

Positive views, attitudes, and acceptability toward mHealth applications in addressing queer sexual and reproductive health: Healthcare providers and the queer individuals

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Abstract

Objective: In the age of digital health, mankind has resources to write over the historical narrative of queer individuals' healthcare exclusions. The main purpose of this study was to explore the perspectives of both healthcare providers (HCPs) and queer individuals regarding the use of web-based tools and mobile health applications (mHealth apps) in the context of addressing queer individuals' sexual and reproductive health services and needs (SRHSN).

Methods: An overall study was conducted as an exploratory sequential mixed method. This article provides findings from the performed qualitative cycle. The selection method was led by purposeful sampling, which targeted 33 HCPs delivering SRHSN within the defined study settings. Additionally, respondent-driven sampling was employed to select 22 queer individuals. Throughout the study, semi-structured one-on-one face-to-face interviews were used to collect data.

Results: Four major themes and related sub-themes emerged from HCPs and queer individuals: (a) aid queer individuals with consultations and treatment improvements, (b) drawing parallels with technology in other sectors, (c) enhancing knowledge and education, and (d) positive perception of technological advancements.

Conclusions: In accordance with our findings, HCPs and queer individuals were all positive and sees mHealth apps as a tool to address SRHSN for homosexual people.

Keywords

Attitudes, acceptability, mHealth apps, sexual and reproductive healthcare, queer population

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Background

Sexual and reproductive health (SRH) refers to physical and emotional well-being, as well as the ability to prevent unwanted pregnancy, unsafe abortion, sexually transmitted infections (STIs) like human immunodeficiency virus (HIV), and all forms of sexual assault and coercion.¹ In South Africa, everyone has the right to have access to healthcare services including reproductive healthcare, and no one should be denied the right to emergency medical treatment.²

However, this seems to be inconsistent with queer individuals. In this article, queer will be used as an umbrella term for lesbian, gay, bisexual, and transgender (LGBT) identity.³ Queer individuals continue to face a lack of

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public health facilities and services, both for general and queer-specific concerns, as well as healthcare providers' (HCPs) decline to offer care to queer patients, articulation of moral judgment and disapproval of queer patients' identities and forced subjection of patients to religious, resulting in poor-quality care.⁴ According to studies,⁵⁻⁷ queer individuals face stigma, prejudice, persecution, emotional distress, and marginalization within healthcare systems and services. Literature has indicated that poor training, understanding, and skills to deal with queer health issues among South African healthcare workers (HCWs) is one of the reasons queer individuals are unable to get healthcare services.^{6,8,9} Additionally,¹⁰ mentioned HCPs' judgmental attitudes act as a further obstacle to queer individuals' ability to obtain healthcare services.

These challenges seem to be global issues, for example, research has indicated that queer individuals are more likely to encounter health inequities due to heteronormativity or heterosexism, minority stress, exposure to victimization and discrimination, compounded by stigma.¹¹ Again, they all reported a variety of stigma, discrimination, prejudice, and disparities in treatment and attitudes from various segments of society, including the healthcare sector, which prevented them from fully achieving their human and health an opportunity.¹² This calls for queer individuals' reproductive health priorities to take into consideration the needs similar to those of cisgender and heterosexual groups (e.g., abortion, contraception, polycystic ovary syndrome) as well as unique needs (e.g., gender affirming hysterectomies, inclusive safer sex guidance) and barriers to care.¹³ If the above challenges are not attended to and resolved, queer individuals will continue having obstacles in accessing sexual-reproductive healthcare services and needs (SRHSN) such as hormonal services, lubricants, will obtain contraceptives in an inconsistent manner, have inadequate access to family planning, be subjected to corrective rape, elevated gender-based violence, and excessive rates of STIs such as HIV.^{8,9,14,15} Furthermore, queer people will continue to face delayed or terminated care, non-disclosure of sexual orientation or gender identity, heightened poor health behaviors, and stigma that is internalized.¹⁶

