Qualitative and Quantitative Methods in Libraries (QQML) 12,4:485-503, 2023

Utilisation of mobile phones for health information seeking by women in rural Busoga sub-region, Eastern Uganda

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Abstract: The use of mobile phones for health information seeking is gaining attention, especially in low and middle-income countries with limited access to healthcare services. Women, who are primary seekers of health information, face challenges in accessing health information and care services in rural areas. Mobile phones have the potential to bridge this gap by providing access to health information and services. The study explored how rural women in Busoga sub-region, Eastern Uganda, utilize mobile phones for health information seeking specifically approaches used and the challenges faced.

A qualitative research approach was adopted, involving in-depth interviews and focus group discussions with rural women, Village Health Teams (VHTs) members, and health workers. The findings reveal that rural women predominantly use mobile phones for voice calls to seek health information in real-time. They rely on calls to confirm the availability of health workers and vaccines at health centres before visiting. Text messaging is also used, specifically the phrase "call me back," as a request for a return call. The study highlights the critical role of mobile phones in bridging gaps in accessing healthcare services, particularly in emergency situations. The findings contribute to understanding the experiences of rural women in using mobile phones for health information seeking and provide insights into the challenges they face in utilizing this technology.

Received: 15.6.2023 Accepted: 27.11.2023 ISSN 2241-1925

Keywords: Health information seeking, women, mobile phones, health workers, rural areas, Uganda

1. Introduction

The use of mobile phones for health information seeking is a growing area of research particularly in low and middle-income countries where access to health care is limited, and significant barriers limit access to health information and services. It is reported that mobile phones are a promising tool for improving access to health information and services, particularly in areas where traditional forms of communication and information dissemination are lacking.

Women are the primary seekers of health information worldwide, with access to such information being integral to making informed decisions and engaging in healthy behaviours (Hinneburg, 2017; Lee, 2018). Considering that women are the primary caregivers of their families (Guendelman et al., 2017), they play a crucial role in determining the health status of their household members and are, therefore, an essential component of the health ecosystem.

Unfortunately, women residing in rural areas face significant challenges in accessing health information and care services, resulting in health disparities between rural and urban areas (Lee, Hirai, Lin & Snyder, 2020; Avila, 2018; Subedi et al., 2019). However, the emergence of mobile technology has brought hope that mobile health (mHealth) could bridge the infrastructural gaps to healthcare access that have traditionally impeded progress in remote regions (Hampshire et al., 2021; Sekabira & Qaim, 2017).

The widespread adoption of mobile phones has made them a ubiquitous technology globally, with 91.54 percent of the global population owning a mobile device, as reported by Statista (2022). In Africa, mobile phone infrastructure is growing faster than access to essential services such as piped water and roads. As a result, many households in the region now have access to mobile phones, as highlighted by GSMA (2018) and the World Bank (2017). In

Uganda, particularly, urban areas report mobile phone ownership rates of 86.2 percent, while rural regions have a slightly lower ownership rate of 68.8 percent, according to the Uganda Bureau of Statistics (2021). The gender-based ownership gap is also significant, with male ownership at 78.4 percent and female ownership at 64.6 percent. In Busoga, a rural area in Uganda, 73.7 percent of the population owns a mobile phone (Uganda Bureau of Statistics, 2021).

While studies have examined the use of mobile phones for health information seeking, there is limited research on the experiences of rural women in this regard. The unique challenges faced by rural women, such as limited connectivity and lack of digital literacy, may impact their ability to use mobile phones for health information seeking.

Therefore, there is a need to explore how rural women are using mobile phones for health information seeking, and the challenges they face.

2. Literature review: Horst and Miller (2006) made the crucial point that emerging technologies are not automatically embraced passively as they travel across the world in a study tracking the spread of cell phones in Jamaica. Instead, they are appropriated, co-opted, and used in ways that the producers did not perhaps plan (Hampshire et al., 2021).
Most studies document this bottom-up phenomenon among health professionals and patients.

