



Human-centered design exploration with Kenyan health workers on proposed digital mental health screening and intervention training development: Thematic analysis of user preferences and needs

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Abstract

Background: Health providers' perceived sense of knowledge, competency, and self-efficacy to support the needs of their patients contributes to optimal patient health outcomes. With regards to mental health service delivery in Kenya, this area needs further exploration. Guided by the e-health technology acceptance mode, the needs and preferences of health care providers around mental health training for clinical management and their ability to intervene in peripartum adolescent mental health care are explored. We probed how well-equipped service providers are, their engagement with technology to learn and offer services. The health care provider's technology use preferences were also explored.

Method: Guided by a human-centered design-focused qualitative inquiry we interviewed 20 specialists around their needs, perspectives, and preferences for digitized mental health screening and intervention. Mean age was 44.2 years, (range of 32–58 years), 25% (5) males and 75% (15) females. After a written consenting process, the online interviews (30–45 min) were conducted in April 2021, once personal information was de-identified interviews were transcribed and coded. Thematic analysis was used and we combined rapid appraisal of Google Jamboard online storyboards to do individual human-centered design personas alongside.

Results: Our participants were well-exposed to digital technologies. Prohibitive costs of data bundles, lack of funds for consistent online engagement, high workload, and instability of access to appropriate gadgets were found to be barriers to e-health training. Emerging opportunities were well-identified adolescent mental health service and intervention needs, willingness to take online courses offered on learning platforms, and wish for these to be disseminated through diverse social media. Other recommendations were the need to have a user-friendly interface such as data-light engaging and practical materials including animations, short, group-based learning.

Conclusion: Understanding contextual factors that influence perceived usefulness and ease of use of the remote/digital components would be critical for e-training development and its uptake.

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Keywords

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Background

The COVID pandemic has resulted in rising mental health problems and service needs globally.¹ In Kenya, a recent third wave of the pandemic has raised concern around adolescents' mental health.² The continued surge of mental health problems in Kenyan adolescents during the pandemic has resulted in anticipated increased demand for mental health services from primary health providers and specialists.^{1,3} Although eHealth has the potential to address the growing needs and be applied for health care worker (HCW) training and mental health screening and intervention services, research in how to apply a rapid and well-planned method to design eHealth solutions in pandemic crisis context to meet the needs remain limited. The goal of this study is to apply human-centered design (HCD) and qualitative approaches of research methodology (described below) to assess needs, design preference, opportunities, and strategies to guide the design of the eHealth solutions. This study focuses on exploring the application of eHealth for providers' training (including training for specialists, non-specialists, and lay health workers) and peripartum adolescents' mental health care (i.e. screening and intervention service). This study is an extension of an ongoing National Institute of Health-supported mental health intervention research for peripartum adolescents in Kenya (K43TW010716, 2018–2023). The study is the first step toward designing provider and patient-centered eHealth solutions. This study also provides a rapid methodological approach for gathering needed design information in the public health crisis contexts.

Mental health needs and provider-based barriers in Kenya

Kenya is a lower-middle-income country with a population of about 52.5 million⁴ and a physician–patient ratio of 0.2 to 1000 people. The psychiatrist–population ratio is 0.19 to 100,000. It is estimated that of all persons seeking health services in Kenya, a quarter of the inpatients and almost half of all outpatients suffer from mental illness.⁵

World Health Organization (WHO) mental health treatment gap action program (mhGAP)⁶ made a case for serious

resource, investment, policy, and treatment gap that exists worldwide around mental health services. As a result of these barriers there remains a significant difference between the number of people who need care and those who receive care.⁷ Worldwide there is an acute shortage of human resources for health, and the greatest burden is borne by low-income countries, especially in sub-Saharan Africa and parts of Asia and Latin America.⁸ This gap entails the poor representation of medical and clinical officers as well as nurse specialists. Geographically, there is a huge divide between what is available in rural areas and urban areas. Most Kenyans, about 70% of the population, live in rural areas.⁹ This divide is also explicit in mental health services. COVID-19 has exposed several health systems, services including infrastructural and investment lacunas. With rising cases, there was significant pressure on HCWs to deliver routine as well as differentiated COVID-19 responses without adequate protection or support in the early part of 2020.

A large number of provider barriers were longstanding problems of not having adequate information, knowledge, or even exposure to mental health problems. The paucity of staff in itself has been a challenge in offering sustainable mental health friendly, treatment-focused, or preventative services. Although there is a mental health policy 2015–2030,¹⁰ which outlines a multidisciplinary approach to intervention and management via collaborative care and highlights the human rights of individuals with mental illness and vulnerable populations, the mental health care services have not received the level of reform needed in Kenya.¹¹

Ongoing COVID pandemic and heightened mental health needs

It has been well-recognized that the pandemic has disrupted and at times halted critical mental health services in 93% of countries worldwide, while the demand for these services is increasing.¹² We are witnessing the blatant rise in mental illness along with a concomitant increase of extreme poverty in lower- and middle-income countries (LMICs) in the context of the global pandemic.¹³

In studies carried out in Bangladesh, Kenya, Nigeria, and Pakistan amongst health care needs of residents of informal settlements, it was reported that in all four countries cost of health care increased while household income reduced.¹⁴ At the same time, in Kenya, a rise in domestic and gender-based violence, substance use, adolescent pregnancies, depression, anxiety, and suicides have been reported.^{1,15,16} It has also been suggested that need for a more in-depth and formal mental health response plan specific to the COVID-19 pandemic with requisite funding allocation, ramped up training of professional health workers, community health workers, and digital solutions to improve access to care and mitigate COVID-19 infections.¹

One of the reasons for an increase in mental and psychological stress in the Kenyan population is due to the lack of access to quality health care coverage. One of the reasons that our participants identified for increased mental and psychological distress is due to the stress of not being able to access general health care when needed. Only 11% of Kenyans are covered by National Health Insurance and with over 70% of the Kenyan workforce working in the informal sector, the majority are either not eligible or cannot afford the premiums set by the government to maintain health insurance provision.¹⁷ The workforce engaged in the informal sector is particularly vulnerable as even basic services are not accessible.

