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Crisis and curfew: Lived experiences of community members seeking emergency maternal and neonatal care before and during the COVID-19 pandemic on Mfangano Island, Lake Victoria, Kenya

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Prior to the COVID-19 pandemic, families in rural sub-Saharan Africa faced numerous well-documented barriers in accessing timely care during maternal and neonatal health emergencies. We are now beginning to further appreciate the complex impacts that global disruptions, like the COVID-19 pandemic, can have on access to maternal care across vulnerable health systems, particularly for mothers seeking care in remote settings. In 2021, we initiated a qualitative follow-up study to the MOMENTUM (Monitoring Maternal Emergency Navigation and Triage on Mfangano) cohort study conducted within the remote communities of Mfangano Island on Lake Victoria, in Western Kenya, in 2019 and early 2020. Given the timing of this follow-up study, we sought to further qualify the barriers previously identified during the initial MOMENTUM quantitative survey, as well as explore specific ways that the COVID-19 pandemic impacted these barriers. In September 2021, 4 Focus Group Discussions (FGDs), with a total of 44 participants, were conducted among patients and families who had recently experienced maternal and neonatal emergencies. Additionally, 15 Key Informant Interviews (KIIs) were conducted with community leaders and health-care providers to allow reflection more broadly on their local emergency health-care system. A grounded theory methodology was utilized to analyze respondent themes. The lived experiences reported here by FGD and KII participants substantiate and validate numerous challenges previously identified in our prior study. Importantly, participants also highlighted specific ways that the pandemic intensified each of these factors, through the spread of misinformation, restricted mobility due to government curfews and lockdowns, increased frequency of health worker strikes, and worsening financial and resource constraints across the health system. Participants also described creative ways in which contextually experienced providers (i.e., Mfangano Health Navigators) facilitated critical coordination to help patients access care during the chaotic circumstances generated by the pandemic. These findings suggest that trained community health workers can play an influential role in improving emergency care coordination, particularly during future pandemics and similar public health disruptions within extremely resource-limited environments.

Keywords: Maternal health, Kenya, Emergency care coordination, COVID-19, Three Delays

Introduction

Millions of women and children living in rural sub-Saharan Africa continue to face perilous challenges accessing care during pregnancy and childbirth. Of the nearly 300,000 deaths attributed globally to pregnancy- and childbirth-related complications, more than half occur in sub-Saharan Africa [1]. In these underserved settings, delays in accessing emergency care have been shown to be a major driver of poor outcomes [2–5]. In theory, the respective delays in accessing emergency care can be described using the "Three Delays" model which defines these as (1) the delay in recognizing the need for care; (2) the delay in reaching the appropriate care setting; and (3) the delay in receiving definitive care at appropriate health facility [6]. In the field, however, accurately measuring these delays, particularly the first and second delays that occur in the community setting, has been a difficult logistical problem for researchers. To

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address this gap, various innovative strategies have been deployed in an attempt to quantify time delays and more fully diagram the specific obstacles faced by patients and their families in rural settings during a health crisis [7–9].

While this research has richly described the complex barriers that rural African mothers have faced for decades, further evidence is now emerging documenting the heightened impact that global disruptions, such as the COVID-19 pandemic, have had on maternal health across these already vulnerable health systems [10–12]. Kenya's experience during COVID was no exception, where mothers faced frequent interruptions in care provision, fear and misinformation, travel restrictions, and economic hardships during the initial COVID waves [13–15]. Here, we present the lived experiences of families on rural Lake Victoria in Western Kenya seeking emergency maternal care both before and during COVID-19 surges in 2020 and 2021. These accounts elucidate unique barriers faced by this remote population, as well as opportunities for community-based solutions during future health system disruptions.

Maternal health on Mfangano Island, Kenya

Mfangano Island Division is located in Lake Victoria, Homa Bay County, Western Kenya. Mfangano is home to approximately 30,000 Luo and Suba people who live primarily in small fishing and subsistence farming communities with no running water and limited electricity. Mfangano is served by numerous small public and private health centers that are severely under-resourced, constrained by staff shortages, poor infrastructure, and limited medical supplies [16]. Consequentially, less than 50% of mothers receive adequate antenatal care and only 15%–55% deliver at a health facility with skilled birth attendants [17]. The maternal mortality rate for communities living on Mfangano Island is estimated to be nearly 583 deaths per 100,000 live births which is one of the highest rates in the world [18]. Mfangano also has one of the most HIV-impacted populations in sub-Saharan Africa, with a seroprevalence of nearly 25% among adults [19], further exacerbating maternal and neonatal health challenges.

