

Research



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Development of a digital mental health platform in the era of COVID-19 pandemic in Kenya: findings and implications

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Abstract

Introduction: COVID-19 global pandemic exposed mental health gaps that have been salient among adolescents and young people. The glaring gaps include lack of information, undefined referral systems, and inadequate human resources for mental health. We aimed to develop a digital web-based platform to support young people's mental health and psychosocial needs during the COVID-19 pandemic. **Methods:** we adopted a mixed methods action research approach to design and pilot a digital mental health intervention for young people during the pandemic. We piloted the platform between Oct 2020 and July 2021, and recruited a sample of 150 young people through the community gathering spaces in three informal settlements in Nairobi City County using a convenient sampling method. **Results:** overall, participants reported that information provided to them via the platform was pertinent and beneficial, and that the self-assessments improved their mental health and psychosocial awareness and signposted them to available support and services. The support services consisted of informative weekly bulk emails and short motivational messages related to mental health, with a total of, 1343 short messages distributed through the short message service (SMS). Moreover, more than half the participants completed online self-assessments and participated in 19 online sessions. **Conclusion:** findings from this pilot study demonstrate that digital mental health systems are feasible and have the potential to improve access to mental health and psychosocial services. This is especially crucial during times of public health crisis, such as the COVID-19 pandemic. The realization of such systems requires swift multistakeholder partnership approach and investment.

Introduction

The global COVID-19 pandemic has exposed the mental health gaps that have been salient among adolescents and young people [1,2]. Lack of

information, undefined referral systems to mental health services, and inadequate human resources have been identified as major gaps [3,4]. Technology-supported platforms have been found as possible alternatives, considering the shrinking healthcare workforce and the increasing demand for mental health and psychosocial services [2,4-6]. World Health Assembly Resolution on Digital Health, unanimously approved by the WHO Member States in May 2018, demonstrated a collective recognition of the value of digital technologies to contribute to advancing universal health coverage (UHC) and other health aims of the Sustainable Development Goals [7].

A digital mental health intervention refers to information, support, and therapy for mental health conditions delivered through an electronic medium to treat, alleviate, or manage symptoms [7]. Digital mental health is part of digital health, which is rooted in e-Health, defined as “the use of information and communications technology, in support of health and health-related fields” [7]. Various digital mental health platforms have been developed to suit different populations and address specific gaps brought about by the pandemic [6,8]. Many clinicians and patients, alike, are now realizing the full potential of these digital tools, as they become the only alternative to connect at a time when face-to-face visits are restricted [9]. The majority of developed digital mental health interventions are based on Cognitive Behavioral Therapy for anxiety and depression [10], with fewer interventions aimed to improve general well-being. This suggests that researchers may be more likely, to develop interventions based on, existing clinical guidelines despite the effectiveness of tackling general well-being, in non-digital prevention interventions [11]. Kenya has a young population with, approximately three-quarters of the population aged below 30 years. On average, one in every ten people experiences a common mental disorder, with an increase in the number of one out of four patients visiting outpatient clinics [12]. Depression, anxiety disorders, and alcohol use disorders are the most

common, among young people [12]. The Kenya Mental Health Policy (2015-2030) provides a framework that guides mental health reforms, in the country, to ensure that all persons have access to comprehensive, integrated, and high-quality mental health care that is promotive, preventive, curative, and rehabilitative at all levels of healthcare [13]. As Kenya encounters this demographic transition, rapidly growing cities, mental health problems and extreme inequality among young people, it implies the need to focus on youth empowerment and youth-centered mental health services. In Kenya's capital city, Nairobi, approximately 50% of the residents live in informal settlements, consisting of a heavy representation of children and adolescents below 24 years [14-16]. Young people are prone to involvement in crime, violence, and risky behaviors such as the use of psychoactive substances, and early and unintended pregnancy leading to poor mental health and social outcomes [17,18].

