages Project in rural Malawi. The Millennium Villages project takes an integrated, community-led approach to sustainable development, addressing main contributors to poverty including access to health, education, food security, infrastructure and business development. In the Malawi site the project equipped all CHWs with the CommCare application which has been used by project workers on basic smartphones since 2013. Commcare is a mobile job aid for frontline workers that can be configured according to the requirements of the context. It is especially popular in the context of health.⁸ In the project, it provided a number of functionalities ranging from the collection and monitoring of household data to the provision of pictorial and audio-counselling material. The audio files used by CHWs in this study contained simple informative messages regarding preventative and curative health issues that related to the accomplishment of the Millennium Development Goals.¹⁹ They included topics such nutrition, water purification, and newborn care. The messages were translated into Chichewa, the local language, and were then recorded by a professional speaker. The following illustrates the content of an audio message related to the identification of danger signs:

The mother and the family members should keep monitoring for any danger signs on the baby. These signs include: Failure to breast-feed, fever [. . .].

Before the study, ethical approval was obtained from the Ethics Committee of North-western and Central Switzerland (EKNZ) and the National Health Sciences Research Committee (NHSRC) in Malawi (#1350). Additionally, before each data-gathering session, written informed consent was sought from all participants and measures were established to protect privacy and confidentiality.

The sampling process was purposeful in that it was based on the involvement of CHWs from different clinics and of CHWs with diverse technological/ mobile phone competencies. Although all clinics were rural, they were located in areas with varying characteristics. Clinic C (where five out of eight CHWs were involved) was in a remote and isolated area which was difficult to reach by car, especially in the rainy season. The clinic was not connected to the national power grid and was supplied with solar power supply. Clinic A (14 out of 21 CHWs) had a better infrastructure, being connected to the national power grid and backed by solar power. Clinic B (10 out of 18 CHWs) was very close to the main road and was also linked to the national power grid.

Study protocol. In the recruitment process, the CHW manager accompanied the researchers to the three rural clinics in the project area where CHWs gathered for meetings or provided part of their service. The research project and goals were presented. Then, CHWs were invited to take part in the discussions, which took place in a room outside the clinic. The researchers emphasized the voluntary nature of participation and stressed the option of withdrawing from the research at any time. To avoid bias by CHWs with high mobile phone literacy skills who might be very keen to volunteer for the focus group discussions, the CHW manager was asked to encourage participants whom s/he perceived to have lower technological competencies. The main directive was not to interfere with clinical and any other health-related service provision. This meant that the recruitment of participants and the formation of the focus groups were highly dependent on the workload of CHWs and the patient load in the clinics. This dependency resulted in varying numbers of participants in the focus groups. Box 1 summarises the focus group characteristics. In addition to the focus groups with CHWs, the main CHW supervisor from each clinic was interviewed.

The focus group participants were encouraged to reflect on their own experiences and perceptions of using phones and counselling messages in their work contexts. The approach was semi-structured in that the question guide was flexible and allowed for new discussions on new themes.²⁰ The discussions, which generally covered user perceptions of all of the functionalities of the CommCare application, were increasingly centred on the use and perceived role of audio counselling. In the individual interviews, the supervisors were invited to report their observations on how the CHWs, whom they supervised, perceived and used their phones and the counselling messages. The average duration of the conversations was 65 minutes.

Notes were taken during the conversations and, with the agreement of the participants, the conversations were audio taped. In two groups, some participants disliked the use of the tape recorder and thus only notes were taken. While the data were gathered between the beginning of March 2015 and the end of May 2015, the analyses and

Box 1.**FOCUS GROUP CHARACTERISTICS**

Site	Nr	Gender		Experience (in years)	Level of seniority
		Male	Female		
Site A					
	01	3	—	3x8	3 CHW
	03	1	2	2–8	1 Senior CHW, 2 CHWs
	06	2	2	4x8	4 CHWs
	09	3	1	2–8	1 Senior CHW, 3 CHWs
Site B					
	02	1	1	2–8	2 CHWs
	04	4	2	2–8	1 Senior CHW, 5 CHWs
	07		2	8	2 CHWs
Site C					
	05	2		2–8	1 Senior CHW, 1 CHW
	08	2	1	2–8	3 CHWs

Notes

CHW= Community Health Workers

interpretation of the findings were part of a longer, ongoing collaboration with CHWs and supervisors which lasted from December 2014 to August 2015. The formative analysis and interpretation process was initiated directly after the first interview. The notes were read, re-read and expanded on, interview questions were revised and added and emerging key themes were described. After the interviews, the audio material was transcribed verbatim and entered into NVivo qualitative data analysis Software; QSR International Pty Ltd. Version 8, 2008. The analysis was conducted by grouping and re-grouping similar statements into emergent themes.