The MOMENTUM study and the "Three Delays"

The Mfangano Community Health Field Station represents a collaboration between the University of Minnesota Center for Global Health and Social Responsibility, Maseno University in Kisumu Kenya, and a community-based organization known as the Ekialo Kiona (EK) Center on Mfangano Island. Through a "Community Health Ecosystem" model, the Field Station facilitates longitudinal mentorship and research collaboration to address complex health, environmental, and poverty challenges faced by this remote population. As a complementary approach to large-scale studies that often dominate global health research, the Field Station promotes adaptive, locally contextualized investigations to identify enduring community-led solutions [20].

In 2019, the Field Station initiated a study known as MOMENTUM: Monitoring Maternal Emergency Navigation and Triage on Mfangano. MOMENTUM is a mixed-methods, cohort study focusing on barriers and delays that impact access to emergency pregnancy, obstetric, and neonatal care for patients living within the remote communities of Lake Victoria [9]. Between January 2019 and February 2020, the primary quantitative study was conducted to assess the "Three Delays" [6], and their impact on maternal and neonatal health outcomes (see Appendix 1: "Three Delays" Flow Diagram from Salmen et al. [21]).

Utilizing an innovative participatory audit strategy, the primary quantitative study analyzed 56 cases of maternal or neonatal emergencies among patients seeking care at 10 rural health facilities within Mfangano Island Division (**Figure 1**). This participatory audit was used to calculate delay intervals for each emergency and cataloged various patient-reported barriers and factors contributing to each of the three delays. Please see DesLauriers et al. [9] for full description of MOMENTUM study methodology. Among many findings, this study reported that patients within this remote population experienced an average total delay interval, from symptom onset to definitive treatment, of over 39 hours. Underscoring the perilous nature of emergency care for these small communities, the study also documented 14 neonatal and 2 maternal deaths in this 12-month period [21]. The Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) data collected in September 2021 and reported here serve as a qualitative follow-up to the initial quantitative study.

Mfangano health navigation program

The MOMENTUM study also seeks to provide actionable data to support a locally coordinated Health Navigation (HN) program on Mfangano Island that was developed and first implemented in 2014 by local Field Station partners. This program is adapted from the Kenyan Ministry of Health (MoH) recommendations for improvements in health referral coordination at the community level [9]. Designed using local needs assessments and similar patient navigation models, the HN program relies upon community health workers (CHWs) initially recruited by the MoH, who then received specialized "Health Navigator" training to serve as birth planning educators, pregnancy monitors, lay first responders, and emergency referral coordinators. Most importantly, the HN program focuses on providing critical triage, logistical support, patient advocacy, and follow-up during maternal and neonatal emergencies. In this capacity, the HN program also coordinates a 24-hour on-call emergency boat, housed at the EK Center, to aid with the emergency transfer of patients from island facilities to the mainland hospitals. Throughout the duration of the MOMENTUM study, the HN program was operational within the Mfangano East location on Mfangano Island, serving 2 MoH health facilities, and thus enabling preliminary comparisons of HN impact on maternal and neonatal health outcomes among patients presenting to participating versus nonparticipating facilities in the program [9]. Importantly, the analysis of the initial 56 MOMENTUM cases indicated significant