Digital technology and potential to build capacity

As countries prepare to strengthen health systems under universal health coverage and achieve “Health for All,” digital technology and tools have a key role to play in improving health workers’ abilities to care for people and communities in reaching the targets.¹⁸ Digital education has the potential to improve the competencies and satisfaction of health professionals.¹⁹ The World Health Organization (WHO) 2020 Digital education for building health workforce capacity report¹⁹ suggests that the integration of digital learning needs to be directed towards four levels: (a) *external factors*: include the level of digital and health literacy of the population, the extent to which the target population is receptive to adopting innovations and Information Communication Technology (ICT) systems. These also depend on government and civil society commitment and investment in the right infrastructure and public engagement. (b) *eHealth policy and infrastructure & resource-related factors*: pertain to the incorporation of digital learning and exposure in the health workforce development objectives in long-term plans and evidence-based policy, sufficiency of technical infrastructure, appropriate levels of funding, and robustness of multi-sectoral collaboration amongst stakeholders such as inter-ministerial partnerships. At this level, the standardization of the quality of curricula, user interfaces, and accreditation mechanisms to allow for a uniform assessment of different educational institutions is critical. (c)

eHealth institutional, staff-related capacity & training factors: these factors pertain to the standardization of the quality of curricula, accreditation mechanisms to allow for a uniform assessment of different educational institutions and development of training plans for health workers. (d) *Individual factors*: include the beliefs, attitudes, and behaviors of administrators, teachers, students, and the support staff involved in the educational and technical processes. In Kenya, the Constitution of Kenya 2010, Kenya Health Policy (2014–2030), Vision 2030, Kenya eHealth Strategy (2011–2017), ICT Master Plan, and the Health Bill, reiterate sustainable adoption, implementation, and efficient use of eHealth products and services at all levels of health care delivery.^{20–24} The Kenyan national e-Health Policy also stipulates that due to the shortage of HCWs, the adoption and use of e-Health and mHealth technologies are critical to enhancing equitable access to health care in Kenya.²⁵ It mandates that to address this shortage, the Government should in collaboration with the private sector promote the use of e-Health technologies such as telemedicine to increase reach to the underserved Counties in Kenya as well as to reach vulnerable populations. However, other reviews of e-health initiatives in Kenya, have reported that there is a myriad of e-Health projects being implemented in urban centers rather than marginalized areas where geographical inequalities and inequities in access to health care exist. Often the benefits arising from eHealth adoption are not passed on to patients or beneficiaries.²⁶ Another study reported that several public health facilities purchased a digital health system primarily for administrative purposes and digital systems are not being fully integrated.²⁷

Aims of the study and the guiding framework

The study has two aims: (1) understanding local perspectives in application of e-Health in mental health care training and perinatal adolescent mental health care (e.g. needs in applying technology in supporting mental health training and services, opportunities, feasibility); and (2) understanding e-Health design strategies and user-preferences for health provider training and adolescent mental health screening and intervention care, which can be applied to promote user-centeredness design.

This study applies an HCD methodology, which uses an empowerment-based approach to design products, services, systems, and experiences that address the core needs of those who experience a problem.²⁸ e-Health users’ perspectives (i.e. 20 HCWs of different cadres) and their involvement in design processes are considered. To promote uptake and appropriateness of strategies, informed e-Health strategies and an adapted *e-Health Technology Acceptance Model (TAM)* are applied, which consider external, e-Health policy and infrastructure system, institutional eHealth capacity, and individual factors that may influence uptake and use of eHealth. We inquire about users’

perspectives on four domains of factors and strategies that would promote users' positive attitude and intention to use the technology approach of training and mental health services (Figure 1).

Table 1. Participant profiles and characteristics.

Sociodemographic features	Category	Frequency	Percentage (%)
Gender	Male	5	25
	Female	15	75
Age (Years)	30–40	6	30
	41–50	11	55
	51–60	3	15
Education level	Diploma	6	30
	Higher diploma	3	15
	Degree	9	45
	Postgraduate	2	10
Cadres	Nursing officer	13	65
	Senior nursing officer	5	25
	Medical officer and psychiatrist	1	5
	Medical social worker	1	5
Work experience (years)	0–10	4	20
	11–20	8	40
	21–30	6	30
	31–40	2	10
Work environment	National hospital	10	50
	Level 5 hospital	5	25
	Level 3 hospital	5	25