The first author analysed all the data and the second author reviewed the parts regarding the audio consultation. Themes were developed independently and discussed and refined until consensus was reached. That is, the patterns and characteristics of the themes were iteratively defined and refined and connections and disconnections between the themes were discerned from the data. Box 2 presents a summary of the three themes and exemplary empirical statements.

Validity of the research approach. The main way in which validity and trustworthiness can be implemented in qualitative research designs is seen in the triangulation of data, methods, investigators, and theory.^{21,22} In this study, the triangulation of data resulted from the involvement of participants from three intervention sites (CHWs from three clinics). Investigator triangulation was realised through the collaboration of two investigators from diverse disciplinary backgrounds, i.e., from social sciences and public health, who analysed the data independently from one another. Theoretical triangulation was achieved by contrasting the emerging framework with concepts

Box 2.

MAIN THEMES AND EXEMPLARY EMPIRICAL QUOTES

	Context	Underlying mechanisms
Participatory legitimisation	<p>Limited understanding of mobile device at onset of mHealth implementation;</p> <p>[...] with the community people, you have to be patient... just start working, using the phone, without telling them what's the purpose of, they will even leaving you, with your phone...</p> <p>Like they were jealous... In a community, they are human beings... like, for example, there is a husband and the wife, and the visiting person is a male CHW, yes, the husband might feel like he is trying to coax my wife, because of this very beautiful device.</p> <p>Restricted opportunities for participation; 'absent presence'</p> <p>But at first it was not like a normal conversation because they [CHWs] had to concentrate on the phone and not on the conversation.</p> <p>You're [a CHW] using your phone. So they [household members] were a little bit... What is this man doing? [...]. Is he just checking, is he talking to me?</p>	<p>Audio counselling as a change management tool for the mhealth implementation (creating transparency about the purpose of the phone)</p> <p>That was the fear of the community, they were not understanding [the purpose of using the mobile phone]... But after sitting down with them [explaining] the purpose of this phone gadget is like a job aid [...]. So you just listen to this audio, this is a message for HIV/AIDS. [...]. So you just click it on [the audio message], then they finally, they are listening [...]. So they are now convinced and enjoying the recordings.</p> <p>CHW: But at first they thought... we wanted just to show off [using the mobile phone]</p> <p>Interviewer: How did you convince them then?</p> <p>CHW 1: Through the messages. CHW 2: The healthy messages...</p> <p>Facilitate a sense of participation</p> <p>So, after listening to the message then we pose questions. [...] So, they feel it that it's special for them, the phone is special for them.</p> <p>if you press that message, they [household members] listen to that, they say, all right, this phone is really useful. And it is very important to us, because it contains a lot of messages for our everyday life.</p>

(continued on p. 469)

Box 2. (continued)