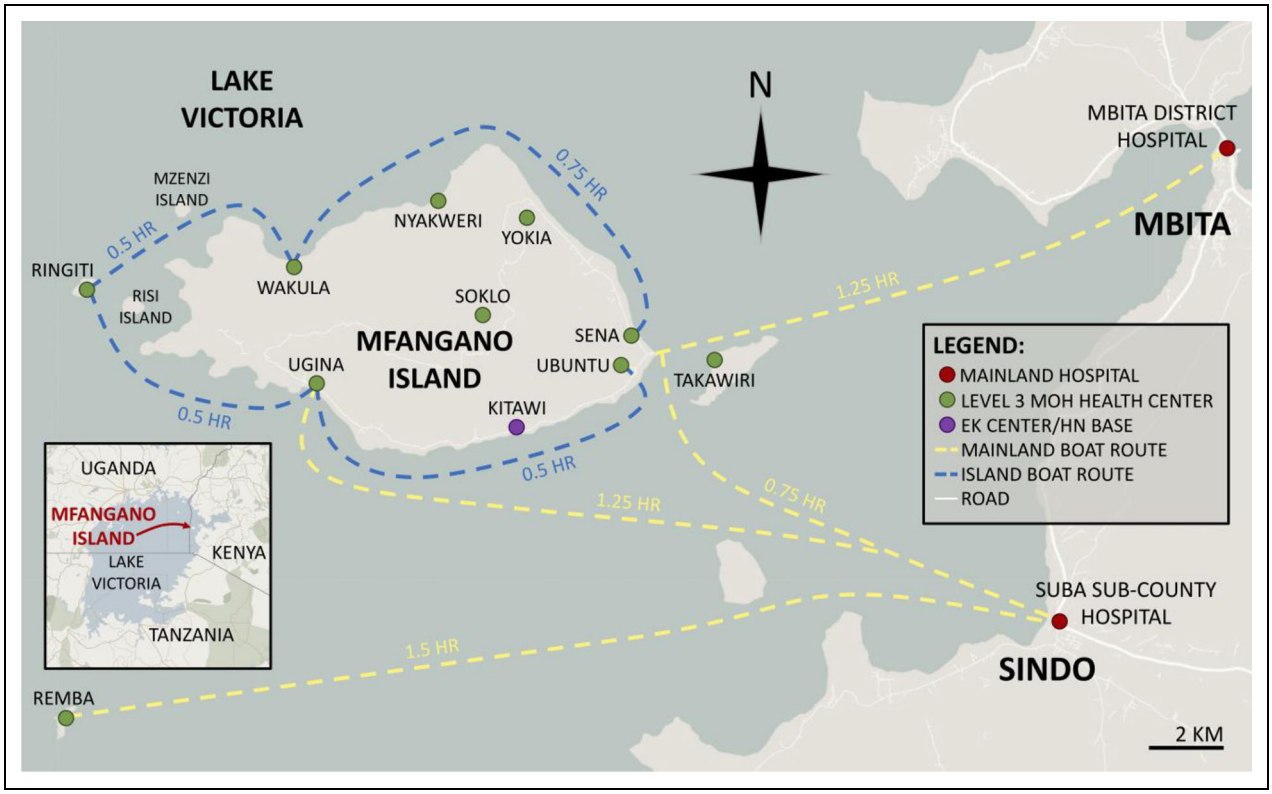

Figure 1. Map of Mfangano Island Division, Lake Victoria, Kenya, showing 10 health facilities participating in MOMENTUM study, Ekialo Kiona Center, and examples of routes traveled during emergency transport (reproduced with permission from Salmen et al. [21]).

reductions in Type 2 (reaching care) and Type 3 (receiving care) delays associated with emergencies that involved Health Navigators and the use of their community-managed Emergency Boat.

Qualitative follow-up study: Objectives and goals

Across Kenya, COVID-19 generated unprecedented disruptions in access to pregnancy-related and obstetric care, and consequently, suspected increases in the incidence of out-of-hospital births [22]. COVID-19 was particularly disruptive for under-resourced health systems such as Mfangano Island [23]. In September 2021, following a pause in research operations due to COVID-19, we initiated a follow-up qualitative study to our initial quantitative cohort study. Given the before and after timing of these studies related to the pandemic, our follow-up study was designed broadly to substantiate and further examine previously identified barriers to emergency care on Mfangnao Island, and elucidate specific ways in which communities experienced disruptions in access to emergency maternal care during COVID-19 surges. Overall, the purpose of this qualitative study was to document community perspectives on navigating maternal and neonatal emergencies both before and during the pandemic, and directly involve families and community leaders in identifying locally tailored solutions.

Utilizing results from the quantitative cohort study conducted from 2019 to 2020 as a starting point [9, 21], this study was designed to revisit the top reported factors associated with the Three Delays identified in the initial study, and then facilitate a more specific focus on the impact of the COVID-19 pandemic on these previously reported barriers. We also sought to identify opportunities for intervention in the event of future pandemics and similar public health crises within this extremely resource-limited environment. Finally, exploring the operationality of the HN program generally and during a pandemic was seen as vital to its continuation and expansion.

Methods

Study population

Data collection occurred in July and August 2021 on Mfangano Island. The study population was comprised of 2 groups of participants, both recruited through purposive sampling led by local research staff working at the EK Center who were familiar with the study communities. The first group participated in FGDs. FGD participants were recruited among mothers and their family members who had recently experienced a pregnancy-related, obstetric, or neonatal emergency requiring transfer to the mainland from 1 of the 10 Mfangano Division health facilities. The second group participated in KIIs. KII participants were recruited among community leaders and health-care providers involved in addressing issues pertaining to maternal and neonatal emergencies. Those invited to participate included church leaders, chief community leaders, beach monitor leaders, traditional birth attendants (TBAs), local pharmacists/chemists, Health Navigator program staff, and Ministry of Health officials and administrators. **Table 1** summarizes the composition of FGD and KII participants.