For instance, the research conducted by (Oliver et al., 2015) examined the utilisation of personal mobile phones among Community Health Workers in Kenya to address the challenges posed by heavy workloads and limited resources. Similarly, Hampshire et al. (2017) investigated the informal adoption of mobile health (Mhealth) activities by Community Health Workers in Ghana and Malawi. Mars and Scott (2017) explored how junior doctors in South Africa shared images of dermatological conditions with specialist consultants via mobile phones for expert advice, while Williams and Kovarik (2018) examined

the same practice. Additionally, Ling et al. (2020) studied the informal use of phones by healthcare workers in Thailand for patient referral. These studies collectively highlight a predominant focus on investigating the utilization of mobile phones among healthcare workers and patients. However, limited evidence exists regarding the utilisation of mobile phones by women, who often bear the burden of disease as patients and serve as the primary caregivers for their children, spouses, and relatives.

Other studies that looked at the use of mobile phones have been done on expectant and nursing mothers. For instance, Dasuki and Zaman (2019) investigated the use of mobile phones to access maternal health in Nigeria and discovered that mobile phones improved women's access to emergency healthcare services, empowered women to seek better quality care, and increased their knowledge of how to stay healthy. Participating in the m-health intervention also increased their sense of social connectivity, reflecting Tenhunen's (2018) and Barboni's (2018) findings on women's usage of mobile phones to keep connected with friends and family in ways that were previously impossible. In Bangladesh, Bishwajit et al. (2017) studied the usage of mobile phones to request birthing services in urban areas using data from an urban household health survey. They discovered that women living in informal settlements were less likely to request delivery assistance and also received less post-natal care than women living in other sections of the city. Kazi et al. (2017) studied women in Kenyan community healthcare centres to investigate mobile phone use for healthcare provision. They discovered that 82% of women-owned a phone. The ladies preferred phone conversations over text messages, most likely because many of them were illiterate and text messages from health officials would have to be read aloud by someone else, violating privacy.

Watkins et al. (2018) conducted a study in South Africa on the use of personal cell phones to improve healthcare among chronic disease patients, pregnant women, and health staff. The research was carried out in Mpumalanga, South

Africa, with 113 patients and 43 health staff from seven basic healthcare clinics and one district hospital participating in semi-structured in-depth interviews. The information was analysed thematically. They noticed that patients and health workers have been creating digital communication solutions' using mobile phones to address health care gaps and minimise health concerns. Setting medicine alarms and reminders, discussing medical visits and medication with family and friends, and arguing about symptoms with other patients on social networking sites such as Facebook and WhatsApp. Younger patients preferred to use their phones to search for health information via the internet and social media, whereas elderly persons lacked the essential knowledge and internet packages (data). WhatsApp is the most popular platform for young patients to talk about, share, and get health information. Receiving calls from health providers concerning their health was more enjoyable for older persons since it made them feel cared for by the system. Because these patients and health professionals lacked the financial wherewithal to pay for airtime, they only used websites and social media on occasion. Many people didn't know what to look for or where to look.

Even though this study is about health, it is broader and applies to both male and female patients. Consequently, there is a gap when it comes to women's health information seeking in and out of hospital settings.

Hampshire, et al. (2015) studied young people's informal use of mobile phones to bridge health care disparities in Ghana, South Africa, and Malawi. They collected data from over 4500 young adults aged 18 to 25 years using mixed methods and discovered that young people have devised informal ways of using cell phones for health care purposes, such as gathering health information. In an emergency, they "flash," email, and call relatives or friends for urgent practical assistance. As well as search the internet for health information.

Despite its many benefits, some challenges restrict the opportunities offered by mobile phones for health information seeking and access purposes. Ebo et al.

(2020) investigated the challenges encountered with the use of mobile phones to deliver public health services in the Greater Accra region of Ghana. Reporting that infrastructural problems, multiple language issues, illiteracy, technical issues and costs involved with phone usage are some of the barriers. They state that infrastructural problems include poor network coverage and lack of electricity to charge the mobile phone to keep it working all the time. In addition to technical issues regarding the phone such as size, resolution, processing capacity and general phone complexity especially since rural dwellers may not have the skills to operate complex applications on the phone.

Also, via questionnaires, focus group discussions and key informant interviews with pregnant women, lactating mothers and health workers, Laar et al. (2019) investigated the perspectives of women and health workers on the feasibility of using mobile health technology for the provision of maternal and child health services in rural settings of Upper West region of Ghana. They found that unreliable or limited power supply, cost of mobile phones and their functional utilities such as airtime, and network coverage are the main barriers to phone use for health purposes.

