Challenges in accessing maternal and child health services during COVID-19 and the potential role of social networking technologies

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Abstract

Background: The COVID-19 pandemic causes new challenges to women and their babies who still need to access postnatal care amidst the crisis. The novel application of social network technologies (SNTs) could potentially enhance access to healthcare during this difficult time.

Objectives: This study describes the challenges experienced in accessing maternal and child health services by women with limited or no education during this COVID-19 pandemic and discusses the potential of SNTs to support maternal and child health amidst this crisis.

Methods: We administered surveys to women who had recently given birth in a rural setting and interviewed a purposively selected subset to ascertain their experiences of accessing maternal and child health services during the COVID-19 pandemic. Our analysis involved descriptive analysis of quantitative data using STATA 13 to describe study participants' characteristics, and content analysis of qualitative data to derive categories describing maternal health challenges.

Results: Among 50 women, the median age was 28 years (interquartile range 24–34), 42 (84%) completed upper primary education. Access to the health facility was constrained by transport challenges, fear of contracting COVID-19, and delays at the facility. Due to the COVID-19 crisis, 42 (84%) women missed facility visits, 46 (92%) experienced financial distress, 43 (86%) had food insecurity, and 44 (88%) felt stressed. SNTs can facilitate remote and timely access to health services and information, and enable virtual social connections and support.

Conclusion: SNTs have the potential to mitigate the challenges faced in accessing maternal and child health services amidst the ongoing COVID-19 pandemic.

Introduction

COVID-19

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The World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) as a global public health emergency on 30 January 2020.[1] The disease has become a global pandemic infecting over 248 million (of which

over 8 million are from Africa) and resulting in over 5 million deaths as of the 8 December 2021.[2] Of those, over 127,000 cases and over 3000 deaths have been in Uganda.[3] The pandemic has disrupted access to healthcare especially in resource-limited settings which have long been struggling with the overburdened health systems with limited service infrastructure and low clinician-patient ratios. For instance, in Uganda, the Ministry of Health (MoH) reported a reduction in facility-based infant deliveries in March 2020 compared with January 2020 and an increase in maternal mortality.[4] In a country where two in every 10 people (21% of the population) live on $1.25 a day or less,[5] many working poor cannot physically distance from others and maintain their livelihood, and poverty constrains access to healthcare services. Across the country, the pandemic is expected to render many people severely food-deprived, expose many to extreme poverty, and contribute to a significant decline in health expenditures. Although there is some promise in COVID-19 treatment (e.g. dexamethasone),[6] most are not available in low-resourced settings (LRSs).

Maternal and child health in Uganda

Even before the COVID-19 pandemic, Ugandan hospitals have been struggling with severe shortages of healthcare professionals and medical supplies. In 2019, the WHO estimated the doctor-patient ratio in Uganda at 1:24,725, which is significantly lower than the 1:1000 ratio recommended by the WHO. In the setting of the pandemic, the focus is disproportionately put on COVID-19 treatment at the expense of other important healthcare services such as maternal and child health, thus creating new challenges especially to the vulnerable rural women and their babies. Amidst the current lockdowns and travel restrictions, women still need to access postnatal care for themselves and their children, including Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) prevention. . Since the onset of COVID-19 in March 2020, Uganda's maternal mortality increased by 10.4%, from 1089 in 2019 to 1202 in 2020 drawing from the data contained in the Health Management Information System.[7] Neonatal death rate rose (from 39 to 49/1000 live births) during the 3-month lockdown—April to June 2020.[8] Early in the pandemic, the Ugandan MoH recorded a 29% reduction in facility-based infant deliveries and an 82% increase in maternal mortality.[9] In a country where (before the COVID-19 crisis) over 17 women have been dying daily due to preventable pregnancy-related complications,[10] the effect of the COVID-19 crisis on maternal and child health cannot be under looked. Studies detailing the challenges experienced by women in accessing healthcare services during this pandemic are lacking.