Table 1. Focus group discussions (FGDs) and key informant interview participant characteristics

FGDs: Four Focus Group Discussions, Forty-Four ($N = 44$) Total FGD Participants

Sex	Highest Education Level	Marital Status	Occupation	Mfangano Location	Type of Emergency
Female: 43 (98%) Male: 1 (2%)	None: 10 (23%) Primary: 25 (57%) Secondary: 6 (13%) Tertiary college: 3 (7%)	Single: 8 (18%) Widow: 1 (2%) Married: 34 (78%) None: 1 (2%)	Housewife: 3 (7%) Farmer: 13 (30%) Business: 18 (41%) Student: 4 (9%) Teacher: 1 (2%) None: 5 (11%)	South: 11 (25%) North: 13 (30%) West: 15 (34%) East: 5 (11%)	Neonatal: 4 (9%) Maternal: 36 (82%) Both: 4 (9%)

KIIs: Fifteen ($N = 15$) Key Informant Interview Participants

Sex	Highest Education Level	Mfangano Location	Category
Female: 4 (27%) Male: 11 (73%)	Primary: 2 (13%) Secondary: 7 (47%) Tertiary college: 6 (40%)	South: 1 (7%) North: 2 (13%) West: 1 (7%) East: 10 (66%) Other: 1 (7%)	HN Program (Health Navigators and Emergency Boat Team Staff$133#$133#): 4 (26%) Community Leaders (Church, Chief, and Beach Monitors): 6 (40%) Health Facility Staff: 2 (13%) Traditional Birth Attendant: 1 (7%) Chemist/Pharmacist: 1 (7%) Ministry of Health Official: 1 (7%)

Study design and data collection

The FGDs and KIIs were designed and conducted according to standardized protocols for qualitative data collection that had been previously implemented effectively within this study population [24]. The study further incorporated current guidelines from the Kenyan MoH regarding COVID-19 safety for meetings and community gatherings. For FGDs, a detailed interview guide was developed with questions focusing on observations and perspectives of patients and families who have experienced a maternal or neonatal emergency (Appendix 2). Four FGDs were conducted at the EK Center with a total of 43 female participants and 1 male participant. For KIIs, a similar but slightly separate interview guide was tailored more specifically to community leaders and health-care workers centered around their experiences and knowledge of emergency care at the community level (Appendix 3). A total of 15 KII interviews were conducted in person at the EK Center or by telephone. Given high English literacy among the study population (where numerous other languages are also spoken including, Dholuo, Swahili, and Suba), the study team opted to conduct all FGDs and Interviews in English, with facilitators fluent in local languages available during each session to provide additional clarification for any participants. All FGD and KII were recorded on digital recorders, transcribed, and then reviewed for accuracy by local Kenyan research staff.

Data analysis

Utilizing grounded theory methods [25], our dataset was analyzed by a multidisciplinary team comprised of local research staff, Kenyan and American public health and medical students, and senior U.S. and Kenyan investigators, working together via Zoom meetings. The data analysis team first read together through all transcripts from both the FGDs and KIIs to identify emergent themes. Recognizing a general thematic congruence in content between FGDs and KIIs, the analysis team decided to incorporate FGD and KII responses within an integrated qualitative master dataset. Multiple team debriefs were conducted via Zoom, with particular attention given to input from culturally and linguistically competent Kenyan team members living within the study population of Mfangano Island to further corroborate preliminary findings. Subsequently, all FGD and KII transcripts were manually coded utilizing the same set of themes, then organized into broad general categories and specific subcategories within the master dataset. All thematic coding and categorizations underwent a final review for accuracy and reliability by both English and Dholuo-speaking members of the analysis team.

Results

Results from the master dataset are described in detail below, highlighting themes most pertinent to our study objectives, and illustrating representative participant

responses within each theme category. These results are also summarized in table format within Appendices 4 and 5.

Common maternal and neonatal emergencies

Consistent with results from the quantitative MOMENTUM study [21], participants corroborated a list of common maternal and neonatal problems for which people in their community seek emergency medical care. Primary problems requiring emergency medical attention reported by FGD and KII respondents included pregnancy- and obstetric-related complications for mothers, namely premature labor, prolonged labor, infections, and postpartum bleeding. Among neonates, the most commonly reported emergencies were infections, diarrheal diseases, and dehydration.