In a study about informal phone usage for health care even by young adults both male and female in rural South Africa, Hampshire et al (2015) revealed that people lack airtime and data, and experience phone breakages and low battery charge due to electricity fluctuations in rural settlements. Further indicating that there is a likelihood of misinformation due to a lack of skills in navigating the enormous amounts of information provided by the internet.

Previous studies have been largely limited in context by focusing on the formal use of mobile phones and ignoring the individual informal engagement with the device. While some studies do exist, their focus is on young adults, patients and health workers whose information practices and challenges may not fully relate to rural women in developing countries. Additionally, as noted by Lupton and

Maslen (2019), the experiences of digital health by women in disadvantaged communities such as rural areas may be different and thus call for a specific study endeavour. This gap justifies the need for the current study in Uganda.

3. Methods: The study adopted a qualitative research approach. According to Creswell and Creswell (2018), it is best suited for studies whose purpose is to learn from participants about their experiences within their settings and the meanings and interpretations they attach to these experiences. It is also suitable for new and less researched contexts such as the current study. It was appropriate for this study because it is participant focused and enabled exploration of women's experiences in using mobile phones for health information seeking.

The study's participants were twenty rural women, ten Village Health Teams (VHTs) members and ten health workers such as mid-wives, and nurses at health centre IIIs from Jinja and Kamuli districts in the Busoga sub-region, Eastern Uganda.

Data was collected using individual in-depth face to face interviews and focus group discussions. With this kind of interview, the interviewer has access to the subject's facial expressions, gestures, and other paraverbal communications, which may help to clarify the meaning of the words said (Carr & Worth, 2001). Such interviews were the most appropriate for the rural women because most of them were illiterate and required oral clarity on certain issues. Whereas focus groups discussions were used to collect data from the VHts and health workers.

4. Findings:

4.1. How rural women use mobile phones for health information seeking

The objective of the study was to explore rural women's use of mobile phones in seeking health information. Participants gave details of how they use mobile phones in seeking health information, although some of them revealed that they don't use their phones at all for health information seeking. Approaches employed by rural women emerged as a core category of using

mobile phones for health information seeking. The main approaches are discussed below:

4.1.1. Voice calls

Participants revealed a significant preference for voice calls as the primary method of seeking health information via mobile phones. They expressed a greater satisfaction with real-time, interactive communication facilitated by voice calls compared to other available options such as SMS. One FGD participant shared: “I use my phone for calls mostly so that the person can respond immediately and even me I can explain my health problem in real time.” While another asserted, “I use it to call the person I need information from. I don’t SMS or do those sophisticated things young people do with their phones. I just call directly and we discuss the health issue at hand” (W3), whereas one emphasised, “I only use it to call. When I need advice on something I call my doctor and he explains something to me or tells me that he is available at the health centre and I go there for consultation” (W12).

These statements reinforce the observation that, for rural women, voice calls are the most used application employed in seeking health information on mobile phones. The women demographics indicated that women participants owned feature phones, which offer limited applications in comparison to smartphones, thereby limiting their choice of applications. This is further aggravated by a lack of skills and knowledge to operate more advanced applications on mobile phones. This could be attributed to illiteracy, which renders them unable to read and write messages, another feature offered by feature phones.

The above results align with the findings of Chang et al. (2017), which indicate that women residing in rural areas primarily utilise mobile phones for voice communication purposes, such as making and receiving calls as they seek health information. These observations stress the importance of aligning the design of mobile health initiatives with women's established patterns of phone usage. By acknowledging and incorporating the compatibility of mobile

technology with women's existing phone behaviours, the effectiveness and acceptance of such initiatives can be maximised.

Regarding the type of information sought through voice calls, besides the common health information needs, it was interesting to know that most participants needed to know if the health worker they want to see and the vaccines for their children were available at the health centre on the day of their visit. As one participant stated, "I first call the health worker before I go to the health centre, because sometimes they are not there." (W4). This sentiment was corroborated by a healthcare worker during a group discussion, who affirmed:

> Some just call to know if we are available at the health centre, so that they can come to get treatment or to bring their children for immunisation. Women call and ask if the vaccine for their child is available on a given day before they come to the health centre. That is perhaps the most sought-after information even more than information on sicknesses (FGD-HW).