The potential of mHealth technologies

The Director-General for WHO recently called for innovative responses to fight the COVID-19 pandemic.[11] The use of mHealth technologies (such as mobile phones-based apps) can provide innovative and faster (compared to traditional approaches e.g. face-to-face) ways of promoting health. For instance, mHealth technologies (e.g. SMS texts and real-time medication adherence monitors in particular) have been shown to successfully promote the adoption of health behaviors including antenatal and postnatal service utilization.,[12,13] as well as HIV/AIDS prevention[14] and medication adherence.[15,16] Importantly, over 75% of the population in Uganda accesses mobile phones, and there is telephone network reception across the country— including rural areas.[17]

Basic mHealth technologies such as social network technologies (SNTs)—often known as social media (e.g. WhatsApp, Twitter, and Facebook) allow users to create, share, and monitor electronic content independently, thereby provoking a major transformation of the internet from a top-down information-provider model to one which is driven by users themselves.[18] Such technologies can be important tools for creating and disseminating timely information, as well as enabling women to be more actively involved in their health. This novel application of SNTs could potentially enhance more sustainable maternal and child health given the prime focus upon networks/communities, rather than the commonly used individual conceptualization of health behaviors. The type of communication is important given that maternal and child health is shaped by factors at both individual levels (e.g. depression, age), as well as factors beyond the individual (e.g. economic activity, social support). Despite the potential advantages of SNTs, knowledge on their application to support maternal and child health during this COVID-19 crisis is limited especially in low resource settings. Here, we describe the challenges experienced in accessing maternal and child health services by women of limited or no education during this COVID-19 pandemic and discuss the potential of SNTs to support maternal and child health amidst this crisis.

Methods

Parent study

Participants were drawn from a parent study—MatHealth— that has been described previously.[19] Briefly, the parent study was a randomized trial of 80 pregnant women who were enrolled between January and December 2019 and followed until six weeks after delivery. Pregnant women initiating ANC were randomized (1:1) to a mobile phone-based *MatHealth App* that enabled them to receive tailored monthly maternal and child health-related video and

Table 1. Socio-demographic and basic health status characteristics of study participants.

Characteristics	(N = 50)		Value
Age			
	Median	(IQR)	28 (24–34)
Marital status, *n* (%)			
	Married		18 (36)
	Cohabiting		26 (52)
	Single		1 (02)
	Separated		5 (10)
Literacy, *n* (%)			
	Unable to speak basic English		35 (70)
	Unable to read basic English		36 (72)
	Unable to write basic English		38 (78)
	Able to speak the local language		49 (98)
	Able to read the local language		44 (88)
	Able to write the local language		44 (88)
Distance from Mbarara regional referral hospital, *n* (%)			
Within 10 km			30 (60)
Beyond 10 km			20 (40)
Type of residence, *n* (%)			
Rural area			31 (62)
Education, *n* (%)			
	None		2 (4)
	Lower primary: up to P3 level[a]		6 (12)
	Upper primary: up to P7[a]		42 (84)
Employment, *n* (%)			
	No employment		18 (36)
Casual worker			32 (64)
Formal work			0(0)

(continued)

Table 1. Continued.

Characteristics	(N = 50)	Value
HIV status, *n* (%)		
Positive		6 (12)
Negative		44 (88)

[a]In the Ugandan education system, P3 is often attended by 6–8 year olds. P4 to P7 is often attended by 9–12 year olds.

audio files, set clinic attendance appointment reminders, and talk to an obstetrician versus routine care. They were recruited from Mbarara Regional Referral Hospital (MRRH), which is the largest hospital in rural southwestern Uganda. The MRRH employs 11 obstetricians and 22 midwives and performs over 10,000 deliveries annually with a maternal mortality rate of 270/100,000 live birth, cesarean section rate of 30%, and a perinatal mortality rate of 56/1000. There is currently no follow-up mechanism for pregnant women and no provision for remote consultation of healthcare providers. Inclusion criteria were as follows: (a) initiating antenatal care at MRRH with a first presentation in the first or second trimester, (b) not having attended school or having a low education level (i.e. not having studied beyond primary seven elementary education), (c) 18 years and above, (d) residents of Mbarara (within 20 km of MRRH), (e) ability to use mobile phones, (f) willing and able to give informed consent, and (g) able to speak Runyankole (the local language). Women who were not able or willing to give informed consent were excluded. These pregnant women were recruited into the study between January and December 2019. The median follow-up was 6 months (interquartile range [IQR] 5-7). The analysis utilized a mixed-methods design. The analysis presented in this paper involved surveys administered to 50 participants as well as an interview of a subset of 21 participants from the MatHealth study, 14 months after concluding the study.