As we step into a digital age, the question is not just about technological advancement; it is about leveraging innovation as a force for change. For queer individuals, often sidelined and dismissed in healthcare systems, we believe that embracing digital health becomes a revolutionary act and could be used to address challenges experienced by them and close gaps that government cannot achieve in a sudden approach. Mobile health applications (mHealth apps) have already been employed in the healthcare sector to bridge the gap and address some general health issues,¹⁷ used mHealth to improve tuberculosis (TB) case identification,¹⁸ employed mHealth to improve TB referrals,¹⁹ applied mHealth software designed to assist people living with HIV in self-managing the symptoms associated

with their HIV and HIV-associated non-AIDS illnesses, and²⁰ used an HIV prevention and sexual health education smartphone app developed to improve sexual health and HIV prevention among teenage sexual minority young persons and others. However, specifically, some qualitative research has been conducted into the use of different innovative interventions for queer individuals to address different sexual and reproductive healthcare issues such as supporting health among young men who have sex with men (MSM) and transgender women with HIV,²¹ the acceptability and feasibility of a pilot study examining the impact of a mobile technology-based intervention informed by behavioral economics to improve HIV knowledge and testing frequency among Latinx sexual minority men and transgender women,²² and transgender women's experiences using SMARTtest, a smartphone application to facilitate self- and partner-HIV/syphilis testing using the INSTI multiplex.²³

Many of these studies have focused on the single or/and specific SRHSN separately; most of the studies did not include the perceived views, attitudes, and acceptability of both users'—HCPs and queer individuals. Little is known on how mHealth apps can address comprehensive SRHSN for queer individuals. To gain insights into how mHealth apps can address queer sexual and reproductive health and to understand both queer individuals and HCPs' perceived views, attitudes, and acceptability toward mHealth apps, our study applied a qualitative method. The aim of the qualitative method was to explore the perspectives of both queer individuals and HCPs regarding the use of mHealth apps in the context of addressing queer individuals' SRHSN, with the intention of developing innovative solutions to close the gap in service accessibility and influence the healthcare system into adopting innovative systems and solutions. This was achieved by one main research question (MRQ) and two probing questions (PQ) that this study aimed at addressing:

- MRQ: What is your view regarding the use of web-based tools and mHealth apps in addressing SRHSN for queer individuals?
- PQ 1: What is your take if we were to use web-based tools and mHealth apps to address SRHSN for queer individuals?
- PQ 2: If web-based tools and mHealth apps were to be used to address SRHSN for queer individuals?

Adapted from various literature studies (^{4,6,9,10,24,25}).

Aim

The purpose of this qualitative cycle was to explore the views of both queer individuals and HCPs regarding the usage of web-based tools and mHealth apps in the realm of addressing queer individual SRHSN.

Methods

Design and settings

This was a qualitative study that employed one-on-one interviews that were semi-structured and used a semi-structured interview guide as data sources to investigate queer individuals' and HCPs' perspectives on the use of web-based tools and mHealth apps in the light of dealing with queer individuals' SRHSN. For HCPs, we conducted our research at seven district hospitals in Tshwane and Johannesburg, in the Gauteng province of South Africa, and for queer individuals, we conducted our research at one of the non-governmental organizations (NGOs) in Tshwane that provides healthcare services to LGBT and intersex people.

Population of interest and recruitment strategy

This study's population of interest included 33 HCPs (medical doctors, nurses, psychologists, and social workers) who provide SRHSN and 22 gay, bisexual, lesbian, and MSM who represent queer people getting and using SRHSN at NGOs (see Table 1). The total sample size was 55; the population of interest was sampled until data saturation and richness were achieved. This means that the principal researcher stopped data collection and interviews once no new information was emerging; this was reached at participant 30 for HCPs and the principal researcher continued to confirm data saturation to the 33rd interview. For queer individuals' data saturation was reached at the 19th interview and the principal researcher continued to confirm data saturation at the 22nd interview. All HCPs were purposively sampled. We recruited HCPs during their working hours by outlining the study's aim, objectives, and research questions.

We began recruiting queer employees at an NGO by using convenience sampling, and then we asked them to help us refer more queer persons to participate in our study. This sampling method was respondent-driven sampling (RDS) as it was difficult to find queer individuals to participate. This sampling method was used until the principal researcher reached saturation with the 19th participant. After participating in the study, queer participants were given ZAR250 as a mark of appreciation and for transportation.

Inclusion criteria

All HCPs who were working at the selected seven district hospitals in Gauteng province took part in the study. HCPs were working specifically at the hospital's gateway clinics, casualty, outpatient departments, obstetric departments, counseling, and reproductive health clinics as most of them were the ones encountering queer individuals and

render SRHSN. All queer individuals who were 18 years and above in the selected study settings were included.