Method

Participants, setting, ethical approvals, and tools

The participants were identified at four key facilities—Kenya National Hospital (KNH), Mathari National Teaching and Referral Hospital, Pumwani Hospital, and Nairobi Metropolitan Services' Ngara Health Centre. KNH is the largest of the five National referral hospitals in Kenya with a bed capacity of 1800, receiving patients from all over the country for specialized care. KNH has a fully-fledged department of mental health with 5 psychiatrists, 12 psychologists, and 4 nurses. Mathari national hospital is a national referral mental health facility with mental health staff of 320 nurses, 10 clinical officers, 20 psychiatrists, 19 psychologists, and 5 medical social workers. Pumwani hospital is the biggest maternity hospital in Kenya with close to 200 nurses, 14 clinical officers, 2 psychologists, and 3 medical social workers on ground, but no dedicated mental health department. Ngara Health facility has 5 psychologists, 9 clinical officers, 25 nurses, 1 psychiatrist, and 3 medical social workers. All these facilities run outpatient services with KNH and Mathari offering inpatient services as well. There are no dedicated inpatient services for child and adolescent mental health populations. It provides facilities for medical education and training to colleges and universities as well as participating in national health planning.²⁹ Mathari National Teaching and Referral Hospital is the only public specialized facility for mental health patients that is also among the five national referral hospitals in Kenya. It offers specialized psychiatric services, drug rehabilitation, forensic services, and training in psychiatric services. It has a bed capacity of 700 and also participates as a national referral hospital in national health planning.²⁹ Pumwani maternity hospital is the largest obstetric and referral hospital in Kenya for delivery of expectant mothers, with a bed capacity of 354, and the majority of its clients are from the poor socio-economic background.³⁰ Ngara health center is located just next to the Nairobi Central business district with a population of 31,132 residents living around it.³¹ The participants were facility staff carrying out key duties in adolescent,

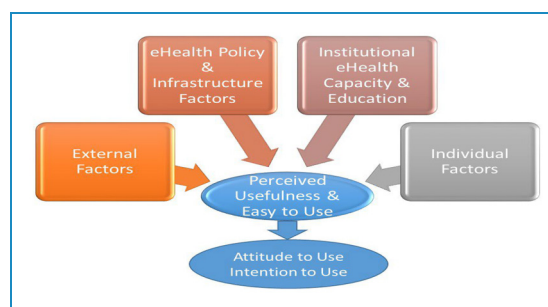


Figure 1. Ehealth technology acceptance model.

maternal health units as well as those providing mental health services.

Tools

An interview guide was developed by the team which was refined after two pilot interviews were carried out. The final guide addressed the following areas: (1) dynamics of the COVID-19 pandemic, (2) proposed training, (3) technology's role, and (4) other considerations.

Methodological approach

The eHealth TAM focuses on understanding contextual factors that influence perceived usefulness and ease of use of the remote/digital components. These also consider how user experiences, attitudes inform intention and practical use of technology which in this context focuses on digital training. A thematic analysis covering exposure to technology, choice of gadgets for engagement with digital services, online training, or other professional learning exchange was probed. Preferences for digital learning and training including barriers and challenges, choice of social media platforms, provider understanding of mental health needs during pandemic, and needs of adolescents especially peripartum adolescents were probed.

Data collection and analysis

The interviews were conducted online after consent forms were physically distributed and collected prior to the interview appointment. Consent forms were read out again during the interview reiterating participant rights and providing an overview of the studies. The interviews were conducted by PM, VN, JK, and MK. VN and MK wrote notes on the open-access Google Jamboard using Zoom's shared screen option to make the questions more interactive, allowing the respondents to see what was being noted down as the interviewer asked questions to the participants (Box 1). Given that these meetings were online, the Jamboard provided a structure to focus attention on participants' key experiences and thought processes during the interview. The questions were asked by the lead interviewer and sometimes clarifications were sought by other team members. The Jamboard was to help build personas and stories for every participant that they could further curate and interact with around their engagement with mental health and interaction with digital technology. This also offered our participants an interactive way to process their material given these interviews were carried out online and offered our team to further probe based on responses. VN transcribed the interviews and the authors collected reviewed themes and developed Jamboard prototypical personas (Figures 2a and b).

Box 1. Interview questions mapped on our conceptual model.

1. *External factors*
 - How has COVID impacted you and your work in relation to patient's mental health needs?
 - How have young people been impacted by COVID?
 - How about your own experience as a HCW?
 - What kind of COVID-19 related considerations should the trainings on mental health screening keep in mind? (your needs, patient needs, etc.)
2. *eHealth policy and infrastructure*
 - Would technology play any role in making such trainings possible?
 - How would you disseminate/share what you learnt with adolescents in need of mental health services?
 - How would you disseminate/share what you learn with pregnant adolescents?
3. *eHealth staff capacity /training*
 - Have you recently received any training on mental health screening?
 - Did these trainings equip you adequately? what's missing?
 - Have you taken any trainings offered on mobile phones?
 - If we made short videos lectures would you prefer these to reading text on PDFs? Why?
 - Would computer animations video be useful as teaching aids (Case studies, demos)? Why?
4. *Individual level factors and uptake of proposed training*
 - How do you find trainings on mental health screening?
 - How can we make the trainings more useful and effective?
 - What are your preferred delivery models of the proposed training? (online, face-to-face)
 - How did you find the mobile phone-based trainings?
 - What mobile phone-based technologies did you find easier to use when learning?
 - What other mobile phone-based technologies do you use? (WhatsApp, Telegram, Facebook, Zoom)
 - If we developed an android customized app for training, what features would make easier for you to learn?
 - Would you prefer to learn alone or in a group? Why?
 - When the training is ready, would you try it?

Results

Theme 1: participant needs and preferences

Overall we found that our participants felt that though there were several COVID-related trainings that they had to undertake for new protocols and procedures that had to be put in place, the mental health training exposure was lacking. Many HCWs shared that they felt stigmatized by their clients who feared coming in contact with care professionals. At the same time, they also feared their own exposure to individuals who may be "asymptomatic with COVID" or "hiding or undermining their symptoms."