The COVID-19 pandemic affected different aspects of life, especially among young people living in informal settlements and university students [18-20]. Youths understand each other better and often turn to their peers first when distraught [21]. Social distancing and isolation brought about by the pandemic disrupted their routines and enjoyable activities, and their physical and social connection [22]. The inability to access their regular healthcare providers for routine face-to-face psychosocial services and support exacerbated their worry, making them very anxious and fearful [23]. Both the 2007 and the 2015-2030 mental health policy recognizes youth as a population with specialized needs within mental healthcare services [13]. The policy recommends interventions that are multi-sectoral. To respond to this crisis, relevant stakeholders involved in the provision of mental health services in the city, came together to develop a mental health platform to offer much-needed mental and psychological support during the pandemic. The objective of this study is to describe the

collaborative design and development of a digital platform to support the mental health and psychosocial needs of young people during the COVID-19 pandemic.

Methods

Study design: we adopted an action research approach to design and pilot the platform. Figure 1 summarizes the key steps in the project cycle. Study permission was obtained from the county health management operational research unit in January 2021. We conducted three end-user sensitizations, for youth leaders heading the youth advisory councils from the community gathering spaces, and health care providers.

Study setting: for purposes of piloting the platform, a convenient sample of one hundred and fifty young people aged between 18 and 24 years were invited to participate in the program. They were drawn from three youth gathering spaces within the informal settlements of, Mukuru and Huruma, and *Amazing Minds* organization. Mukuru informal settlement is located on the Eastern side of Nairobi city in Embakasi South constituency. It is one of the largest slums in Nairobi and stretches along the Nairobi/Ngong River, in the industrial area of the city. The settlement has 9 villages with a population exceeding 118,528 (2019, Kenya population census). Huruma slum is in Mathare Ward of Starehe Constituency in Nairobi, and it comprises six villages with a combined size of approximately 4 hectares with over 2,700 households and a population size of 206,564 (2019, Kenya population census). *Amazing minds* is a youth-led peer-to-peer organization that works with young people in colleges and universities, supporting them through peer counselling on mental health. Our previous studies [17,23-25] in the informal settings and informal reports indicated that young people living in the informal settings were already experiencing a higher gap in terms of access to mental health and psychosocial services, and therefore our choice of the study setting.

Self-assessment tools: we uploaded seven validated mental health self-assessment tools namely Patient health questionnaire (PHQ9); Cohen Psychosocial support scale; Corona Anxiety Scale; Hurt Insult Threaten Scream tool; Rosenberg scale; Generalized Anxiety Disorder scale 7 and Edinburg Postnatal Depression Scale onto the app to encourage self-assessments and instant scoring by the users. Resource materials on common mental health conditions including depression, anxiety, suicide, stress, and substance abuse were also uploaded. In the social domain, we developed messages that were distributed through the bulk SMS system on topics related to mental health, sexual reproductive health and self-awareness. We also added validated links from the Ministry of Health, Kenya and the WHO on COVID-19.

Collaborative learning and design process: the coalition drew together partners from different sectors; the County government of Nairobi, The University of Nairobi, the Youth community (end users), advocacy partners, and technology partners to help in the piloting and learning. We adopted a nonlinear iterative process involving all the listed stakeholders. We held several virtual meetings, focus group discussions and expert interviews to gather insights, share perspectives and derive consensus and ownership of the entire design process. We adopted a stepwise approach during the design thinking process to ensure that relevant stakeholders are on brought on board. Each partner had specific roles and responsibilities in the coalition, as illustrated in Figure 2. We held several engagement meetings with stakeholders including Wazi [26], the technological partner, the youth leaders, and health care workers, on what we wanted to have on the web application. The partner agreed to upgrade their existing digital mental health platform to suit the purpose of this partnership, which was informed by the learnings gained from multiple stakeholders' engagement meetings we held. Wazi developed an end-to-end web platform that comprised key features as summarized in Figure 3.