Data collection

We contacted all the participants in the MatHealth study through phone calls. Of the 80 women called, 50 (63%, 50/80) participated in this study—30 participants had either moved away or their phone numbers were not available. Authors ATM, PK, and JK administered surveys to the 50 participants to collect information of their sociodemographic, basic health, as well as data related to COVID-19 prevention (e.g. access to information, vaccination). For qualitative interviews, we purposively sampled participants based on our experience interacting with them in the parent study to achieve varied experiences of the utilization of maternal health services. From private space at a research office near MRRH, ATM and JK

carried out semi-structured interviews with participants in July 2021. Interviews were carried out until thematic saturation was achieved (i.e. until no new data was obtained)—which occurred after the 21st participant. Each interview lasted between 40 and 50 min. All questions in the interview guide were translated from English into the local language (Runyankole) and back-translated to English by a different translator, after which the two versions were compared for accuracy. The interviews were carried out in the local language, digitally recorded, transcribed, and translated to English for analysis. Interviews mainly elicited information about the challenges that women are encountering in accessing maternal and child health services amidst COVID-19-induced lockdowns. Although the women had already given birth, they still had to access facilities for postnatal care such as taking their children for immunization, accessing family planning, HIV/AIDS-related services (e.g. early infant diagnosis), as well as seeking treatment for their babies. Following each interview, AM and WT reviewed the transcripts for quality, clarity, and detail.

Analysis

ATM and WT used STATA 13 to describe study participants' characteristics and COVID-19-related information. AM and ATM used inductive content analysis[20] to derive categories describing and summarizing challenges encountered by participants in utilizing maternal health services. Initially, they reviewed and discussed 20% of transcripts for content relevant to challenges related to access to health services. They then assembled a codebook from the identified concepts, using an iterative process, which included developing codes to represent content, writing operational definitions, and selecting illustrative quotes. Following completion of the codebook, AM and ATM applied codes using NVIVO 11. Differences in coding were harmonized through discussion.

Human subjects and ethics approval

All participants provided signed informed consent before study participation. The Institutional Review Committee of Mbarara University of Science and Technology, the

Table 2. COVID-19 related issues.

Characteristics		(*N* = 50)	Value
Where women currently get COVID-19 information, *n* (%)			
	Friends and relatives	31 (62)	
	Healthcare providers	13 (26)	
	WhatsApp	5 (10)	
	Radio	46 (92)	
	Village health teams	2 (4)	
What women want to know about COVID-19, *n* (%)			
	COVID-19 protection	38 (76)	
	Symptoms of the new COVID-19	29 (58)	
	COVID-19 transmission	26 (52)	
	What to do if I have the symptoms	23 (46)	
	Most groups at risk	20 (40)	
	COVID-19 treatment	36 (72)	
	Coping with COVID-19 consequences	17 (34)	
What women are doing to prevent COVID-19			
	I wash my hands with soap, *n* (%)		
	Always	29 (58)	
	Sometimes	21 (42)	
I have taken COVID-19 vaccination, *n* (%)			
	No	49 (98)	
When I am public, I wear a mask, *n* (%)			
	Always	30 (60)	
	Sometimes	13(26)	
	Never	7 (14)	
When I meet someone, I greet him by, *n* (%)			
	Shaking hands	15 (30)	
	Hugging	5 (10)	
	Waving from a distance	30 (60)	

Table 2. Continued.