	Context	Underlying mechanisms
Scaffolded delivery	<p>CHWs can forget some standardized information; You have somebody [the virtual voice!] to support you in case you have forgotten any point, to remind you. They [audio messages] remind me of a lot of things. I just play . . .</p> <p>Audio messages don't reflect the specifics of the household; [audio message] has not all the information you needed to share . . .</p>	<p>A mutually constitutive and interwoven process between the CHW (who added (situation) specific and contextualised information) and the virtual expert (who ensured the complete delivery of the standardised message).</p> <p>You've reached not even the end of it [the message], but ask them what they've understood from the message. And since the messages are also too brief, from there is when you just add your comments. so maybe if myself I can have learn some things and forget other information, the audio contains all the information</p> <p>. . . in the past, without the messages, I will come and visit households. I just tell them in brief do A, B, C, D. But with the phone they listen first. I ask them questions . . . so it's more detailed information.</p> <p>And since the messages are also too brief, from there is when you just add your comments.</p>
Assertive persuasion	<p>Difficulties in changing long-established, cultural health practices</p> <p>. . . it is not easy, because there are some who refuse to follow preventative measures you know behavior change sometimes is not easy.</p>	<p>Proximity/trustworthiness through re-enforcing the CHW's messages; Authority/power distance through experts from outside</p> <p>whenever we give them these messages using our own mouth, they do just feel like it's our own word, we do just make it. But whenever they get this from the phone they do feel it that, oh, it's important</p> <p>So they [community members] thought, oh, these are the true messages, they say, this one [the CHW] is telling us the truth, because he is telling the same message like the phone.</p> <p>when they hear it from the phone they know it is something from above. the community will be in a position to follow more what's on the phone. Because they think it's coming from people who really know the things, people who have also told the HSAs</p>

and related empirical findings from the extant literature. To establish transparency, another key indicator for the study's quality, the data analysis and interpretation, i.e., the development of emergent themes, was documented and the quotes presented can be exactly linked back to the role and the (anonymized) context of the data gathering.

Results

Overall impressions. The CHWs perceived the use of the audio messages easy to handle. In addition, the audio-based counselling was highly regarded by CHWs with some of them even marking it as the most preferred, work-related function of their phone "*That part of the [audio] messages is what I like most . . .*" The positive perception of the audio messages was also reported to be shared by community members. An indicator of the value that community members attach to audio counselling can be seen in the observation that absent household members were summoned by their family when audio-based counselling was initiated: "*. . . they call one another to listen to the messages.*" The specific qualities that the audio messages offered, as perceived by CHWs and their supervisors, can be synthesised according to three themes, which will be presented in the following.

Theme 1: Participatory legitimisation of mobile phone use. A central observation during the implementation of the mHealth Commcare application was that audio messages served as a highly relevant means to convince the community of the value of the mobile phone and helped to legitimise its use. The mere acceptance of the use of an mHealth app during household visits in rural and marginalised communities could not be taken for granted and was conceived to be a sensitive process requiring the provision of information. For example, CHWs felt that if members were not convinced of the use of the phone, there was an imminent danger of refusal, not only of the phone but of the entire counselling process:

[. . .]. Because you know, with the community people, you have to be patient . . . just start working, using the phone, without telling them what's the purpose of, they will even leaving you, with your phone . . .

One of the initial challenges was that some community members did not understand the role and importance of the new device for them. ("*How important is it to us?*"). The smartphone was conceived as a device exclusively for health workers ("*only being used by the CHWs,*" as one supervisor explained). A resulting misconception, as reported by CHWs and supervisors, was that some community members tended to believe that CHWs would use the phone, a prestigious object, to show off. The study participants alluded to psychosocial and micro-political tensions between mobile phone owners and non-owners in the community, as a supervisor explains:

Like they were jealous . . . In a community, they are human beings . . . like, for example, there is a husband and the wife, and the visiting person is a male CHW, yes, the husband might feel like he is trying to coax my wife, because of this very beautiful device.

The introduction of the device also changed the communicative constellation of the household visit. Prior to the implementation, household visits typically manifested in vis-à-vis constellations in which the CHW was directly facing the household members. With the mobile phone, a third party was introduced to the communication that directed the CHWs' attention (at least partly) away from the household members to the novel device. While CHWs reported that they became much more fluent in handling the device, this was more challenging at the onset when CHWs needed considerably longer to navigate through the digital forms while collecting data from the household.

But at first it was not like a normal conversation because they had to concentrate on the phone and not on the conversation. —Supervisor

You're [a CHW] using your phone. So they [household members] were a little bit. What is this man doing? [. . .]. Is he just checking, is he talking to me?

In other words, if typical mHealth functions, such as data collection, decision support, monitoring and toll-free talk, are used at the household level, their application tends to inhibit opportunities for the community to participate in the mHealth experience. Against this background, the participatory nature of the audio-based messages was considered highly relevant by CHWs. In a number of statements they tied the use of audio-counselling messages directly to the ways in which the community started to accept and appreciate the use of the mHealth app, thus promoting its legitimate use in the household.