The learnings from the initial in-person meetings highlighted the preferred digital device for accessing the application as smartphones because they were easily accessible and the use of pseudo names for confidentiality. Access to information and linkage to the specific specialists/service providers served as the basis for the technology platform that was initially presented through this collaboration. Additional collaborative learnings shaped the development of additional features like the self-reported well-being score, indicator questions to help identify which gathering space they were from, and improved notifications flow to increase engagement on the application. Before this amendment, notifications needed to be turned on within the user's account settings, hence couldn't display for action. Wazi team also added the "join a session" and "talk now" tabs. As a development process, the team undertook extensive system testing, user acceptance tests, and demonstrations internally, with peers, and with other members of the collaborative project. Technical issues, which included login problems experienced with those using the Chrome app, site connection issues on the app leading to dropping in connection, were raised and promptly addressed. We developed rapid testing of multiple channels embedded into the digital platform, with chat rooms, e-group therapy, SMS-based mental health promotion and USSD-based testing of positive mental well-being messaging. The efforts included testing these channels and understanding the practical issues behind the roll-out of such initiatives in formal health services. The application infrastructure was designed to support fluctuations in traffic automatically by scaling specific cloud computing required resources and had reasonable policies to support the high availability of the application which allowed for a smooth user experience. Continuous Integration and Continuous Deployment (CI/CD) pipelines were automated to ensure zero downtime during this deployment lifecycle. This collaborative partnership used a multilevel implementation framework, in three tiers namely, partner identification, resource material development, and

piloting of the intervention as illustrated in Figure 4.

Below, we describe the roles of coalition partners

Nairobi Metropolitan Service: The Nairobi Metropolitan Service (NMS) was responsible for the conceptualization of the idea, stakeholder engagement, resource mobilization, and piloting of the intervention, supervision, and documentation. It gave access to the services, information, and linkage to a specialist through the NMS structures. Additionally, NMS developed and gathered relevant information materials as per WHO and local guidelines to provide resources and materials to the young people who accessed the web application. They also carried out baseline meetings with the Youth advisory bodies and end-users, for needs assessment on their mental health needs, sensitized them on the web platform, the layout of services, and got their feedback and buy-in. They also identified pilot facilities (gathering spaces) where the end users could be accessed to participate in the pilot.

Wazi: Wazi as the technological partner was responsible for the system design and app upgrade, enriched by the discussion from the design thinking workshops with stakeholders and end users. They on boarded the peer mentors/psychologists for online therapy, piloted the web application system update, and implemented baseline and end-line assessments to assess the impact of the intervention.

University of Nairobi: the inspire study, through the University of Nairobi, did joint conceptualization of the paper with NMS, assisted in identifying validated and appropriate mental health screening tools, created the thematic mental health motivation weekly messages for the end users, and mobilized resources. The messages were developed in collaboration with other partners, including youth representatives, lay and professional counsellors and psychologists. They also supervised the process and manual development.

citiesRISE: citiesRise through the youth-led community groups helped in the identification of peer mentors, mobilized the youth from the community, identified indicators for measurement during the piloting and gave the financial support for the system licenses and maintenance.

Youths champions and representatives: young people drawn from the study areas were sensitized about the platform and their views sort on the design and buy in of the platform. They were instrumental on creating awareness and inviting of their peers from their safe spaces to use the platform. Their feedback as the end-users was continuously sought through user experience interviews, and focus group discussions. Which were then incorporated to improve the design and general usability of the platform. Their role and participation in the process is shown in Figure 1 and Figure 2.

Results

The process outcomes and feasibility results are discussed below. Impact results are discussed in a separate manuscript under preparation.