Additionally, a Village Health Team member mentioned:

> They can use the phone to call for first aid and get emergency services like a motorcycle to take them to hospital in case of an emergency such as convulsion of a child, late night labour pains. Transport here is very hard to come by (FGD-VHT).

The quotations above reveal that one of the motivations for using calls by rural women, is to ascertain the availability of health workers and vaccines at the facility before physically visiting. This shows that participants express a sense of caution and practicality, as they want to avoid unnecessary trips if the services, they seek are unavailable. This also reflects a desire to optimise their time and resources which as reported by other studies are limited.

Participants mentioned using voice calls to arrange for emergency health services, particularly in situations involving urgent medical needs like bleeding or convulsions. In such cases, mobile phones serve as a lifeline, enabling individuals to reach out for assistance when immediate transportation

is not readily available. This highlights the critical role that mobile phones play in bridging gaps in access to healthcare services in rural areas.

4.1.2. Text messaging

Apart from voice calls, participants actively utilised text messaging as a means to seek health information. They employed a specific phrase, referred to as "call me back," which served as a request for a return call. This practice bore resemblance to a phenomenon known as "flashing or beeping," where individuals intentionally cause their phones to ring briefly, signalling the recipient to call back, as it would appear as a missed call.

Participants explained that they resorted to this approach due to limited airtime, which restricted their ability to engage in extended conversations or consultations with various health information sources including health workers, Village Health Team members, friends, etc. It was primarily employed when seeking information from sources perceived 'richer' than the participants and thus considered more likely to respond with a call-back. This practice however, was only employed by individuals with basic phone literacy skills, including reading and writing abilities to be able to retrieve the automated "call me back" text from the phone.

This data provides insights into the complex dynamics of seeking health information in resource-constrained settings, where individuals creatively adapt their communication strategies to overcome challenges such as limited airtime as affirmed in a study by Zurovac et al (2013). It also highlights the social and hierarchical aspects involved, as participants selectively employed the "call me back" approach when interacting with individuals perceived economically capable. These findings emphasise the need to consider cultural, social, and economic factors when designing interventions or platforms for health information dissemination to rural communities whose capabilities are generally limiting.

Although several studies indicate that text messages have been used to communicate, store, retrieve and remind patients of their health status or deliver messages that promote health behaviours and choices (Kruse et al., 2019), the

current study revealed that rural women don't regularly use SMS to communicate with each other about health matters nor refer to the ones they receive unsolicited for. It is therefore important to consider client preference for delivery modalities when considering any mHealth interventions (Beratarrechea et al., 2015).

4.1.3. Phone radio

In addition to its primary functions, the mobile phone served as a valuable tool for accessing radio programs, including specific broadcasts on health-related topics. One participant shared her experience, stating:

> ... I have particular health programs I listen to using my phone. But I don't call to ask questions, I just listen to whatever topic they are discussing that day and learn, since I don't have a radio, I use my phone as a radio and listen from wherever I am even sometimes when I am digging, cooking, etc. Sometimes, they talk about diseases and how they are spreading and announce immunisation dates, so I get to get all this information on my phone radio (W2)

Another remark made by a Village Health Team member further supports this notion:

> Some people turn their phones into radios. They use them to listen to radio programmes on health where they get health information. Maybe at that point it is not the information they want but it is still helpful that they can be able to get health information somehow (FGD VHT)

The convenience of using a phone as a radio allowed participants to access health information regardless of their location or ongoing activities. This finding emphasizes the importance of leveraging mobile phone capabilities to extend the reach of health programs and deliver relevant information to individuals, particularly in areas where access to traditional radio devices may be limited due to poverty or other factors such as gender.

Additionally, the observations made by the Village Health Team members highlight the broader impact of phone radios, acknowledging that even if the specific information sought may not be available at all times, the opportunity to access health-related content in any form can still be valuable for

individuals. This insight highlights the potential of mobile phones as a versatile tool for health information dissemination, serving as a complementary resource alongside traditional communication channels.

4.2. Factors that influence use of the phones

As rural women seek information using their mobile phones, they face several barriers and facilitators to access.