That was the fear of the community, they were not understanding . . . But after sitting down with them [explaining] the purpose of this phone gadget is like a job aid [. . .] can you just listen to this audio, this is a message for HIV/AIDS. [. . .] So you just click it on [the audio message], then they finally, they are listening [. . .] So they are now convinced and enjoying the recordings [. . .] And [today] if you are not going to use the phone, they are going to ask you, where is the phone today?

CHW: *But at first they thought. . . we wanted just to show off [. . .]*

Interviewer: *How did you convince them then?*

CHW 1: *Through the messages.*

CHW 2: *The healthy messages . . .*

The legitimisation function was tied to two basic mechanisms. Firstly, playing the audio-counselling messages to household members enhanced the transparency of the mobile phone's role in health provision. Its use marked the mobile phone as a professional tool and helped to clarify misconceptions, for example, that the mobile phone was used as a seductive device. Secondly, according to CHWs, household members realised that although the device was operated by the CHW, its messages and other content were meant especially for them and their health concerns. This can be regarded as facilitating the development of a sense of co-ownership of the new device, which is reflected in statements by the CHWs:

So, after listening to the message then we pose questions. [. . .] So, they feel it that it's special for them, the phone is special for them.

Theme 2: A tool for the scaffolded delivery of counselling information. In addition to legitimisation, the use of audio messages helped CHWs in the actual delivery of the counselling information. In general, the use of audio messages was found to enrich and expand the counselling process in the household, particularly compared with prior practices, as the following statement from a CHW indicates:

. . . in the past, without the messages, I will come and visit households. I just tell them in brief do A, B, C, D. But with the phone they listen first. I ask them questions . . . so it's more detailed information.

As shown in the above quotation, CHWs did not conceive the audio as something separate from their own explanations and they were trained to interweave it with their counselling arguments. Most commonly, after having collected the health status data via the phone, CHWs selected the appropriate messages and introduced them to the household members. After playing the messages, they asked the household members to repeat the parts that were most relevant to them. Or the CHWs responded to questions that were unclear to the household members. If the CHWs felt that there were gaps in understanding, they reiterated the key themes and expanded on topics that they deemed to be particularly relevant to the household. In this sense, the delivery of information was not just transmission, but was interactive: dynamically constituted by the interplay of two information sources, the CHW and the virtual expert, who each compensated for the other's limitations. On the one hand, the information on the tape was standardised and perceived to be rigid as sometimes it did not reflect the specifics of the household, as one supervisor illustrated:

And if you . . . listen to the messages, you can see where are the gaps in terms of information . . . it has not all the information you needed to share . . .

You've reached not even the end of it [the message], but ask them what they've understood from the message. And since the messages are also too brief, from there is when you just add your comments.

There were gaps that CHWs addressed by adding additional information specific to the household and pertinent to the questions of the members. On the other hand, CHWs also admitted to forgetting information, especially when it was detailed and lengthy. In this light, the audio was perceived as a virtual colleague, who helped the CHW to deliver a complete counselling message, as exemplified in the following quotation from a CHW:

You have somebody [!] to support you in case you have forgotten any point, to remind you.

In that sense, the interaction of the two information sources can be seen as a dynamic and mutual scaffolding process where the CHW assisted the virtual expert in providing specific and contextualised information on demand. The virtual expert helped the CHW, in return, by offering complete (basic) information. Following the second notion, the audio was also seen as an educational tool, not only for the community but also

for the CHW, which helped in the recall and internalisation of key messages. Some participants directly named it as a relevant source for their learning.

Theme 3: An assertive persuasion tool to change health practices. Although CHWs tended to be highly regarded in their communities, they faced the challenging task of changing their communities' long-established, sociocultural health practices. They acknowledged the difficulty of this in the focus groups.