Exclusion criteria

All other HCPs who were working at the different wards (not gateway clinics, casualty, outpatient departments,

Table 1. Sociodemographic characteristics of HCPs and queer individuals.

Characteristics	HCPs, n (=33)	Queer individuals, n (=22)
	36.7 (1.55)	25.9 (0.89)
Age, mean (SD)	Frequency, n (%)	Frequency, n (%)
<i>Gender</i>		
Male	5 (15.15)	0
Female	28 (84.85)	0
Lesbian	0	3 (13.64)
Gay	0	8 (36.36)
Bisexual	0	2 (9.09)
Transgender woman	0	7 (31.82)
MSM	0	2 (9.09)
<i>Marital status</i>		
Single	22 (66.67)	22 (100)
Married	11 (33.33)	0
<i>Highest qualification</i>		
Matric	0	10 (45.45)
Certificate	4 (12.12)	1 (4.55)
Higher certificate	0	3 (13.64)
Diploma	9 (27.27)	4 (18.18)
Bachelor's degree	7 (21.21)	3 (13.64)
Post-graduate diploma	4 (12.12)	1 (4.55)
Honor's degree	1 (4.55)	0
Master's degree	8 (24.24)	0

obstetric departments, pharmacy, and reproductive health clinics) and who did not provide sexual and reproductive healthcare (SRH) at the selected seven district hospitals in Gauteng were excluded from the study. Any individual who did not self-identify themselves as queer found at the study setting was excluded from the study. All participants less than 18 years of age did not partake in the study. An anticipated mHealth app would be in English for the purpose of this study.

Data collection

As per protocol, data collection commenced after obtaining ethical clearance from Sciences University Research Ethics Committee (SMUREC): protocol number SMUREC/H/291/2023: PG.

Before the main study, a pilot study was done directed by the principal researcher and supported by supervisors as peer reviewers to ensure that the interview guides adequately addressed what was expected. A total of six pilot study interviews were conducted, these included three of each study population (HCPs and queer individuals). Based on the responses from HCPs and queer individuals in the pilot study, a few phrasing changes were made, but no questions were eliminated.

HCPs' data were gathered between September 12 and November 10, 2023, and queer individuals' data were collected between November 28 and December 4, 2023, in the form of digital audio recordings via semi-structured one-on-one in-depth interviews. Our research was directed by two semi-structured interview guides that catered both study participant groups and included open-ended questions. Before beginning the filling of demographic data and digitally recording an interview, the principal researcher explained the purpose of the study to all the participants, those who agreed to participate in the study were given a consent form to sign. The transcriber verbatim transcribed digitally recorded audio files from the interviews.

HCPs were questioned about their demographics, location of data collection, age, gender, marital status, field of work, duration of work as an HCP, and highest qualification during interviews. Queer participants were asked about data collecting location, age, sexual orientation, marital status, and highest qualification. The question "What is your view regarding the use of web-based tools and mHealth apps in addressing sexual and reproductive health services and needs for queer individuals?" was asked to both HCPs and queer individuals in in-depth interviews. Each interview lasted approximately 20–50 minutes for HCPs and for queer individuals it was approximately 30 minutes to an hour.

Researchers' characteristics and reflexivity

Personal characteristics. The interviews were conducted by Mr Raikane James Seretlo, a male researcher with a

master's degree in public health and 3 years of experience in qualitative research. At the time of the study, he was an nGAP lecturer in the Department of Public Health at Sefako Makgatho Health Sciences University with 1 year of co-supervising postgraduate student. Mr Seretlo has received extensive training in conducting in-depth interviews and focus groups and has previously published multiple studies in the field of public health.

Relationship with participants. Mr Seretlo had no prior relationship with the participants. Before the interviews, participants were informed about Mr Seretlo's role as a researcher and the purpose of the study. They were made aware that the study aimed to explore the perspectives of both HCPs and queer individuals regarding the use of web-based tools and mHealth apps in the context of addressing queer individuals' SRHSN. Mr Seretlo disclosed his professional background and his interest in the research topic, emphasizing his goal of understanding participants' perspectives without imposing his views.