Process outcomes: some of the features that emerged from the design process that were adapted into the web application were: (1) “*talk now*” functionality which allowed peers to join a conversation instantly with peer counselors, (2) customized mental health tools, (3) customized content modules around various topics, (4) simple booking and scheduling to allow for the booking of a future session, (5) in-application surveys to collect additional feedback from peers. Through the 10-month project (Oct 2020-July 2021) we were able to reach 150 young people (male (male 50, female,100) aged between 18-24 years old, across 3 gathering spaces by informing, connecting and linking them to crucial mental health information and resources in the context of the COVID-19 pandemic. They also received motivational messages through weekly bulk short messaging. Additionally, the participants accessed

youth friendly services such as the Sexual Reproductive Health (SRH) services. Furthermore, 162 users conducted 140 mental health self-assessments using the tools embedded in the platform. Fifteen peers' mentors from the three gathering spaces were on boarded into the app and constantly supported through Whatsapp platforms. The peer mentors were able to conduct 19 group sessions addressing topics such as anxiety, depression, and tenets of self-care, coping and resilience. Individual and group video calls by the young people, assisted by the adolescent and youth champions, were held at the gathering spaces.

Feasibility results: the platform was created to increase access to mental health support services for beneficiaries, safely and easily. The key features of the web application were tested during this process to identify the feasibility of the design of the platform. The general acceptability of the platform was positive, as we had users sign up, access content, book and join sessions, as well as take assessments. This was evident from the high rate of uptake, which reached the target of 150 users. A retention rate of 91.3% was attained, a fact attributed to the pre-piloting sensitization workshop done three months before the roll-out of the intervention.

User experience interviews: after conducting user experience interviews, participants reported that the platform was easy to use, and they didn't need much guidance to use it. Here are some of the illustrative quotes; *'Good application, easy to use, especially being able to book a session with a therapist or joining an ongoing session. Additionally, it is able to notify you on upcoming sessions'. 'The App having the personal assessments on mental health is important, especially during this COVID-19 period. We were able to solve our anxieties that arose as a result of exposure to the pandemic'. 'Availability of articles that one may interact with on various topics revolving around mental health and the youth'*. Participants reported that the platform was

generally simple to use and required little to no guidance to learn how to use it.

Peer mentors/therapist onboarding sessions: we held multiple onboarding sessions with the therapists and peer mentors to ensure that they were familiar with features relevant to them, such as schedule management. Once onboarding was completed, therapists and peer mentors reported that the platform was simple to understand and use.

Discussion

This process paper aimed to present a stepwise collaborative design and development of a digital mental health platform to support the mental and psychosocial needs of young people during the pandemic. Utilizing action research and collaborative design methodologies, we have demonstrated that different players can come together and develop services promptly, especially during crises. From a counselling point of view, we utilized relevant theories such as resilience theories, which argue that it is not always the nature of adversity that is most important but rather how we learn to deal with it and bounce back [27]. These theories helped to inform the areas of emphasis in terms of content development and information packages. The conceptual framework for the platform was based on mental health and information technology expert feedback, existing guidelines on youth involvement [28], a review of both academic and gray literature on mental health and psychosocial needs during the pandemic [29-33]. The opportunity in this context was increasing access to and ownership of mobile telephony by the young people in Nairobi county, which currently stands at above 70% [34,35].

Learnings from this process paper could inform the design and development of future interventions and services to respond to similar crises. Central to this process is the multi-stakeholder approach, with each stakeholder

bringing on board their expertise and leveraging on partners' strengths. Teamwork and collaborative efforts are critical in responding to humanitarian crises, such as the COVID-19 pandemic [36,37]. This has been found critical in circumventing potential challenges associated with designing complex interventions [38,39]. These could be related to expertise or resource gaps. Additionally, the design period is significantly reduced, and thus the intervention can respond to the crisis within a short time. This cannot be possible when organizations and or individuals work in silos. Such coalitions bring people together to contribute their expertise for the benefit of a shared goal or objective.