*... it is not easy, because there are some who refuse to follow preventative measures
[. . .] you know behaviour change sometimes is not easy.*

Against this background, CHWs emphasised the role that this new expert voice had in helping them to persuade their communities which it did by facilitating trustworthiness and authority. Most commonly, CHWs were alone during household visits and in their attempts to convince community members to change their health-related behaviours. For them and the community, the phone was like a new companion, a competent medical expert who had been assigned to them. As one CHW nicely puts it: “. . . so the community feels it [the phone] is like a doctor.” Trustworthiness was promoted through the idiom of the virtual expert. The expert used the same language (Chichewa) that was spoken and understood by the household members. The messages were professionally recorded “*in our vernacular language*,” as expressed by one supervisor, which helped to create a sense of proximity. The fact that another, even more persuasive, voice repeated and confirmed the arguments of the CHWs was deemed to strengthen the CHWs' trustworthiness and persuasive capacities in front of household members, as exemplified by a CHW in the quotation below:

So they [community members] thought, oh, these are the true messages, they say, this one [the CHW] is telling us the truth, because he is telling the same message like the phone.

Persuasiveness was also evoked through the distance associated with bestowing expert status on the virtual speaker. In this sense, the professional voice was perceived to be particularly authoritative because it was coming from outside and from “*above*” (CHW), in other words, from “*people who really know the things, people who have also told the HSAs [Health Surveillance Assistants]*” (supervisor).

In addition, persuasion was associated with the novelty and the degree of innovation brought into the context. Many CHWs originated from the villages they served and felt that their clients (who were neighbours) tended to become accustomed to their explanations. The mobile device inserted “*new voices*” (CHW) into this setting, which helped the CHWs to (re)gain attention and increase the curiosity of the communities.

*[The households] become even used to me [. . .] since this is [audio counselling] a new idea, it's like you are trying to draw his or her attention so that you can be together.
(CHW)*

Discussion

The affordances of audio-counselling messages. This study has investigated a form of mHealth in community practice in rural Sub-Saharan Africa using a qualitative

approach to explore the perceptions of the health workers. This is a topic to which researchers and particularly those from the field of global health have not paid much analytical attention. From an educational perspective, this form of audio delivery does not seem to be very interesting at first sight. Playing pre-recorded audio-messages to community members incorporates behaviouristic notions of education and does not seem to meet today's expectations of interactive, collaborative, and constructivist learning designs. Yet, the analysis has revealed that in the context under investigation, the use of audio messages has resulted in a number of complex and perhaps unexpected dynamics that went far beyond the explanatory power of transmission-based and behaviouristic notions of health promotion and education. For example, the ways in which the messages are incorporated in the discussions between health workers and community members help them to construct a new understanding and reflects rather the notions of constructivist learning.

The support that the phone provides can be conceptualised and understood as the provision of distinct, communicative, affordances. The concept of *affordances*, a term coined by Gibson,²³ was deemed to be useful because it is not restricted to the physical properties of the device, such as the phone's audio-playing capacities. Instead and in line with interpretive designs, affordances describe the range of perceived possibilities of what the objects could be used for and what they are best used for. These perceptions unfold in the interplay of the technical properties of the objects with the wider psychosocial, sociocultural, and political structures of the rural communities. The concept is very popular and has been used in a wide range of disciplines and areas, such as in the design of "everyday things"²⁴ or in the field of information systems.²⁵

In this sense, the three main themes identified in the study can be also conceptualised as three different affordances, which will be discussed in the following. (Box 3 summarizes the affordances identified in this study and outlines how they play out in the specific context of healthcare delivery.)

Participatory legitimisation of mobile phone use. The implementation of a technological object (e.g., a mobile phone) in a traditional system (e.g., community-based health services) is a dynamic process that can be expected to create disturbances and conflicts.²⁶ Disturbances are all the more likely if a novel device is inserted into a context in which digital technologies hardly exist and where witchcraft both permeates different religious beliefs and can shape peoples' beliefs more strongly than the mass media.²⁷

Against this background, the informative and participatory nature of audio-counselling was perceived to have a legitimising function and to address a number of informational and attendant sociocultural and political barriers. These included the lack of understanding of the tool's professional role as well as an inhibited sense of co-ownership. In addition, the communicative disengagement observed among health workers who became absorbed by the device when they started to use the mHealth tool, resonates with Gergen's²⁸ notion of absent presence. Absent presence describes a situation where a user is physically present, but is devoted to a technologically mediated world elsewhere, so is actually divorced from her/his immediate environment. In this light, the use of audio counselling did not only re-shift the CHWs' attention back to household members, but the device itself, a second and even more experienced expert, was addressing the members directly. In addition, audio counselling changed