Rural women expressed the importance of having access to relevant contacts. One woman remarked that, 'I have several contacts of people I can call when I need advice on health issues such as doctors, VHTs and friends' whereas another said 'I don't have phone numbers of the nurses at the health centre, this forces me to walk to the health centre whenever I need to talk to a health worker'.

It can be inferred that rural women face a hindrance in utilising their phones to access health information due to limited access to phone contacts of individuals they perceive as reliable sources of health information such as health workers. Furthermore, this revelation underscores rural women's limited understanding of the full potential of mobile phones, as they seem unaware that health information can also be obtained through alternative means such as the internet via internet enabled mobile phones.

Analysis of the data indicated that rural women had limited skills in phone use which restricted their ability to effectively utilise their mobile phones for gathering health information. The limited phone skills among rural women were identified as a significant barrier in their engagement with mobile health information seeking. Due to limited phone skills, these women encountered challenges in effectively navigating phone features, accessing relevant applications, and utilising various functionalities that could provide them with the desired health information. Consequently, their ability to leverage the full benefits of mobile phones as a tool for health information seeking was constrained.

This finding sheds light on the importance of considering digital literacy and phone skills when designing interventions aimed at promoting

mobile health information seeking among rural women. It underscores the need for tailored approaches that address the specific skill gaps and provide adequate support to enhance their phone proficiency. By addressing these limitations and empowering rural women with the necessary skills, it is possible to facilitate their engagement in mobile health information seeking, ultimately improving their access to valuable health knowledge.

Rural women's engagement with mobile health information seeking is also contingent upon their perceptions. For most of these women, physical presence holds great importance in matters concerning health. A respondent emphatically questioned, 'how do you give me advice without seeing me physically?' when asked about their use of mobile phones for seeking health information. This certainly means that rural women place value on physical interaction in the context of health in general but also health information seeking. A number of women explained that, they only use the phone after the first visit, that is for review. To have a conversation with a health worker on how the medication is working or not working in order to get a referral to a better facility. To them, this is permissible because they would have had a physical interaction before and got diagnosed properly.

Additionally, several women elaborated on their usage patterns, indicating that they only resorted to using phones for follow-up purposes after an initial visit. This entails engaging in conversations with health workers to discuss the effectiveness or ineffectiveness of medications and to obtain referrals to more suitable healthcare facilities. For these women, this approach is deemed permissible since it follows an initial visit and accurate diagnosis by a health worker. One participant explained it this way:

> ...not so much unless I need a review after a visit to the hospital. Let's say I went there already and they gave me drugs, then I reach home and I can't remember the directions on how to use them, I call the nurse and she gives me directions again or when I need review for an ongoing illness but I don't want another physical visit to the doctor (W13).

The data also highlighted several technical and financial challenges such as poor network connectivity, airtime and electricity cuts. The participants mentioned that airtime is expensive considering their meagre incomes and this affects their use of mobile phones for health information seeking. The participants were mostly peasants and housewives and so airtime was an additional expense to taking care of their families. As one woman said, "...then there is the airtime problem, sometimes I want to call someone but when I don't have airtime so I end up giving up" (W1), while another agreed, "I could be on an ongoing call and it gets cut before the discussion is finished. But the other person does not call back, so I don't get the information I need at that time." (W7). Therefore, the expenses associated with airtime are burdensome to the rural women and limit their ability to engage with health information seeking using mobile phones.

The unreliable network coverage and interruptions in power supply significantly hinder the ability of rural women to use their phones. Almost all women commented on the unreliable electricity supply in the area. Most of them don't have electricity supply in their homes but charge their phones from the village trading centre or neighbours but even then, general electricity supply in the areas studied fluctuates every now and then. A representative comment revealed that:

> Low battery is a problem because our electricity is not stable. I can charge today and after four days the phone goes off with no battery, then I cannot charge again because there is no power in the entire village for days or I don't have money for charging at the trading centre where they charge something in order to charge for you (W3)

Another problem identified was network coverage which in a way is similar to airtime because calls get cut. In this case, participants revealed that they sometimes have poor network coverage and so they hardly hear the person on the other side of the call or the call get cut or just doesn't go through at all. These findings imply that women end up with "unclear and incomplete information" as stated by (Musoke, 2006, p. 5) which ultimately results in non-usage or reluctance in using such information.