A key lesson from this collaboration is the need for user experience in the design process. User involvement in the design ensures that design teams create products that respond to the needs of the users in ways they like [39,40]. Involving youth ambassadors and young people in the design and development of this platform enabled the coalition to respond to the needs of this dynamic population. A major criticism of digital health technologies is the lack of user involvement in their design [41] which results in products either not being acceptable or impactful to the potential users [37,39-41] and potentially resulting in waste of resources used in the development of the product or platform. We attribute the high acceptability of the platform to the extensive involvement of users in the process. Moving into the future, users should be involved in the design of products and services that are responsive to their needs. This is particularly important when designing interventions/products or services for dynamic populations such as young people.

In implementation science, the concept of public and patient involvement (PPI) in research is now becoming the norm [42,43]. Involvement is not only in the utilization of the process but 'meaningful engagement' where users are involved in designing interventions meant for them [43]. This is a drastic shift from what used to be a mere validation' of research findings with

users. In this collaborative design, PPI was central to the process, and this could have contributed to a seamless process and higher uptake/acceptability of the platform by the very users it was designed for. This approach proves that tackling issues of mental health within cities in a digital space -from information sharing, connection to services and linkage to a specialist, requires a collaborative/ multi-stakeholder approach to effectively reach the intended users. This is corroborated by studies that have demonstrated the role of perceived need and outcome expectations (priming) as factors that affect engagement with e-Health interventions [43,44]. We recommend this approach in the future design of interventions especially targeted at young people.

Conclusion

These findings demonstrate that digital platforms that promote therapeutic relationships have the potential to revolutionize mental health support for young people, especially during crisis situations, by providing access to information and linking them to services. Secondly, this process paper underscores the critical value of collaborative response in crisis response, especially pandemics such as the COVID-19 pandemic. Finally, the paper highlights the need for user engagement in the design of interventions, especially those involving dynamic populations such as the youth.

What is known about this topic

- *There exists a high unmet need for mental health and psychosocial services among adolescents and young people;*
- *COVID 19 pandemic worsened the situation, considering the increased demand for mental health and psychosocial needs and shrinking mental health workforce.*

What this study adds

- *Digital mental health services are a viable option to increase access to mental health and psychosocial needs, especially among adolescents and young people;*
- *Collaborations among relevant stakeholders can lead to faster and effective innovations, especially during crisis response interventions;*
- *The need for user engagement in the design of interventions, especially for dynamic populations such as the youth.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Shillah Mwavua, Manasi Kumar, Carol Ngunu, Alex Royea, David Henia and Chitayi Boniface conceptualized, designed, and implemented the study. Alex Royea and David Henia provided technological expertise. Shillah Mwavua, Manasi Kumar and Isaiah Gitonga drafted the first manuscript with contributions from all Carol Ngunu, Alex Royea, David Henia and Chitayi Boniface and Peter Memiah. Peter Memiah reviewed the final draft. All the authors have read and agreed to the final manuscript.