Characteristics	(N = 50)	Value
How COVID-19 has affected mothers		
I have ever missed a clinic visit because of COVID-19, n (%)		
	Yes	42 (84)
	No	9 (18)
I have suffered financial difficulties because of COVID-19, n (%)		
	Yes	46 (92)
I have suffered food insecurity during this COVID-19 crisis, n (%)		
	Yes	43 (86)
I have felt stressed during this COVID-19 crisis, n (%)		
	Yes	44 (88)

Uganda National Council for Science and Technology, approved this study.

Results

Participant characteristics

As indicated in Table 1, the median age was 28 years (interquartile range 24–34), 36 (72%) were unable to speak English, while 44 (88%) were able to read the local language. The majority of the women (n = 42, 84%) completed upper primary education, and all women had no formal employment. Table 2 demonstrates the COVID-19 related issues.

Descriptive statistics

Table 2 indicates that radios are the main source of COVID-19 prevention information among women (n = 46, 92%). The majority of women (n = 38, 76%) wanted more information about COVID-19 prevention and had not received COVID-19 vaccination (n = 49, 98%). Due to the COVID-19 crisis, the majority of women reported missing some facility visits (n = 42, 84%), suffered financial difficulties (n = 46, 92%), had food insecurity (n = 43, 86%), and felt stressed (n = 44, 88%).

Qualitative results

Women reported that access to the health facility was constrained by transport challenges, fear of contracting COVID-19 at the facility, and delays at the facility. This resulted in missed clinic appointments, use of traditional medicine, borrowing money to access private facilities, and feelings of distress.

Challenges in accessing health services

Transport to the facility. Women reported experiencing COVID-19 related challenges in accessing maternal and child health services. These included delays in getting travel permission from local authorities and a high cost of transport due to travel restrictions. Consequently, some women opted to walk long distances to the facility while pregnant or carrying babies; others borrowed money to access services from private clinics, while others postponed facility visitations.

> My baby fell sick; but as I was about to reach the hospital for treatment, the police told us that they don't allow people to use motorcycles because of COVID-19, so they stopped, yet my baby was convulsing. Also, I had already paid my hard-earned money to the motorcyclist as transport costs, who even charged double the normal fare. I felt so bad … I had no option but to borrow money for transport and treatment and take him to the private clinic where he was given injections. ~ 30 years

Some women reported feeling distressed as a result of failing to get travel permission to take their sick children to the clinic.

I had already given some herbs to my child and pain killers but the high temperatures remained, so I wanted some check-ups. But the chairperson could not give me travel permission to the clinic. He referred me to the police who then told me to go back again the next day. I cried when I reached home. That night, I could not sleep …, I felt helpless and hated myself. After struggling to come in the hospital with a sick child, and then you see as if people don't care, of course, I felt bad. ~ 40 years

Delays at the health facility. Women reported delays in accessing services at the health facility, long queues, and missed appointments due to the absence of healthcare providers.

I went to the health facility on a Monday but could not find the Doctor; they told me Doctors work in shifts because of COVID-19. I was told to return on a Wednesday, so I had to go back home, and return on Wednesday when I finally saw him. I was not feeling well, but I had no option. ~26 years

Fear of contracting COVID-19 at the facility. Some of the women feared contracting COVID-19 from the health facility since the facility was also handling COVID-19 patients. They also reported difficulties in maintaining social distance at the facility due to congestion. As a result, some women decided to postpone visiting the facility, while others opted to use herbal medicine.

I was even late to go for the first antenatal check-up; I went at around 5 months. I was fearing the coronavirus because that's the time when the death rates were very high. ~ 35 years

I have heard of people going to the hospital for check-ups and they end up getting COVID-19, so I feared contracting the virus from the hospital. Even when my child fell sick, I could not risk taking her to the hospital. I gave her some herbals and fortunately, she got well. ~ 21 years

Discussion

In this study, the majority of women with limited or no education were severely affected by the COVID-19 pandemic. They expressed the need for more information about the COVID-19 presentation, had not taken COVID-19 vaccination, reported having missed clinic visitations, and suffered financial distress and food insecurity. These women identified three main challenges constraining access to maternal and child health services during the current COVID-19 pandemic: lack of transport to the facility, unnecessary delays, and fear of contracting COVID-19 at

the facility. This resulted in missed clinic appointments, use of traditional medicine, borrowing money to access private facilities, and feelings of distress. What follows is a discussion of these challenges in relation to how the use of SNTs can potentially be used to support maternal and child health during the COVID-19 crisis.