Sources of emergency care and health information

Respondents described a diversity of health-care resources and information sources utilized by community members when seeking care during emergencies. Respondents reported that majority people do try to seek care first from formal health facilities on Mfangano (i.e., MoH and private health centers and hospitals). However, respondents also highlighted numerous alternative health-care resources within the community utilized by mothers and families during emergencies, including TBAs, Community Health Volunteers (CHVs), Chemists or Pharmacists, and Spiritual/Religious leaders. The most common reasons reported for seeking care from alternative/informal providers included easier access, more affordable services, lack of resources at hospitals, and avoiding potential stigma or mistreatment from providers and staff at formal health centers and hospitals:

> *Patients referred to the mainland come to the chemist thinking we serve as referral facilities; Some of the patients are closer to these chemists than hospital. Patients believe its secretive being treated at the chemist than the hospital.* (M047, 48-year-old male chemist from Mfangano East)

Regarding health information pertaining to maternal and child health, respondents most frequently cited their information sources as structured health talks at hospitals, TBAs, CHVs, local radio station programming, knowledgeable elders in the community, churches and church leaders, and the Mother-Child booklet distributed by MoH.

Delays in accessing maternal and neonatal emergency care

Respondents reported numerous factors that contributed to delays during maternal and neonatal emergencies. Delays spanning the spectrum from recognition of medical emergencies, to reaching appropriate facilities, and finally receiving appropriate care, contributed to numerous poor outcomes and deaths. Major factors identified included inappropriate care recommendations from out-of-hospital providers; mismanagement/mistreatment by medical staff at health facilities; transportation challenges; strikes, "go-slows," facility closures and unavailability of staff at medical facilities; financial barriers; resource unavailability; and lack of accurate information.

Poor advice and misinformation were cited as a frequent cause of delay for patients experiencing maternal or neonatal emergencies:

> *A baby had diarrhea and the mother sought advice from some elderly women who informed her that the cause of the diarrhea is a cultural taboo resulting from the possibility of the father of the baby having extra-marital affairs during the baby's breastfeeding period [i.e., "chira"]. These elderly women advised her to go to TBA for cultural cleansing which involved the administration of an herbal concoction for the baby. There was no improvement in the baby's health even after oral administration of the herbal concoction. Later, the mother decided to take her baby to the hospital where (s)he was treated and recovered.* (M03, 45-year-old mother from Mfangano West)

Respondents also commented on the ubiquitous nature of financial challenges and their contribution to delays in receiving appropriate emergency care:

> *A mother had a sick baby with malaria signs and symptoms. She didn't have enough money to take her to hospital and so decided to buy drugs from the nearest shop. After administration of drugs, there was no improvement noted. She decided to call the spouse who also didn't have money. The condition worsened and so she decided to go to a private hospital where she was asked to pay money upfront to get services. Having no money, she decided to loan out her phone to an MPesa agent in exchange for money for treatment. The child was treated and recovered.* (M043, 35-year-old mother from Mfangano West)

Transportation challenges, both in terms of reaching island facilities across poorly maintained dirt roads, and coordinating transfers by boat to mainland, along with exacerbating weather factors, were frequently cited as causes of significant delays:

> *No reliable means of transport . . . Lack of funds for hiring a boat during emergency, Unpassable roads, stormy weather in the lake, unreliable schedules of public means of transport.* (M038, 39-year-old mother from Mfangano West)

Numerous respondents also described major delays caused by staff unavailability and facility closures at both public and private hospitals due to frequent health-care worker strikes and "go-slows":

8 months' pregnant mother, primigravida, had vaginal bleeding. It was during staff strike and she had to seek for care from private hospital within the island. Towards 9 months she experienced severe lower abdominal pain. On the day strike ended, at around 10:00 pm she developed abdominal, vomiting, frequent passage of stool, which made her mother-in-law to suspect labor pain. She decided to go to hospital but due to long rains which fell up to around 2:00 am caused a lot of difficulties in coordinating transport. In the morning she went to Sena facility where there was no health-care provider making her catch up with 7:00 am waterbus to Mbita. Upon reaching Mbita sub county hospital she found out that no health-care provider had reported to work thereby forcing her to go to a private hospital which could not manage the case and referred her another (second) private hospital. Unfortunately, this hospital too was not able to manage the case and referred her to any facility of her choice. She called a number of hospitals (Gendia Mission Hospital and Karungu hospital, Migori County) which informed them of no position to more admission due to many patients. She decided to go to St. Paul's Hospital in Homabay and reached late. At around 5:00 pm she delivered a live infant with a low APGAR score. Later the neonate died at around 1:00 am. (M038, 39-year-old mother from Mfangano West)

Respondents also noted that even upon reaching appropriate facilities in timely manner, patients often experienced further delays in receiving definitive care due to staff and resource shortages, as well as mismanagement:

A [primigravida] mother experienced labor pain signs around 6 pm . . . . . At 8:30 pm she walked, accompanied by her mother and her siblings to the island facility. Upon reaching the hospital there was no staff on duty and her mother had to send one of her sons to go and wake up the health-care provider. At 9:30 pm the health-care provider came, did an examination, and reported that she would deliver at 5:00 am. At 10:00 pm she developed severe labor pains and the mother had to send for the health-care provider again. He didn't show up despite being called for three times. The mother regretted why she didn't take her daughter to a TBA. She had unskilled delivery from her mother which resulted in the death of the neonate. According to the mother of the patient, the neonate was big. During delivery, the health-care provider was called and arrived after the death of the baby. He was remorseful and regretted about the death of the neonate. (M031, 45-year-old mother from Mfangano West)

Navigating a fragmented care landscape

Overall, respondents illustrated a highly fragmented care landscape in which individuals and families were often forced to navigate referrals, emergency transportation, and unexpected medical costs with little or no formal support or guidance. In particular, mothers experiencing pregnancy- and obstetric-related emergencies described harrowing narratives involving numerous delays and confusion, hospital closures due to staff strikes and other resources issues, and frequent misinformation. At the same time, respondents also highlighted the invaluable role of skillful local providers, health navigators, and community members who were able to utilize connections and previous experiences to provide life-saving assistance during moments of true crisis.

Following decision made, we went to hospital at Sena Health Center [time not mentioned]. After examination at around 2:00 am, I was informed that I could not deliver due to obstructed labor. At around 8:00 am the health-care provider [at Sena] referred us to mainland. The husband, who was the decision maker, opted to call the Health Navigator to coordinate EK Emergency Boat transfer [to the mainland]. When we reached Mbita Sub-County Hospital, and due to the staff strike, the health-care providers at the facility verbally referred us to Saint Paul private hospital in Homa Bay. Upon reaching Saint Paul hospital, we were informed that the theatre unit was fully occupied and had increased emergencies, therefore there was no any other admission, hence we were verbally referred to Gendia private hospital. We decided to go to Sori Lakeside private hospital where after examination we were informed of intrauterine fetal death. In the process of conducting caesarian section, the surgeon discovered that the neonate was still alive contrary to the earlier notion of intrauterine fetal death. The CS delivery was successful, and the neonate is alive and doing well. (M002, 30-year-old mother from Mfangano South)

Impact of COVID-19 on maternal and neonatal emergencies

Both FGDs and KIIs focused on understanding the impact of COVID-19 on maternal and neonatal emergency care in Western Kenya. Participants described numerous dramatic changes to the care landscape due to the pandemic. Respondents described how fear of getting COVID-19 led people to avoid seeking care both from hospitals and others such as TBAs. Misinformation and stigma about COVID-19 also caused confusion among both community members and health-care workers. With increased workload at hospitals due to COVID-19 patients, participants reported that hospital staff were unable to meet demand and provide timely and appropriate emergency care services.

In particular, numerous respondents described negative impacts of government regulations and COVID-19 safety guidelines, such as curfew enforcement and lockdowns, creating unanticipated challenges in accessing care:

> *I was called to attend to a mother who experienced a premature labor pain in their home, the woman called me after 10 pm and told me she was not feeling well, I woke up and requested my husband to escort me to their home but he refused, saying that the government prohibited any movements in the night, I pleaded with him but he told me if I could manage to go myself, then well and good, I decided to go by myself to her home, this was around 10:40 pm in the night. I called a boda boda to come and pick me and all of them did not show up because of fear of the police officers on the road. I walked the whole distance by myself to the woman's home. It took me about 40 minutes because I was walking and stopping sometimes whenever I hear a voice thinking it was a policeman. Though I reached safely, it has been the hardest experience working during the Covid-19 pandemic.* (M056, 40-year-old Health Navigator from Mfangano South)

Respondents also described how public transportation modalities such as ferries and "water-busses" faced reduced carrying capacity and decreased frequency due to government safety guidelines. Given the importance of public transportation for the majority of residents, these restrictions severely decreased transportation options during emergencies and in turn further increased preexisting delays during island to mainland transfers.

> *COVID-19 containment measures of carrying a third the capacity in public transport systems resulted to delay as the water transport vessels were reaching the capacity before reaching other passenger pick-up stations. This resulted in delays in island to mainland transfers and transport.* (M035, 22-year-old mother from Mfangano West)

Respondents also described how nearly all preexisting barriers were exacerbated by COVID-19. Financial and resource challenges worsened due to unequal distribution of COVID-19 relief by the government, loss of employment, and rapidly rising costs of living. Staff unavailability and health-care worker strikes also occurred during the peak of the pandemic further overburdening an already resource-limited health system.