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Figures

Figure 1: project cycle

Figure 2: coalition partners

Figure 3: user interphase on the Wazi platform

Figure 4: collaborative design process

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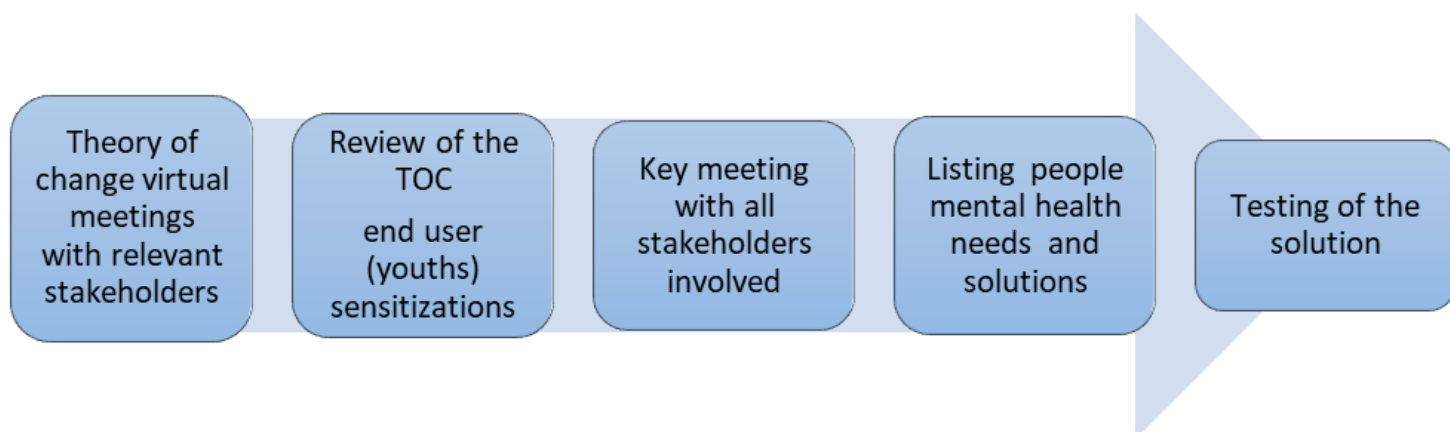