Figure 2. (a) Using Google Jamboard to create participant personas and needs assessment. (b) Jamboard of Participant 19.

They felt that their own safety and mental peace were at stake in this scenario. Most of the participants echoed that while routine and essential services were meant to carry

on as it is, very little was put in place, resource, procedures, and training-wise, to ensure that HCWs' safety and needs were addressed. Many participants alluded to their own

stress, poor coping, and high service demands that created greater mental health issues at their end.

The single participating specialist psychiatrist who we interviewed felt that there was a need for the wide dissemination of interventions such as psychological first aid, for patients and for HCWs' own mental health more needed to be done. He also highlighted the need to address concerns of the patients recovering from the long COVID and the need to think about their long-term care. Many of our participants expressed concerns around the current material conditions of individuals, and vulnerable groups; and how job losses, school closures, opportunities for livelihood, and leisure were going to severely impact the well-being of Kenyans.

One of their clearly articulated needs with regard to the questions we asked was poor integration of mental health in their training in general and very minimal dissemination of screening for mental health needs and their management. Several of our participants were clear that they would like training or a system that is responsive to the end-user (young people or peripartum adolescents) as well as the provider as a user. They believe learning exercises that do not respond to their constraints and knowledge gaps and expectations would not be helpful or create any impact.

The overall user story and related themes are articulated in Figures 3 and 4. We also identified at least two distinct personas (see Figure 3) who would guide the process of adaptation and "humanizing" of the digital content of this proposed training. We found a large number of providers of our sample were well-exposed to technology and found it a highly acceptable and useful form of learning.

Theme 2: COVID-19-related concerns and observations

Interview vignettes from participants concerning how the ongoing pandemic impacted their working lives elicited the following responses:

Reduced client traffic in some facilities, fear of infection. [Participant 1]

Increased workload, school girls coming in for antenatal care ANC and maternity. [Participant 2]

Parents and children stressed; school, college, university calendar has been unpredictable. [Participant 4]

Drug use problems; adolescents seeking care. [Participant 5]

Clients fear visiting health facilities fearing infection. [Participant 6]

Uncertainty in the academic calendar created anxiety among adolescent. [Participant 7]

When probed on how the proposed training would be disseminated to pregnant adolescents who are of interest to this study the following key responses were identified. There was a small cohort of HCWs who were unsure of how effectively they can disseminate mental health information given the constraints on their time and resources.

Not easy, no time, big queues, short interaction during ANC- short interaction, clients are many, time is limited. [Part 2]

A large number of participants were also well aware of mental health needs, interventions, and skills needed for services though some participants were less aware of mental health interventions or skills and wanted to learn more. Almost all our providers felt that the current investment in integrated services and HCW training around mental health services was very sparse and poor. Almost all our providers immediately recognized the burgeoning mental health needs of young people, peripartum adolescent populations, and the general public at large. Others pointed to the need to adopt approaches that bring them closer to the youth.

Continuous medical education (CMEs) to sensitize work-mates, health talks at the waiting bay and during one-on-one sessions. [Participant 6]

Use technologies like WhatsApp, Zoom, reach more adolescents. [Participant 6]

My experience with adolescents is that they like using phones, the challenge would be for those who are upcountry and cannot access phones, or internet bundles, going live on air through radio programs can help reach those in the village. [Participant 8]

Theme 3: technology use, preferred delivery modes, and perceived learning innovation

We learned that a large number of our participants were using digital technologies now more than ever, a large number on their mobile phones. We also found that a number of participants were well-versed with their use and were taking long and short courses on their mobile phones as well as routinely using social media to stay connected with current happenings and developments. Some health care providers used social media platforms to share learning resources, share experiences with other professionals.

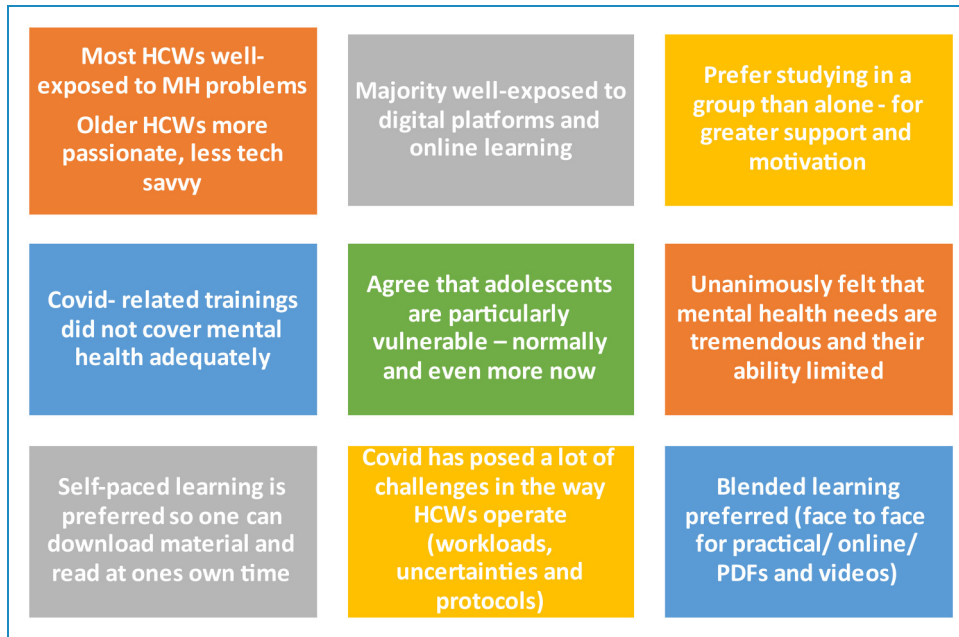


Figure 3. User story themes.