Previous mHealth studies before the COVID-19 pandemic indicate potential benefits of using mHealth technologies to support maternal health during these challenging times. mHealth technology in form of an app composed of educational video and audio files, and SMS appointment reminders improved uptake of exclusive breastfeeding (adjusted odds ratio (AOR), 2.10; 95% CI 1.06–4.15) in India.[21] The use of SMS texts for clinic appointment reminders and health education increased attendance to postpartum visits among Kenyan women living with HIV.[22] Additionally, it has previously been shown that a mHealth technology in form of mobile phone-based multimedia (video/audio) app is useful in providing tailored maternal health information to women of limited to no education in Uganda.[12,19] During the current COVID-19 crisis, some of the hospital visitation requirements could potentially be avoided if women have access to some of these technologies.

The proliferation of SNTs brings about a novel phenomenon in which communities based on physical proximity are complemented by a much wider type of community formed by people who are linked by certain mutual interests or activities. These are known as virtual communities. With virtual communities, the limits of social connections are substantially extended and reconstituted as the traditional geographies of social groupings are opened up and reconfigured. The US Center for Disease Control and Prevention[23] encourages the use of SNTs (e.g. video chats) to connect people infected with COVID-19 with their families and friends. Virtual communities or social support groups (e.g. using WhatsApp groups or chat rooms) can bring together the otherwise geographically disconnected people to mutually interact and obtain access to virtual health-related social support.[24] Women who are COVID-19 survivors, women challenged with maternal and child health issues, those with active infection, and other quarantined women can share experiences, coping strategies, encourage one another, and keep connected to friends and family. This virtual communication can reduce the potential psychological effects of COVID-19 and maternal and child health challenges by providing opportunities to share feelings and lessen anger, stress, and depression. To maintain confidentiality and social anonymity on such virtual platforms, user identification numbers or pseudonyms, rather than people's actual names, may be preferred. Women experiencing other COVID-19-related challenges, such as domestic violence, job loss, or loss of a relative or friend, can also be given emotional support through virtual communities. Through

such communities, good practices such as COVID-19 vaccination can be encouraged and physical distancing can as well be easily observed.

Studies utilizing SNTs (such as WhatsApp, Twitter, and Facebook) to support maternal and child health during this COVID-19 pandemic are lacking. In an online cross-sectional survey conducted among 19,515 pregnant women in China, 91% (17,734) of the women used SNTs to obtain general health information, although only 3% (640) used online prenatal care services.[25] The authors also report that using online prenatal care services, making appointments with doctors electronically, or using social media to obtain health information was related to positive mental health outcomes (reduced depressive and anxiety symptoms). In addition, in China, access to antenatal care information via the hospitals' official social media accounts was associated with a significantly lower risk of perceived stress (adjusted odds ratio [aOR] 0.46; $P = .001$), anxiety (aOR 0.53; $P < .001$), and depression (aOR 0.73; $P = .005$).[26] In the United Kingdom, the use of social media-based support services (known as Facemums) hosted on Facebook during COVID-19 lockdown enabled pregnant women to access useful antenatal information and remote consultations, as well as reduced feelings of isolation.[27] Because the use of these technologies often does not involve traveling to the clinic, they can facilitate delivery of timely services, promote social distancing, improve access to health facilities, enable the provision of services to the isolated and/or contagious patients, and reduce overloading of health facilities. SNTs dedicated to providing maternal and child health services are lacking in Uganda, like in many other low-resourced settings (LRSs). Yet, such technologies would make it possible for women to access many forms of maternal health care with minimum COVID-19 exposure risk, which could potentially address the identified challenges of missed clinic visitations due to fears of contracting the virus.