Researcher reflexivity. Throughout the research process, Mr Seretlo maintained a reflexive stance. He acknowledged his assumptions about the views of HCPs and queer individuals' regarding the use of mHealth apps and discussed these with his research team (supervisors) to ensure they were critically examined. Mr Seretlo's professional background in healthcare sciences, previous work experience in the digital healthcare space, and his master's studies influenced his interest in the study, but he actively sought to minimize bias by using open-ended questions and encouraging participants to share their experiences in their own words. Regular team meetings were held to reflect on the data collection process, discuss emerging themes, and consider how Mr Seretlo's perspectives might influence the interpretation of the data. To further mitigate potential biases, the analysis was independently reviewed by his supervisors.

Data analysis and trustworthiness. The principal researcher imported the study's raw data into MS Excel and prepared a table. Following the thematic content analysis, the principal researcher combined and synthesized data for both participation groups. The transcriber used verbatim audio from the interviews, and the researcher cleaned and corrected language in the 55 transcripts. All transcripts were eventually loaded into NVivo 14 for first code generation. For confirmation of emerging codes, one supervisor was used as an independent coder. Data analysis began with HCP participants since the main study began with them owing to study consent receipt, followed by queer individuals. The principal researcher deeply analyzed both groups' data, reviewing and cleaning up transcripts over and over again without losing the participants' interpretations.

The principal researcher integrated data for both participant groups at the end of the analysis of both findings. The emphasis was on identifying similarities, distinctions, and new information. The principal researcher discovered recurring codes in both groups of respondents. The principal researcher then summarized the codes and established a new folder named themes, connecting the dots between themes, and drawing conclusions based on the merged data. To better understand their viewpoints and thoughts, qualitative information collected from every participant was reviewed again separately.

Several strategies were used to enhance the trustworthiness of our study, with the goal of improving confirmability, dependability, transferability, and credibility. A methodical and comprehensive method for data analysis was indicated and followed for confirmability. Two supervisors who performed peer review and independent coding assured dependability. Data were collected in and around seven district hospitals and one NGO clinic in South Africa’s Gauteng province, and a defined process for data collection was specified to ensure

transferability. Finally, for credibility, we assured extended involvement with data through interviewing, transcribing, coding, analyzing, continual observing, and theme writing.

Findings

Sample

Table 1 depicts the demographic information of both respondent groups, while Table 2 provides an overview of the themes and sub-themes that emerged during the data coding process.

Aid queer individuals with consultations and treatment improvements

Overall, most participants believed that mHealth app development will help queer individuals with different ways of consulting and enhance their treatments. In this context, the following sub-themes emerged during interviews.

Table 2. Emerged themes and sub-themes.

Themes	Sub-themes	
	HCPs	Queer individuals
Aiding queer individuals with consultations and treatment improvements	<ul style="list-style-type: none"> Facilitating consultations for healthcare services Providing guidance on service locations Remote consultation and access for healthcare services 	<ul style="list-style-type: none"> Facilitating consultations for healthcare services Providing guidance on service locations Remote consultation and access for healthcare services
Drawing parallels with technology in other sectors	<ul style="list-style-type: none"> Comparison with banking apps Reference to other web tools 	<ul style="list-style-type: none"> Comparison with banking apps Reference to other web tools
Enhancing knowledge and education	<ul style="list-style-type: none"> Empowering HCPs with information Queer empowerment through self-learning Clarity on queer-related topics 	<ul style="list-style-type: none"> Empowering HCPs with information Queer empowerment through self-learning Clarity on queer-related topics
	<ul style="list-style-type: none"> Informing significant others Provide correct and recent information 	
Positive perception of technological advancements	<ul style="list-style-type: none"> Recognition of digital literacy through smartphones 	<ul style="list-style-type: none"> Recognition of digital literacy through smartphones
	<ul style="list-style-type: none"> Time saving 	
	<ul style="list-style-type: none"> Alignment with the 4IR Embracing the digital world 	

Facilitating consultations for healthcare services. Both HCPs and queer participants stated their views of the mHealth app as a great idea, and further indicated that would assist in providing the direction of where they could go whenever they visit the healthcare facilities and encourages queer participants with planning their next appointment by checking on the app. Again, participants outlined that it would help queer individuals in arranging their appointment virtually without physically visiting the healthcare facility and there will be a reminder for their next healthcare facility visit thus making life easier by avoiding long queues and waiting times. Queer participants stipulated that HCPs would know who they are expecting in the healthcare facility, and they will be able to give them a comprehensive health attention.