Addressing the technical challenges by improving network coverage and ensuring stable power supply can enhance their access to mobile health services especially information. Additionally, implementing measures to alleviate the financial burden, such as offering affordable or subsidized airtime options, can facilitate their engagement with health information through mobile phones.

The proximity of information sources to the women' homes also contributed to their use of mobile phones for health information seeking. The ones in close proximity with VHTs and health workers found no need for phone use whereas the ones who were farther away, often times relied on mobile phones to reach their information sources because they found it convenient and time-saving.

5. Recommendations:

Wainer (1998) argues that in order to improve rural women's health it is essential to continuously get their views on what works best for them or rather want they want. I believe that for any strategy to work, views of the recipients should at the forefront.

The rural women expressed the need for revitalizing regular women's health sensitization meetings in their villages. They recognized the declining organization of these meetings despite considering them crucial for bringing health information closer to them. As highlighted by Asiki et al (2018), health education in any form improves the understanding of health information and facilitates informed decision-making regarding seeking healthcare. Regardless of the presence or absence of mobile phones, rural women consistently seek health information on a daily basis. Thus, revitalizing these meetings would greatly contribute to fulfilling their health information needs.

There was unanimous agreement among the women that toll-free contact numbers for health workers specialising in common women's health issues were necessary. Many women emphasized that if such contacts were provided, they could easily call expert doctors and nurses to address their queries whenever they required information. This is because they lack airtime yet they exhibit a high level of trust in health workers compared to other sources

of health information. They also noted that the health workers available in their villages were not as knowledgeable as those in urban health facilities, who are often financially inaccessible to them. Consequently, the toll-free numbers would enable them to access valuable information when needed.

In the context of mHealth strategies aimed at rural women, it was suggested that a preference should be given to voice calls over text messages. This recommendation stems from the fact that a significant proportion of rural women are illiterate and face challenges in reading and writing. Consequently, voice calls are considered a more suitable mode of communication for them. Moreover, if text messages are employed, it is essential to ensure that they are delivered in a local language that the women can comprehend, rather than relying solely on English.

6. Conclusions

To effectively engage rural women, interventions should consider their preferences for example revitalizing women's health sensitization meetings in villages and providing toll-free contact numbers for specialised health workers were suggested strategies to address their unique health information needs.

Tailoring interventions to the sociocultural, economic, and literacy-related factors specific to rural women is crucial for improving health outcomes and empowering them to make informed healthcare decisions. Further research should explore the effectiveness of voice calls using toll free health expert contacts in addressing the health information needs of rural women.

References

Asiki, G., Newton, R., Kibirige. L, Kamali, A., Marions, L., Smedman, L. (2018). Feasibility of using smartphones by village health workers for pregnancy registration and effectiveness of mobile phone text messages on reduction of homebirths in rural Uganda. *PLoS ONE* 13(6): e0198653. https://doi.org/10.1371/journal.pone.0198653

Avila, J. (2018) Going Rural: The Case for Access to Reproductive Health Care. *International Women's health Coalition.* https://iwhc.org/2018/03/rural-case-access-reproductive-health-care/

Barboni G., Field, E., Pande, R., Rigol, N., Schaner, S., Troyer Moore, C. (2018). A Tough Call: Understanding barriers to and impacts of women's mobile phone adoption in India. Cambridge, MA: Evidence for Policy Design, Harvard Kennedy School.

Beratarrechea, A., Diez-Canseco, F., Fernández, A., Kanter, R., Letona, P., Martinez, H., Miranda, J. J., Ramirez-Zea, M., & Rubinstein, A. (2015). Acceptability of a mobile health based intervention to modify lifestyles in prehypertensive patients in Argentina, Guatemala and Peru: a pilot study. *Revista peruana de medicina experimental y salud publica*, *32*(2), 221–229.