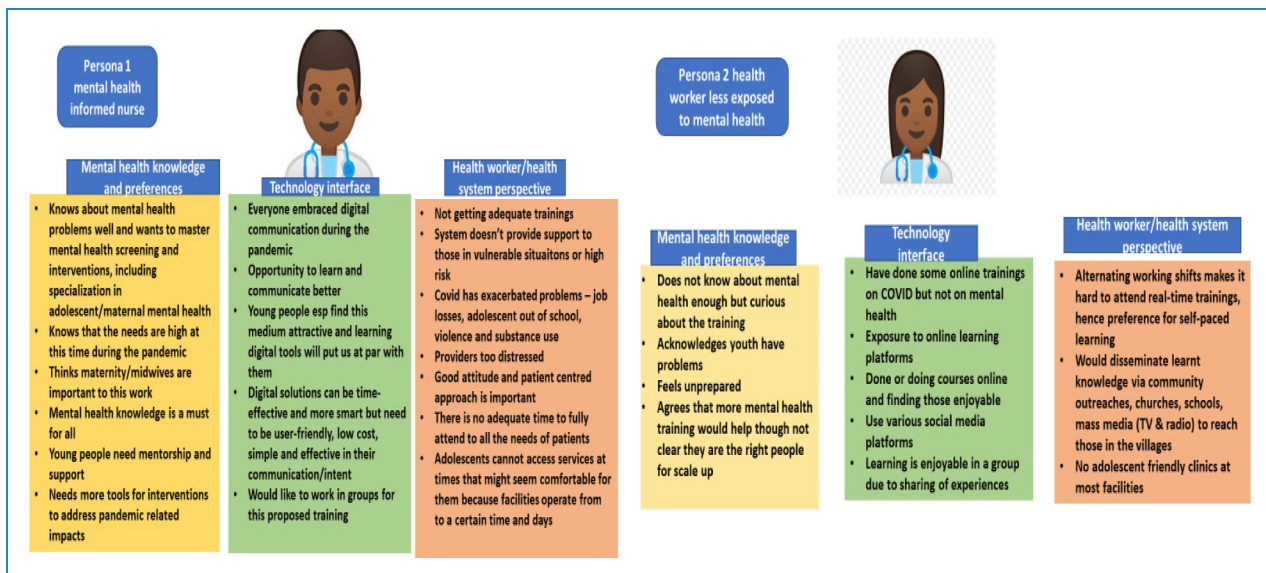


Figure 4. Personas based on Interviews for targeted mental health training.

Feedback on technology use and platform expectations from participants

. face to face is always the best but I don't know whether it's possible due to the COVID pandemic though it can be done online as long as the timing is okay. Like if it's like through zoom when we are working, in the evening is the best or maybe we agree on the time. [Senior nursing officer, 25 years work experience]

I think with technology now you are able to reach bigger numbers and right now with social media people are able

to share; the information reaches quite a big number. [Nursing officer, 10 years work experience]

Prefer online training, system award marks, have deadlines on task(s). [Participant 1]

Online training preferred, set aside time to learn. [Participant 2]

The best is creating a platform where modules are prepared such that anyone can access and learn at own pace. [Participant 3]

Online training has minimal learner interaction; one can immediately ask a question in a face-to-face. [Participant 6]

80% could be online including exams. [Participant 7]

Phone-based training and its viability feedback from participants. There was openness to learning using both computers and phones though the barriers to online learning remained the same. It was suggested that not all HCWs would have advanced devices and not everyone should be thought to be “digital savvy.”

Phone-based training are okay; the only challenge is that when some trainings takes place when I am supposed to be working that’s the only challenge, but if the timing is good I don’t think there is a problem with that. [Senior nursing officer, 25 years work experience]

I found phone-based training very helpful and educative because could always refer back I prefer to do a training on a phone because I do it on my pace when I have my time. [Nursing officer, 16 years work experience]

Depend on device, can download content, require data bundles. Disadvantage learners with poor connectivity. [Participant 1]

When real-time, hectic, conflict with work schedules, access to connectivity. [Participant 8]

Learners can learn at their pace and convenience. [Participant 9]

One is able to learn at their convenience. [Participant 3]

Self-paced learning and focus on individual goals and successes, flexibility in terms of completion of course were identified as key feedback.

Recommendations on preferred features of the online or android training were on the following lines.

Videos are easy to watch, like now when I can see you so even a video is okay so that I can watch later. If I want to watch at a particular time and I am not able to I can do it later. [Senior nursing officer, 25 years working experience]

Yes, actually computer animation could be useful teaching aids, you see they are very entertaining; they are eye catching and you would want to listen to them more. [Medical social worker, 9 years work experience]

Training should have timelines, user is able to move in a sequential manner accessing learning content. Content

relevant to different cadres, provide learners with feedback. [Participant 3]

Users should be able to download and access content offline, live sessions not preferred as they disrupt work schedules. [Participant 5]

Videos should be of high quality. [Participant 6]

Be able to download content and read offline. [Participant 7]

Having an app where once they learn they can go back & review & reference- able to download for future. [Participant 9]

Despite mobile phone-based training offering great potential, a number of challenges including cost of internet, conflicting schedules, and presentation of the learning materials were discussed. These are important issues that must be considered when designing mobile phone-based training.