Figure 1: project cycle

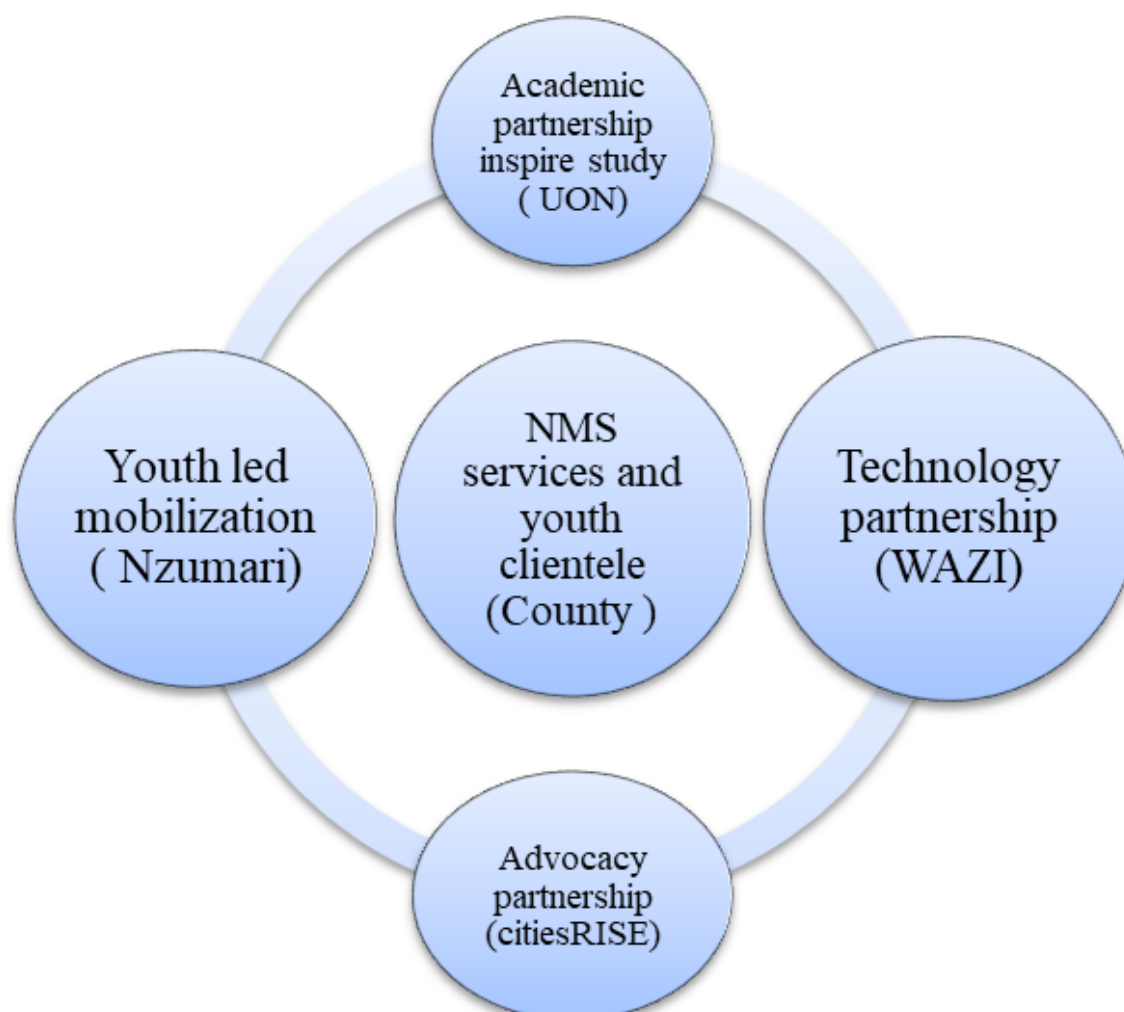


Figure 2: coalition partners

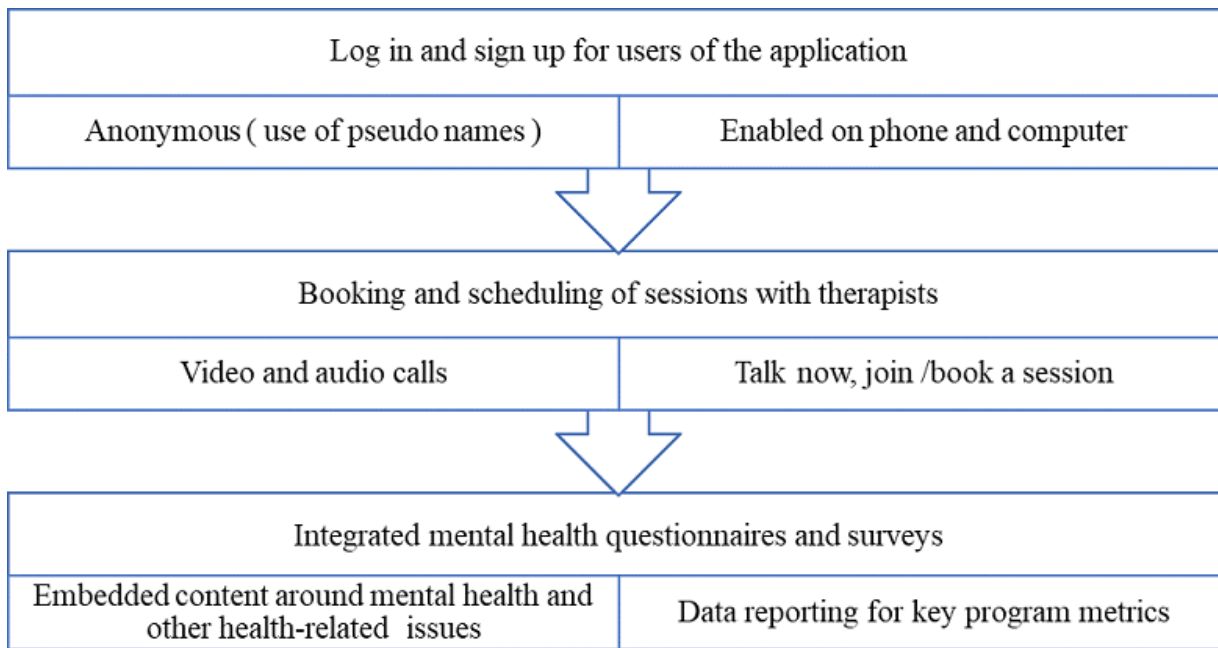


Figure 3: user interphase on the Wazi platform



Figure 4: collaborative design process