Not all reported COVID-19 impacts were deleterious, however. Some respondents reported that they noted improvements in hygiene and access to hand washing stations both in the community and in hospitals. Others reported improvements such as the ability to schedule visits with providers ahead of time, a shift from the normal "first-come first-served" process, as COVID-19 protocols for managing daily appointments at facilities were implemented.

Community recommendations for maternal and neonatal emergencies

Citing the previously reported barriers from our quantitative study, FGD and KII guides delved specifically into recommendations from community members to address previously reported barriers to care, namely lack of awareness about signs and symptoms of emergencies, lack of emergency transportation, frequent health worker strikes, financial barriers, and poor service delivery. To improve awareness of maternal and neonatal emergencies, health-care workers recommended that community leaders support programs to educate their communities on how to recognize the need for care among mothers and newborns and encourage people to timely seek medical care. The importance of CHVs, such as the Mfangano Health Navigators, in this role was also highlighted:

> *Recruit, train, and motivate Community Health Volunteers.* (M053, 43-year-old nurse from Mfangano North)

To improve transportation, participants commented on the need to improve road infrastructure on the island, as well as providing more reliable and affordable means of transport both within the Island and during mainland referrals. To prevent strikes from occurring in the first place, respondents universally endorsed improved government oversight to ensure timely and proper remuneration for health-care workers. To improve access to care during health-care worker strikes, respondents also suggested designating health-care workers at facilities and volunteers in the community to inform patients of where active strikes are taking place and help direct patients to alternative facilities:

> *Provision of a health-care worker to direct patients and help them in decision-making on where to get health-care services during strike.* (M018, 24-year-old mother from Mfangano West)

To reduce financial barriers, numerous respondents suggested ways to help people register for the National Health Insurance Fund or Linda Mama maternity insurance programs that are available but not universally accessed at present. To improve health-care delivery at facilities, improvements in equipment and services at health facilities, more qualified health-care staff, and improved referral systems were universally recommended and requested by participants.

Community feedback on health navigation program

The final aspect of our FGDs and KIIs specifically sought perspectives of the locally directed Mfangano HN program. Respondents commented on aspects of the program that were working well and recommendations for improvement and expansion. Participants appreciated the support of Health Navigators for help with seeking care

and assistance with reaching facilities on the island, as well as having 24-hour access to the HN Emergency Boat services for mainland transfers. Respondents described numerous scenarios whereby Health Navigators reduced delays, advising patients and families, coordinating with mainland facilities to ensure expected treatments and staff were currently available during the pandemic, mobilizing the emergency boat to expedite transportation off the island, and advocating for patients.

> *At 9 months pregnant I experienced labor, went to Sena hospital to deliver and I was diagnosed with low HB [hemoglobin]. Later, I was referred to the Mbita sub-county hospital on suspicion of complications during delivery. Health-care workers at Sena called the Ekialo Kiona nurse [Health Navigator] to coordinate the emergency boat for my transfer to the mainland. At Sena, I was administered 2 IV fluids, and at Mbita I was administered 2 IV fluids and one unit of blood transfusion. At Mbita the medical workers were all ready and came in to help in good time without any delay. My reason for medical success was that at Mbita they had blood for transfusion which lacked in Mfangano island facilities. I delivered successfully.* (M003, 24-year-old mother from Mfangano North)

Suggestions for improving the HN program included the provision of more motorbikes and ambulances to coordinate travel to the facilities within the Island, expanding the number for on-call emergency boats, and expanding the number of trained Health Navigators in each region of the island.

Discussion

A growing body of research has recently begun to describe how the COVID-19 pandemic both revealed and further exacerbated long-standing health-care inequities and health-care access barriers for populations around the world [26]. This has also been well documented regarding access disruptions to essential care services in Kenya [27]. Yet in addition to the abundant literature describing global impacts of the pandemic across large sectors and national systems, careful qualitative inquiry is also needed to further characterize and humanize the impacts of these trends within specific underserved populations.

As our group has described elsewhere [20], by prioritizing in-depth, iterative, and locally contextualized investigation, methodologies that Adams et al. [28] have described as "slow research", community members are often able to articulate their own creative and enduring solutions for the unique ways that global problems manifest within their local settings. The lived experiences of providers in Kilifi Kenya, for instance, advocate for increasing participation among local CHWs, TBAs, and midwives to help mitigate pandemic-related disruptions within their health system [29]. Similarly, lived experiences of women seeking antenatal care within a county hospital system in Kisumu Kenya highlight the need to address specific pandemic-related fears and stigmas at the individual and community level for pregnant women in Western Kenya [14].