What I have seen with online trainings at times like in the class I have difficulties with internet, the cost of the bundles [mobile data package]; you know it’s not very easy. [Senior nursing officer, 20 years work experience]

For we nurses we work in shifts so you need to look into the time the trainings are offered [real-time sessions] to ensure the learner fully participates with minimal disruptions. [Nursing officer with 24 years work experience]

It is very important I am able to download learning materials; we have Wi-Fi all over in the hospital I would download from work and come do my studies in the house. [Nursing officer 16 years work experience]

Barriers and opportunities expressed by participants. A large number of barriers were articulated by our participants. There was consensus on the barriers such as financial constraints and limitations to access to technology. This included a paucity of resources to pay for data bundles, have appropriate gadgets for carrying out training outside of office hours. There were also concerns that the training during office/clinical shifts interferes with the demands and patient needs. There were significant concerns expressed around availability and access to strong internet connectivity as well as access to laptops and computers in all workspaces. Many clients do more hands-on clinical care and their access to this infrastructure is limited.

Poor digital literacy for older HCWs also presented as a barrier. The fact that the entire world including Kenya had to ramp up e-health and e-learning services to communicate and provide routine services presented new opportunities to

build better systems and integrate digital health and learning more fully.

Discussion

Implications for digital training development

The TAM model was a helpful guide that enabled us to understand the perceived ease of use related concerns, uptake of technology-frequency, mode, acceptability of different modes, design features as well as contextual and organizational needs and barriers that would determine their long-term approach to its adoption, sustainment of integrated mental health and digital health system. The actual use and acceptability we learned would depend on how far we address their resource and technology inequity gaps. We also learned that group work and blended asynchronous and synchronous learning will need to be tested and at the same time the material needs to be simple and short.

This inquiry was embedded in an ongoing study on mental health interventions for pregnant adolescents keeping WHO's mhGAP-based screening and group interpersonal psychotherapy (IPT-G) implementation by a joint non-specialist and lay health workers. Due to the disruptions associated with the COVID-19 outbreak, an online training that combined mental health screening training mapped on WHO's mhGAP along with training on key interpersonal strategies and skills embedded within IPT-G, COVID-19 HCW and patient guidance protocols, patient-centered and provider self-care were added as relevant domains to be disseminated. These domains became core areas where the e-training development will focus. This inquiry enabled a human-centered appraisal of how HCWs viewed the gaps, opportunities around the emerging mental health needs, and the proposal to develop a digital training. The human-centered design has two faces to itself: (a) perspective, preferences of the provider, and their bandwidth to deliver mental health services; (b) HCWs appraisal of peripartum adolescent mental health needs and preferences for intervention or possible support for this population.

Before carrying out this inquiry with the authors in this paper as well as others, the team has been discussing the adaptation of the intervention, planning what HCD means for mental health screening and intervention in primary care as well as the short-and-long-term value of this training and its sustainability.

Based on these deliberative processes and findings of the work, we may create an online course that is simple, hands-on, and well-rounded to prepare our participants in various aspects of professional development, self, and patient care. In addition to this, a *Whatsapp*-based interface that includes interactive pdfs, group support, potential testing of a chatbot for hands-on guidance, and linking providers to specialists are being considered.

Digital technologies evolve even as they are implemented, as does the process by which they are delivered. This is

not only because technologies advance rapidly, but also because stakeholders often reasonably demand changes to integrate multiple health programs or to accommodate local infrastructure and health worker routines,³² we believe that our efforts will help make contextual adaptations that would benefit both providers and their clientele.

Improved patient-centered services with a focus on peripartum adolescents

HCD brings end-users and developers together to co-create health products, services, or delivery strategies that identify, prioritize, and address barriers to usability.³³ An HCD focused inquiry is the “what” for increasing participation and it uses design tools for “how” stakeholders can meaningfully interact to create community-informed outcomes with strong implementation potential.³⁴ We have through our ongoing work on mental health care provider capacity building come to believe that there is no patient-centered care possible without provider self-care and provider-centered health strengthening initiatives. Only when the provider's needs, service delivery capabilities, and competencies are developed can they provide quality, accessible, and integrated care. The primary health care physicians, nurses, and members of their collaborative care team such as social workers, referral psychiatrists, and psychologists all need continuous supervision and mentoring in mental health for their own well-being first and then an ongoing education and supervision in delivering integrated mental health care is critically needed.

WHO mhGAP program⁶ recommends an overall health systems strengthening approach to such training efforts which we think in this case requires (a) processes of building trust and relevant stakeholder engagement—involving decision-makers, relevant program officers, researchers, and HCWs; (b) technology partnership which is receptive to constraints experienced in LMICs; and (c) system and advocacy learn for enabling short- and long-term sustainability of trainings in the health care system and uptake/actual use of the training in future.