Bishwajit, G. Hoque, M.R. & Yaya, S. (2017). Disparities in the use of mobile phone for seeking childbirth services among women in the urban areas: Bangladesh Urban Health Survey. BMC Medical Informatics and Decision Making, No. 17: 182.Carr, E. C. J., & Worth, A. (2001). The use of the telephone interview for research. *NT Research*, *6*(1), 511–524. https://doi.org/10.1177/136140960100600107

Chang, L., Chiuan Yen, C., Xue, L., Choo Tai, B., Chuan Chan, H., Been-Lirn Duh, H., & Choolani, M. (2017). Factors associated with mobile health information seeking among Singaporean women. *Journal of Women Aging, 29*(1), 75-86. https://doi.org/10.1080/08952841.2015.1065144

Creswell, J. W., & Creswell, J. D. (2018). *Research design: qualitative, quantitative, and mixed methods approaches.* Fifth edition. Los Angeles, SAGE.

Dasuki, S. I., & Zaman, E. D. (2019). Assessing mobile phone use by pregnant women in Nigeria: A capability perspective. *The elctronic journal of information systems in developing countries*, *85*(5). https://doi.org/https://doi.org/10.1002/isd2.12092

Ebo, A. H., Abor, P. A., Abuosi, A. A., & Adzei, F. A. (2020). Challenges encountered with the use of mobile phones to deliver public health services in the Greater Accra Region of Ghana- A qualitative study. *Research square*. https://doi.org/https://doi.org/10.21203/rs.3.rs-32363/v1

Kruse, C., Betancourt, J., Ortiz, S., Luna, S. M. V., Bamrah, I. K., & Segovia, N. (2019). Barriers to the Use of Mobile Health in Improving Health Outcomes in Developing Countries: Systematic Review. *Journal of Medical Internet Research*, *21*(10). https://doi.org/https://doi.org/10.2196%2F13263

Musoke, M. G. N. (2006). Access and use of information by primary health care providers in rural Uganda: An interaction-value model. *University of Dar es Salaam Library Journal*.

Oliver, M., Geniets, A., Winters, N., Rega, I., & Mbae, S. M. (2015). What do community health workers have to say about their work, and how can this inform improved programme design? A case study with CHWs within Kenya. . *Global Health Action*, *8*. https://doi.org/10.3402/gha.v8.27168.

Guendelman, S., Broderick, A., Mlo, H., Gemmill, A. & Lindeman, D. (2017). Listening to
communities: mixed-method study of the engagement of disadvantaged mothers and pregnant women with digital health technologies. *Journal of Medical Internet Research*, 19(7):e240, 1-11. doi: 10.2196/jmir.7736

Hampshire, K., Mwase-Vuma, T., Alemu, K, Abane, A., Munthali, A, Awoke, T, Mariwah, S, Chamdimba, E, Owusu, S.A, Robson, E, Castelli, M, Shkedy, Z, Shawa, N, Abel, J., Kasim, A. (2021). Informal mhealth at scale in Africa: Opportunities and challenges. *World Development*,140. https://doi.org/10.1016/j.worlddev.2020.105257.

Hampshire, K.R., Porter, G., Mariwah, S., Munthali, Al., Robson, E.,Owusu, S.A., Abane,
Milner, J. (2017). Who bears the cost of ‘‘informal mhealth? Health-workers” mobile phone practices and associated political-moral economies of care in Ghana and Malawi. *Health Policy & Planning*, 32(1), 34–42. https://doi.org/10.1093/heapol/czw095.

Hampshire, K., Porter, G., Owusu, S. A., Mariwah, S., Abane, A., Robson, E., Munthali, A., DeLannoy, A., Bango, A., Gunguluza, N., Milner, J. (2015). Informal m-

health: How are young people using mobile phones to bridge healthcare gaps in Sub-Saharan Africa? *Social Science and Medicine, 142*, 90–99. https://doi.org/10.1016/j.socscimed.2015.07.033

Hinneburg, J. (2017). Evidence-based health information enabling informed decision-makingJana Hinneburg. *European Journal of Public Health, 27*(suppl_3). https://doi.org/10.1093/eurpub/ckx187.519

Horst, H. & Miller, D. (2006). The Cell Phone: An anthropology of communication. Oxford: Berg.