Box 3.**OVERVIEW: AFFORDANCES, CONTEXT AND UNDERLYING MECHANISMS**

Affordances	Context	Underlying mechanisms
Participatory legitimisation	Limited understanding of mobile device at onset of mHealth implementation; restricted opportunities for participation; 'absent presence'	Audio counselling as a change management tool: Creating transparency, marking the device as a professional tool and clarifying misperceptions; helping to develop a sense of co-ownership
Scaffolded delivery	Restricted access of CHWs to knowledge resources; audio messages don't reflect the specifics of the household	A mutually constitutive and interwoven process between the CHW who added (situation) specific and contextualised information and the virtual expert who ensured the complete delivery of the standardised message.
Assertive persuasion	Difficulties in changing long-established, cultural health practices	Proximity (as trustworthiness) established through using the same language and through repetition of the CHWs' messages; Authority (as power distance) through experts from 'above'.

the multimodal composition of the household visit, because CHWs tended to move the hand with the phone towards the clients (to enable them to hear more clearly) making the communicative parties involved more closely connected in terms of their physical spacing.

A tool for the scaffolded delivery of counselling information. In addition to legitimisation affordances, this study has shown how the use of audio messages scaffolded CHWs in the delivery of their own counselling messages. Similarly, Ramachandran, Canny, et al.²⁹ found in their tentative study on CHWs' use of counselling videos that these videos served as anchors for health discussions in that they scaffolded CHWs and engaged their clients. Importantly, the present study suggests that the scaffolding process is mutually constituted in that the CHW adds situation-specific information to the general message delivered by the virtual expert, while the virtual expert ensures that the CHW does not forget basic information. In the latter sense, the audio messages have an educational role not only for the household members, but also for CHWs. The way in which the scaffolding was performed was very simple, with no gradual/contextual fading mechanisms and no metacognitive support that could be provided by digital technology.³⁰

However, scaffolding as a learning mechanism can be considered relevant in the specific situation of CHWs. In contrast to busy clinical settings in high-income

countries where knowledge tends to be constantly co-constructed and distributed in a multiplicity of ways among actors and the physical environment,³¹ CHWs tend to work in professional isolation and to have limited access to technical and knowledge resources. In this respect, and considering that the training of CHWs typically lasts for only a couple of months, messages that constantly help them to recall and internalize basic messages can be regarded as a viable means of learning.

An assertive persuasion tool to change health practices. It is widely acknowledged that not only the introduction of (mHealth) technology but also the transformation of long-established health practices represents a considerable challenge and, as other researchers have observed, can be met with firm resistance on the part of communities.²⁹ In the context under observation, the audio messages appeared to have exerted a particular form of persuasive power over the community. This was not only due to the novelty effect, namely the increased attention that subjects tend to give to media forms that are novel to them, which may disappear over time.³² More importantly, the persuasiveness of the device can be understood as a product of the interplay of proximity and distance resulting from the dynamics about to be described.

Trustworthiness, as a relevant precursor to persuasion, was created by the virtual expert voice that communicated the same messages as the CHW. In doing so, the virtual expert also used the same vernacular language as the local people which can be seen to facilitate cultural proximity. Studies on virtual agents (a different area of study) support this observation. For example, Yin, Bickmore and Cortés³³ found that cultural congruity (the perceived cultural proximity of the communication partner) has a significant interaction effect on the agent's perceived trustworthiness and persuasiveness. However, persuasiveness, as observed in this study, can not only be explained by proximity. Instead, it is constituted through its interaction with distance. This is a result of the authority bestowed on the virtual speaker as an external expert, as someone from outside and above. Similarly, prior studies observed how authority was exerted by the health workers' use of mobile devices. For example, Indian CHWs made use of the device's authority for the *soft intimidation* of their clients.³⁴ Additionally, Medhi, Jain, Tewari et al.³⁵ indicate that the capacity of an mHealth tool to virtually involve an invisible authority from outside (from Delhi) enhanced the social respect, recognition and power of Indian health workers. However, in the literature, authority was mostly linked to the use of mHealth tools per se, whereas the findings of this study suggest that it results specifically from the in-built expert voice.