It will be a great idea; I don't want to lie. It will help most- yah most of us it will help because you find yourself that you won't be able to kind of like go the centre, you are at work, so you can just only make an appointment, you understand. I believe there won't be so much long lines and there won't be so much chaos, at least a nurse of doctor will work knowing that I'm coming through, I have i-appointment, yes. That's like easy kind of like living life, making life to be easy. (P6, Bisexual man)

Uuu!! Exciting I am sure the will reminder us to take medication. Not only medication reminder but also about my next hospital appointment. (P9, Gay)

If there is an app queer can download and check up on when is their next clinic, well then, it's great, yah. I'm for it. (P11, Registered nurse)

You know, one wouldn't have to put an appointment during on one-on-one visit, they can set an appointment on the app. (P15, Registered nurse)

Providing guidance on service locations. HCPs and queer individuals imagined that mHealth app would provide assistance in guiding clearly queer individuals on where different SRHSN are rendered and offered, thus reducing unnecessary movement and waiting. Again, HCPs indicated that the mHealth app would reduce their time of going to other wards or places in the hospitals to ask for information, they will just open an app and ask question than by physically going to that specific place/area.

They will be able to get the service or understand better what their problem is or what they are able to access from which facilities because facilities are different, sometimes you find that you go to a secondary hospital whereas you are supposed to start at the primary healthcare; then at

least the app will be able to give also direction as to where to go for this particular problem, where to find help, where could be the problem be better addressed, Yeah!! that app will also give them insight on what to expect when you go to those facilities. (P8, Registered nurse)

The app will be very, very useful to all of us because it would make things easy, let's say you write whatever you want on it, and it gives you a location where to get it, so I think- yah it's actually- I don't know what to say but it's perfect. I think the idea of it, because the sooner it- yah it becomes discovered ne or made, it will help a lot of people, a lot. (P12, Transgender woman)

I would like to think a queer patient will go to a specific app and it will inform him/her where they can find help. For example, I think it would make things much easier for them and they will know the right places where they can find help so that when they come here and we say, we don't offer that they think we judge them or whatever. (P29, Clinical psychologist)

Remote consultation and access for healthcare services. Participants mentioned that having mHealth apps will cater different types of patients like those who are shy and unable to express their health concerns when consulting with HCPs face-to-face.

I would say, I mean, there is a value for it, it is important because you may find someone doesn't have to interact with an individual, but you could interact in the online space where one person can be free, and it allows a person to be fairly free compared to when you are interacting with someone, because now I don't have to wonder what the person is thinking about. (P5, Clinical psychologist)

The app? I think it will help because some of the people can't talk, they are shy to talk but they can write online, they can share their... how they feel about this, about being a queer, they can share. So, I think the mobile is going to be a perfect thing. (P7, Enrolled assistant nurse)

I think the app will benefit a lot of people, what I can say I don't know what I can say, but I can say someone might have some symptoms of other diseases or feel sick, but they are afraid to share with someone. Yes, the person is shy to tell someone but can easily type on the app and get help. (P16, Gay)

Other participants indicated that mHealth apps will enable queer individuals' learning and put them ahead of time. When they visit the hospital, they will have an

understanding of what could be wrong with them and what type of services are they going to receive.

Someone can open an app and learn about this or enter a website and learn about this, that's like we would be 20% ahead already because before they come into a physical building, they've already learned from an evidence-based website. (P2, Clinical psychologist)

Iyo!! It will help, before I come to the clinic to get my medication, I will check which medicine am I collecting and also nurses will know on time, it's simpler they know oh this person is supposed to get a PrEP, or this person is supposed to get uhm what's this ART or any form of uhm medical service that he might need. So, I feel like app is nicer and easier to use most of the time, yes. (P10, Gay)

Some participants supposed that mHealth apps will encourage remote and immediate consultations thus minimizing unnecessary hospital visit. Furthermore, participants indicated that questions would be asked on the app regarding the services offered, this will also save their time of coming for nothing to the hospitals. Participants added that it will minimize the thoughts of being denied healthcare services and discriminated against and addresses their health concerns anytime of the day even when they do not have money to travel to the healthcare facilities.