Kazi, A., Carmichael, J., Hapanna, G., Wangoo, P., Karanja, S., Wanyama, D., Muhula, S., Kyomuhangi, L., Loolpapit, M., Wangalwa, G., Kinagwi, K. & Lester, R. (2017). Assessing Mobile Phone Access and Perceptions for Texting-Based mHealth Interventions Among Expectant Mothers and Child Caregivers in Remote Regions of Northern Kenya: A Survey-Based Descriptive Study. *JMIR Public Health and Surveillance.*

Kruse, C., Betancourt, J., Ortiz, S., Luna, S. M. V., Bamrah, I. K., & Segovia, N. (2019). Barriers to the Use of Mobile Health in Improving Health Outcomes in Developing Countries: Systematic Review. *Journal of Medical Internet Research*, *21*(10). https://doi.org/https://doi.org/10.2196%2F13263

Laar, A.S., Bekyieriya, E, & Isang, B. B. (2019). Assessment of mobile health technology for
maternal and child health services in rural Upper West Region of Ghana. *Public Health*,168:1-8. https://doi.org/10.1016/j.puhe.2018.11.014.

Lee, H.S. (2018). A comparative study on the health information needs, seeking and source
preferences among mothers of young healthy children: American mothers compared to recent immigrant Korean mothers. *Information Research*, 23(4), paper 803. Retrieved from http://www.informationr.net /ir/23-4/paper803.html.

Lee, H., Hirai, A.H., Lin, C-CC., & Snyder, J.E. (2020). Determinants of rural-urban differences in health care provider visits among women of reproductive age in the United States. *PLoS ONE* 15(12): e0240700. https://doi.org/10.1371/journal.pone.0240700

Ling, R., Poorisat, T., & Chib, A. (2020). Mobile phones and patient referral in Thai rural healthcare: A structuration view. *Information, Communication & Society*, 23 (3), 358–373. https://doi.org/10.1080/1369118X.2018.1503698.

Lupton, D., & Maslen, S. (2019). How Women Use Digital Technologies for Health: Qualitative Interview and Focus Group Study. *Journal of Medical Internet Research*. 21(1): e11481 doi: 10.2196/11481

Mars, M., & Scott, R. E. (2017). Being Spontaneous: The Future of Telehealth Implementation? *Telemedicine and e-Health*, 23(9), 766–772. https://doi.org/ 10.1089/tmj.2016.0155.

Oliver, M., Geniets, A., Winters, N., Rega, I., & Mbae, S. M. (2015). What do community health workers have to say about their work, and how can this inform improved programme design? A case study with CHWs within Kenya. *Global Health Action*, *8*. https://doi.org/10.3402/gha.v8.27168.

Sekabira, H., & Qaim, M. (2017). Can mobile phones improve gender equality and nutrition? Panel data evidence from farm households in Uganda. *Food Policy*, *73*,

95–103. https://doi.org/10.1016/j.foodpol.2017.10.004.

Subedi, R.T., Greenberg, L. T., & Roshanafshar, S. (2019). *Does geography matter in mortality? An analysis of potentially avoidable mortality by remoteness index in Canada*. Health Reports. https://www150.statcan.gc.ca/n1/pub/82-003-x/2019005/article/00001-eng.htm

Tenhunen, S. (2018) A Village Goes Mobile: Telephony, Mediation, and Social Change in Rural India. Oxford: Oxford University Press.

Uganda Bureau of Statistics (UBOS). (2021). Uganda National Household Survey 2019/2020. Kampala, Uganda; UBOS.

Watkins, J. O. T., Goudge, J., Gómez-Olivé, F. X., & Griffiths, F. (2018). Mobile phone use

among patients and health workers to enhance primary healthcare: A qualitative study in rural South Africa. *Social Science and Medicine*, *198* (August 2017), 139–147. https://doi.org/10.1016/j.socscimed.2018.01.011

Williams, V., & Kovarik, C. (2018). WhatsApp: An innovative tool for dermatology care in limited resource settings. *Telemedicine & eHealth*, 24(6), 464–468.

World Bank. (2017). Fact-sheet: Infrastructure in Sub-Saharan Africa. WorldBank.

Zurovac, D., Otieno, G., Kigen, S., Mbithi, A. M., Muturi, A. Snow, R. W., Nyandigisi, A. (2013). Ownership and use of mobile phones among health workers, caregivers of sick children and adult patients in Kenya: cross-sectional national survey. *Globalisation and Health*, 9:20