Most countries especially in LRS rely on informal audience feedback through social media metrics (e.g. number of followers, number of likes), which do not provide proof of feasibility, acceptability, and impact analysis. There is a need for evaluation studies utilizing technology adoption models such as the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which has a track record of predicting technology adoption in healthcare.[28] Moreover, the design and evaluation of SNTs should be informed by theories and frameworks related to social networking and behavioral change—an approach that has been shown to have positive effects on health behavioral change.[29]

Importantly, health information disseminated through SNTs may not reach women who do not possess smartphones or who have no access to internet connections. This situation can result in a digital divide with inequity in access to important information and/or resources. Only 19% of people own smartphones in developing countries, compared to 72% in developed countries.[30] In Uganda, only 44% of the total population of Uganda has access to smartphones.[31] Audio files could also be used by those with feature phones, although this may require adding memory cards to the phones to extend their storage capacity.

Additionally, although access to affordable internet is increasingly becoming a development priority, the internet coverage rate of 45% in developing countries is low compared to the 81% in developed countries.[32] Access to the internet in Uganda is limited at just under 40%.[33] Using a stand-alone (offline) mHealth application to disseminate health education and promotion videos in the local language can enable access among illiterate populations and populations without access to the internet.[12] However, this automated approach constrains real-time interactions that can potentially minimize the effects of social isolation. Access is further restricted by unfavorable government regulations. For instance, in 2018, Uganda introduced social media tax of 200 Shilling (US$0.05) per day on all social media users—which potentially excludes poor populations from accessing health promotional messages shared on social media. Providing accessible and affordable SNTs requires collaborative efforts from all the key players including SNTs users, internet service (e.g. telephone companies) social media service providers (e.g. Google, Facebook), healthcare providers; and regulatory bodies.

Furthermore, technological usability skill gaps exist The low literacy levels in developing countries, standing at 50% in sub-Saharan Africa compared to 14% in developed countries also constrain technology usability skills.[34] Women may be affected more than men—10% of women, compared to 4% of men in Uganda have no education.[35] Only 33% of Ugandan women (aged 15–49) have achieved at least some secondary level of education.[36] Women with low levels of education are often unlikely to access reliable health information and utilize maternal and child services compared to women with secondary or higher education.[37] Moreover, most of SNTs sites often use the English language. Building local language-based SNTs can address the challenge of the language barrier for women with low levels of education.

Further, the ability of users (especially vulnerable populations) to understand the information shared on SNTs and to discern its quality warrants attention. For instance, there have also been concerns of misleading information about COVID-19 circulating on SNTs.[38] The desperate need for information during the crisis, the easiness of information dissemination via these technologies, and poor moderation of online content are the main drivers of misinformation dissemination.[39] The use of official SNTs (such as those belonging to the government) should be emphasized, and resources should be allocated to facilitate the continuous monitoring and correction of untruthful posts from the users.

Conclusion

This study describes the challenges experienced in accessing maternal and child health services by women of limited to no education during this COVID-19 pandemic and discusses the potential of SNTs to support access to maternal and child health services amidst this crisis. Mothers' access to a health facility is mainly constrained by transport challenges, fear of contracting COVID-19 at the facility, and delays in being attended to at the facility. SNTs can potentially support access to maternal and child health services by facilitating remote and timely access to quality health services and information, enabling virtual social connections and support that transcend geographical barriers thereby promoting social distance, and reducing the effects of isolation; and reducing overloading of health facilities. Issues of concern that warrant further investigations include; evaluating the feasibility, acceptability, and impact of SNTs, implementing favorable government policies and quality assurance checks, and devising innovative ways of reaching vulnerable poor and illiterate populations who do not have access to technology or lack usability skills. Overall, technology has revolutionized our world in the past several decades. When harnessed properly, it also has significant potential to mitigate the incredible challenges faced by women in accessing maternal and child health services amidst the ongoing COVID-19 pandemic.

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