The interrupted timeline of the MOMENTUM study on Mfangano Island, incorporating quantitative data collected prior to the pandemic, as well as FGDs and KIIs nearly a year and half after the start of the pandemic 2021, facilitated a unique opportunity to understand specific local perspectives on how the pandemic disrupted emergency care access within this remote population, and solicit locally driven solutions. FGD and KII participants validated previously documented barriers to emergency care, chiefly misinformation, transportation challenges, staff unavailability at facilities, and financial constraints. Notably, respondents describe how the pandemic intensified and compounded each of these factors in different ways. In particular, respondents describe the additive barriers created by COVID-related facility closures and staff unavailability, occurring simultaneously with poorly understood curfews and lockdowns, amid overall reduced off-island transportation options. For instance, women experiencing obstetric emergencies during COVID curfew periods were faced with a nearly impossible puzzle to solve in real time: even if their families were able to surmount barriers to identify an open and staffed health facility, and coordinate an affordable and safe transportation option, they and anyone who assisted them faced uncertain legal consequences for traveling without preapproved permission.

The reports from participants that local community health volunteers, Mfangano Health Navigators, and local staff at remote facilities were able to facilitate successful emergency coordination for many patients during these periods, despite these formidable obstacles, speak to the depth of their hard-won knowledge of their health-care landscape, and their remarkable creativity and determination. As others have suggested [29], CHWs and other lay community members may represent an embedded resource that should be strengthened to mitigate inevitable future health-care disruptions.

In addition to the numerous ideas for strengthening health infrastructure, staffing, and community education, our FGD and KII respondents also suggest key preparations that should be made for pandemic-related restrictions, when public health officials and leaders need to be mindful of both public and private transportation modalities that families utilize to access emergency care. One simple improvement suggested from this analysis would be the provision of emergency travel waivers for select operators within various formal and informal transportation sectors within remote communities like Mfangano (i.e., boat coxswains, motorcycle taxi drivers). A program like this needs to be accompanied with community education about when and how to travel, and improved communication channels with government facilities, an ongoing effort that would likely strengthen baseline referral and coordination procedures in the process. In fact, when provided with a summary of our qualitative data, this is exactly the recommendation that was presented by EK staff and Health Navigators to local Ministry of Health leaders in April 2023.

Study limitations

Our study was limited by the nature of our purposive sampling strategy among families experiencing health emergencies and the relatively small number of KII participants representing MoH health care facility staff (2). While a broader representation may have been achieved with larger or more randomized sample, we felt this directed strategy would facilitate observations from individuals directly involved in past or ongoing maternal and neonatal emergency care episodes. Echoing participant experiences, mobilization, and recruitment for the FGDs and KIIs were also limited by ongoing COVID-19-related travel and gathering restrictions per MoH guidelines in 2021. Furthermore, our study may have been impacted by recall bias, as we were unable to conduct qualitative data collection for logistical and safety reasons during the height of the pandemic.

Conclusion

Our study provides a critical look into the lived experiences of families before and during the pandemic, within a particularly remote and underserved population of fishing communities on Lake Victoria in Western Kenya. The results of this qualitative study indicate numerous areas of intervention, at the community and system-levels, for improving maternal and neonatal emergency health-care access in places like rural Mfangano Island. These results emphasize the need for careful planning to improve community access during future public health crises like a pandemic. While it is true that addressing the harrowing challenges described by participants on Mfangano will also require national, regional, and global efforts to reduce maternal and neonatal mortality, participant experiences also highlight numerous opportunities for creative local interventions that could be mobilized immediately, effectively, and durably within the hands of contextually experienced health workers and community leaders. Given the real possibility of future disruptions and emerging health threats, we must consider not only large multinational strategies, but we must also understand the unique impacts of the pandemic on specific communities, and the ideas that emerge from the experience of local agents for change.

Supplemental files

The supplemental files for this article can be found as follows:

Appendix 1: "Three Delays" Flow Diagram

Appendix 2: Focus Group Discussion Guide MOMENTUM Study

Appendix 3: Key Informant Interview Guide MOMENTUM Study

Appendices 4 and 5: Summary of FGD and KII Responses and Recommendations

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Competing interests

Several of the authors BM, EO, GB, SO, JO, LC, LM, and CS have been involved directly and indirectly in the establishment of the Ekialo Kiona Center, the local partner supporting the Health Navigation program described in this manuscript.

Author contributions

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Formal analysis: All authors.
Funding acquisition: LM, LN, CS.
Investigation: All authors.
Methodology: BM, EO, ND, LM, LN, CS.
Project administration: BM, EO, EP, LC, LM, LN, CS.
Supervision: BM, EO, ND, LM, LN, CS.
Validation: All authors.
Visualization: BM, ND, CS.
Writing—original draft: BM and CS.
Writing—review and editing: All authors.

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