Practice implications. From a more practical perspective, the three affordances that were identified are distinct, in that they support different phases and functions in the performance of mHealth-assisted counselling. The legitimisation of the tool (the mobile phone) can be seen as a precursor to any effective counselling and, more generally, of the successful deployment of an mHealth application. Participatory legitimisation is of pivotal importance to the implementation phase of an mHealth project in rural Sub-Saharan Africa. Scaffolded delivery refers to the actual practice of counselling, i.e. to the ways in which the digital voice is interwoven with the health worker's own explanations.

The findings suggest that the use of audio-based counselling has a relevant role in the use of mobile devices for health services delivery by CHWs. What this study has

shown is that audio counselling should be integrated in mhealth applications used at the community level as they help legitimizing the use of these novel technologies. Audio messages are, from a technical standpoint, relatively easy and cheap to create. Similarly, the deployment of audio neither requires advanced smartphones nor constant network connectivity. What appears to be relevant, however, is that the speaker should use the same language as the local people to support trust building and the feeling of cultural proximity.

Another step in this direction, which further supports persuasion, is to use self-created audio (or video) files, for example, recordings about the successful use of mosquito nets created by local authorities, such as village chiefs or district heads. The finding of Ramachandran, Canny, Das et al.'s²⁹ study about the use of persuasive videos created by key influencers in the community are encouraging. They show that these influencers are highly motivated to contribute to such endeavours and that the videos resulted in engaging community members and motivating CHWs. What can also be discerned from the above study is that the work is not done by providing the messages to CHWs.²⁹ Instead, to unfold their scaffolding and persuasion potential, CHWs need to be instructed and trained in integrating the messages with their own counselling arguments. This also reflects the experiences of Ramachandran, Ramachandran, Canny, Das et al.²⁹ who found that only after specific training did CHWs start to link the videos with their own counselling activities.

Limitations of the study. This study has a number of limitations. First, the results should be seen as a starting point. Although the findings are underpinned by related observations from previous studies, one matter that remains undetermined is the extent to which the findings and concepts developed in this specific setting can be used and be useful in other cultural and geographic areas. Accordingly, future qualitative investigations in other regions, and from the perspective of other community members, may reveal additional affordances. Another limitation is that this study has identified affordances as perceived by the users of technology, i.e., the CHWs and their supervisors and not by other community members. Although CHWs live in the villages in which they work and can be viewed as part of the community, the analysis of the perspective of the clients would be another relevant step for further research. In addition, the findings only represent a snapshot in time. For example, the technological landscape is changing dramatically in developing countries. This means that perhaps in a few years' time mobile phones will have permeated even the most rural areas and a voice from a mobile phone will have different meanings.

Need for further research. While this research has revealed how the use of audio messages is perceived to support the CHW's counselling activities, prospective quantitative research should address the causal relationships between counselling and health. The effects of using different modalities of counselling materials should also be investigated. For example, further qualitative and quantitative work may contrast the differences between community-produced and external materials or between the use of pictograms and self-created photographs. Qualitative research is needed to explain the mechanisms as perceived by users and clients. In addition, quantitative trials are required to determine the specific outcomes associated with the use of the different modalities.

Conclusion. This research has conceptualised different affordances associated with the role of phone-based audio counselling in the delivery of health education and promotion in a rural area of Sub-Saharan Africa and, in so doing, it has started to explore a little understood phenomenon.

The findings indicate that perceptions of positive affordances of the use of mobile phone as an assistive working tool can be tied to: (1) the participatory legitimisation of the use of the mobile phone as a working tool during household visits through the facilitation of transparency and co-ownership; (2) the scaffolded delivery of counselling information through a mutually constitutive process between the health worker and the virtual speaker; and (3) the use of assertive persuasion to change health practices through the balanced establishment of proximity (e.g., common language) and distance (e.g., bestowal of expert status).

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