Building back better

At the National level, several recommendations and processes have been put in place to ramp up digital health and digital health learning to respond to the current pandemic. The attention is on the emerging health especially mental health needs due to the long COVID phenomenon we are increasingly witnessing. WHO along with other United Nations agencies is reviving the motto “build back better” not only to remind ourselves of how massively the pandemic is likely to impact health, the livelihood of people, and economies of the world but also to rethink ways in which governmentality and health infrastructure, investment and system strengthening can be thought about. “Build back better” is

a call to make our systems more resilient and adaptable, patient-centered as well as attuned to addressing health disparities. Mental health is a field that has emerged “out of shadows” and has alarmed the world lately with how severely it can be impacted by global pandemics. We also know that global investment especially in Sub-Saharan Africa on mental health systems, services, and programs is very poor.^{35,36} We need to empower our HCWs to provide integrated, holistic services to their patients including their psychosocial well-being. We also need our providers to be resilient, competent in offering holistic care, and build a good team and work environment which necessitates that they themselves have optimal mental health, their own well-being, and well-rounded professional development are important. Contextualized interventions are important in settings with multiple barriers to care.³⁷

While interventions targeting the population, community, and health care are needed to build a more robust system response, we are arguing that empowering health care providers is an important part of the process of mapping impacts of mental health training and screening across population and community levels.³⁸ At a systems level, we need these care teams, local and national health policymakers to disseminate mental health messages that entail timely treatment, prevention, and promotion of mental health. This will enable the building up of mental health-friendly systems and countries.

Limitations

The inquiry was carried out during the challenging times of COVID and perhaps some of the outcomes post-pandemic might vary. Given the limitations of qualitative inquiry, the study may not be generalizable to HCWs outside of the urban Kenyan context. It is also possible that in-person interviews might lead to further areas of concern that did not come out clearly during the online interviews.

Conclusion

Our inquiry has provided a deeper understanding of multi-level factors that are likely to determine the potential uptake of digital training. We did find that most HCWs did share the concern that mental health needs have exacerbated during COVID-19. While many HCWs did share the need to get better prepared and trained to offer mental health services others shared several barriers that come in the way of offering integrated services. We do think digital trainings can offer a vital resource and tool to build the capacity of this workforce.

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Ethical approval: The Institutional Ethics review committee of KNH and the University of Nairobi approved (No. P694/09/2018), and a research permit from Kenya National Commission for Science, Technology, and Innovation (NACOSTI/P/21/8757). Permission was also sought from these study sites through their respective research regulating bodies. This study is nested under the first author’s ongoing work on implementing mental health interventions for pregnant adolescents in primary care LMIC settings (INSPIRE) study. This work is part of the COVID supplement (No. 3K43TW010716–03S1) issued from September 2020 to September 2021. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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References

1. Jaguga F and Kwobah E. Mental health response to the COVID-19 pandemic in Kenya: A review. *Int J Ment Health Syst* 2020; 14: 68.
2. UNICEF. Impact of COVID-19 on poor mental health in children and young people ‘tip of the iceberg’ – UNICEF. <https://www.unicef.org/kenya/press-releases/impact-covid-19-poor-mental-health-children-and-young-people-tip-iceberg-unicef> (2021, accessed 8 January 2022).

3. Presidential Policy and Strategy Unit (PASU), Population Council. Promises to Keep: Impact of Covid-19 on Adolescents in Kenya. 2021.
4. KNBS. 2019 Kenya population and housing census volume 1: population by county and sub-county. <https://www.knbs.or.ke/?Wpdmpro=2019-kenya-population-and-housing-census-volume-i-population-by-county-and-sub-county> (2019, last accessed 12 February 2021), pp. 1–49.
5. Borgen Project. Addressing mental health in Kenya – the Borgen project. <https://borgenproject.org/addressing-mental-health-in-kenya/> (2021, last accessed 8 January 2022).
6. World Health Organization. Mhgap intervention guide for mental, neurological and substance abuse disorders in non-specialized health settings. Mental health gap action programme. <http://scholar.google.com/scholar?HI=en&btng=Search&q=intitle:mhgap+Intervention+Guide#1%5Cnhttp://scholar.google.com/scholar?HI=en&btng=Search&q=intitle:mhgap+intervention+guide%231> (2010, last accessed 8 January 2021), pp. 1–121
7. Kohn R, Saxena S, Levav I, et al. The treatment gap in mental health care. *Bull World Health Organ* 2004; 82: 858–866.
8. Miseda MH, Were SO, Muriangi CA, et al. The implication of the shortage of health workforce specialist on universal health coverage in Kenya. *Hum Resour Health* 2017; 15: 80.
9. The Conversation Africa. COVID-19 exposes weaknesses in Kenya’s healthcare system. And what can be done. <https://theconversation.com/covid-19-exposes-weaknesses-in-kenyas-healthcare-system-and-what-can-be-done-143356> (2020, last accessed 4 May 2021).
10. Ministry of Health. Kenya Mental health policy. <http://www.health.go.ke> (2015, last 8 January 2021).
11. Marangu E, Sands N, Rolley J, et al. Mental healthcare in Kenya: exploring optimal conditions for capacity building. *Afr J Prim Health Care Fam Med* 2014; 6. <https://phcfm.org/index.php/phcfm/article/view/682>. (last accessed 12 January 2021)
12. World Health Organization. COVID-19 disrupting mental health services in most countries, WHO survey. <https://www.who.int/news-room/detail/05-10-2020-covid-19-disrupting-mental-health-services-in-most-countries-who-survey> (2020, last accessed 8 October 2020).
13. Kumar M and Kumar P. Impact of pandemic on mental health in lower- and middle-income countries (LMICS). *Glob Ment Health* 2020; 7: e35.
14. Ahmed SAKS, Ajisola M, Azeem K, et al. Impact of the societal response to COVID-19 on access to healthcare for non-COVID-19 health issues in slum communities of Bangladesh, Kenya, Nigeria and Pakistan: results of pre-COVID and COVID-19 lockdown stakeholder engagements. *BMJ Glob Health* 2020; 5: e003042.
15. International Center for Research on Women. Intersectionality between health & education: The dilemma facing Kenyan adolescents amid COVID-19. <https://www.icrw.org/intersectionality-between-health-education-the-dilemma-facing-kenyan-adolescents-amid-covid-19/> (2021, last accessed 12 August 2021).
16. Ahmed SAE, Changole J and Wangamati CK. Impact of the COVID-19 pandemic on intimate partner violence in Sudan, Malawi and Kenya. *Reprod Health* 2021; 18: 222.
17. Ouma PN, Masai AN and Nyadera IN. Health coverage and what Kenya can learn from the COVID-19 pandemic. *J Glob Health* 2020; 10: 020362.
18. WHO. Strengthening health workers capacities through digital health. <https://www.who.int/hrh/news/2019/strengthening-health-workers-capacities-through-digital-health/en/> (2021, last accessed 5 May 2021).
19. World Health Organization. Digital education for building health workforce capacity. Geneva, Switzerland: WHO, 2020. <https://www.who.int/publications/i/item/dfigital-education-for-building-health-workforce-capacity-978-92-4-000047-6>
20. National Council for Law Reporting. Kenya Law: The Constitution of Kenya. <http://kenyalaw.org/kl/index.php?Id=398> (2010, last accessed 5 May 2021).
21. Ministry of Health. Kenya health policy 2014 to 2030 – health publications. <http://publications.universalhealth2030.org/ref/d6e32af10e5c515876d34f801774aa9a> (2014, last accessed 5 May 2021).
22. Ministry of State for Planning. Kenya Vision 2030. <https://vision2030.go.ke/> (2008, last accessed 5 May 2021).
23. Ministry of Medical Services, Ministry of Public Health and Sanitation. Kenya National eHealth strategy 2011–2017 Media isfteh – International Society for Telemedicine and ehealth. https://www.isfteh.org/media/kenya_national_ehealth_strategy_2011_2017 (2011, last accessed 5 May 2021).
24. Ministry of Information Communications and Technology. The Kenya National ICT Masterplan. <https://smartnet.niua.org/content/182a477d-8d73-4e04-a387-9ff87b21f43c> (2014, last accessed 5 May 2021).
25. Ministry of Health. Kenya National ehealth Policy 2016–2030. 2016, pp. 1–64. <https://www.health.go.ke/resources/policies/> accessed on 8 January 2021.
26. Njoroge M, Zurovac D, Ogara EAA, et al. Assessing the feasibility of ehealth and mhealth: A systematic review and analysis of initiatives implemented in Kenya. *BMC Res Notes* 2017; 10: 90.
27. Muinga N, Magare S, Monda J, et al. Digital health systems in Kenyan public hospitals: A mixed-methods survey. *BMC Med Inform Decis Mak* 2020; 20: 2.
28. DC Design. What is human-centered design? Design thinking is a process, mindset... by DC design DC DESIGN medium. <https://medium.com/dc-design/what-is-human-centered-design-6711c09e2779> (2017, last accessed 4 May 2021).
29. Directorate of Committee Services. Departmental committee on health report on the status of national referral hospitals. [moz-extension://da8fe363-c310-4e51-bf26-a1d44a9f990e/enhanced-reader.html?Openapp&pdf=http%3A%2F%2Fwww.parliament.go.ke%2Fsites%2Fdefault%2Ffiles%2F2019-06%2Freport%2520on%2520The%2520Status%2520of%2520National%2520Referral%2520Hospitals.pdf](https://www.parliament.go.ke/sites/default/files/2019-06/report%2520on%2520The%2520Status%2520of%2520National%2520Referral%2520Hospitals.pdf) (2019, last accessed 5 May 2021, last accessed 8 January 2021).
30. Pumwani Hospital. Pumwani maternity hospital. <https://www.pumwanimaternity.go.ke/> (2021, last accessed 8 January 2021).
31. KNBS. 2019 Kenya population and housing census volume II: distribution of population by administrative units. <http://www.knbs.or.ke> (2019).
32. Holeman I and Kane D. Human-centered design for global health equity. *Inform Technol Dev* 2020; 26: 477–505.
33. Beres LK, Simbeza S, Holmes CB, et al. Human-centered design lessons for implementation science: improving the

- implementation of a patient-centered care intervention. *JAIDS J Acquir Immune Defic Syndr.* 2019; 82(3): S230–S243.
34. Adam MB, Minyenya-Njuguna J, Karuri Kamiru W, et al. Implementation research and human-centred design: How theory driven human-centred design can sustain trust in complex health systems, support measurement and drive sustained community health volunteer engagement. *Health Policy Plan* 2020; 35: ii150–ii162.
 35. Lund C, De Silva M, Plagerson S, et al. Poverty and mental disorders: breaking the cycle in low-income and middle-income countries. *Lancet* 2011; 378: 1502–1514.
 36. Morgan G. What we talk about when we talk about investment in mental health. *Lancet Psychiatry* 2018; 5: 695–696.
 37. Leung CL, Naert M, Andama B, et al. Human-centered design as a guide to intervention planning for non-communicable diseases: The BIGPIC study from western Kenya. *BMC Health Serv Res* 2020; 20: 415.
 38. Shidhaye R, Lund C and Chisholm D. Health care platform interventions. In: *Mental, neurological, and substance use disorders: disease control priorities*, 3rd ed., vol. 4. Washington, DC: The International Bank for Reconstruction and Development/The World Bank, 2016, pp. 1–61
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