So, let's say I have a question, it will be easy for me to ask the doctor, like okay I am sick and which kind of medicine I can drink, or I'm having HIV so what I can do, you know, so before I come to the doctor or going to the pharmacy to by those kind of medicine I'll you know. (P4, MSM)

It's going to be a huge benefit because here it's far, you have to use taxis, some of days you don't have money and you want to come and check yourself, maybe you're not feeling so well so you don't have money. So maybe the app you can type what's going on, this, you get it. And I hope that it's going to be 24-hours [Laughter]. (P15, Transgender woman)

It will be a better thing to have app neh, so that everybody, even you will- when you get access to app, you can ask more things, rather than come, ask this individual I am here for one-two-three, this individual takes you to that individual. (P22, Enrolled nurse)

I feel like they won't have to come all the way to the clinic to ask certain questions and stuff. If the app is there, they can ask questions, they know where to get what service, you understand? Because, for example, if let us say he came to the clinic and they were like, no, you understand, but then if he knew a place he was going to go to the

right place, not going there and then being denied the service and then it becomes a whole commotion, whereas it's not rendered, you know. Then he- so that he doesn't take it as discrimination, as you would see. If someone else had come, maybe you would have given them the information that find that is not offered. So, then they will know where to go to get what help and what not, yah. (P27, Registered nurse)

Additionally, queer participants believed that an mHealth app is a good idea and highlighted that it will be making their lives easy, they will read, access health information online, and it will make them comfortable to consult virtually.

So, if ever like now we are accessible to like an app and all of that, it will be much easier for them because they will like okay get on my phone, uhm and read and everything, and know everything about sexual wise, especially like as queer people. So that will be- it will be very smart, and it will be very easy. (P2, Gay)

I think it would be great to have a clinic or an app that goes into that space where it's all digital where you consult digitally, where even medication is delivered digitally. Where just at the click of a button or the click of a link your medication is given. But if then it's in a severe case where you're like ah I feel like I have an STI or I might be exposed then you can come in physically, but first consult then can be digital. So, I think here is a need, that's why I feel there is a need, we need that. (P5, Gay)

Drawing parallels with technology in other sectors

Another theme that emerged among the participants was that participants compared and related mHealth apps to other existing technologies and applications. Participants considered that mHealth apps will be helpful and more beneficial as the same as other technologies whereby clients would not need to stand in unnecessary queues to seek for help. The participants admitted that people are using other different technologies therefore, an mHealth app will be relevant.

Comparison with banking apps

Participants compared the relevancy of mHealth apps with the ones used by banks. Furthermore, the participants highlighted the importance of how mHealth apps will be convenient for queer individuals who are working and also require continuity of care even after hours.

It will be very, very helpful. A person can use that. Like the banking app, we are no longer going to the banks to stand in

a queue and get asked so many questions in the queue and get a person that is less interested in assisting you to give you more information. I'd give example with the bank. Right now, when you take a loan, you will read on your own on your app in your phone to say if ever I take this loan, these are the conditions, you understand? As much as it will be like that to an individual who will do it on her own time, as healthcare providers we will work from 07:30 to 16:00 whereas some queers are engaged at that time. They might not even able to come to the hospital. But if ever you have an app, when they get home... they will take off your shoes, lay on their back or sit on their sofa, you open your app: "what is it that they are talking about when they say one, two, three?" Then you start reading for yourself. And the more you read, the more it becomes clear to you as an individual. (P13, Social worker)

Isn't like as an app ne, okay let me make an example about i-banking app. Banking app has services, transactions, send money, cash back are quite faster and makes life easier, you know, yah kind of things like that, will be the same with this health app, it will help, yeah, it will be very helpful. (P15, Transgender woman)

Reference to other web tools

Some participants acknowledged that due to the modern period of technology, people are using and being aware of online tools like internet and Google, social media platforms such as TikTok, Instagram, YouTube, and Facebook, other commercial apps like Uber Eats, and dating apps, mHealth apps will be important, beneficial, information will be readily available, and the HCPs' challenges and delay of being trained and taken for skill workshops will be addressed. Again, participants showed that it is important to promote and utilize health-related apps as much as others are and some participants compared it to other services found in magazines like *sis Dolly*.

Hmm, I think obviously in 2022 we live in a modern age where the Internet and the web is easily accessible than a building of a hospital or a clinic. So, I think that would be very important and the starting point. Because if this information is readily available everywhere. (P2, Clinical psychologist)

Tool actually. Like public tool that uhm many people are on. So, if ever, let's say they are on Instagram, many people are on Instagram, many people are on Facebook. So, if ever like the app is influenced on Instagram but not much on Instagram because on Instagram you just post and all of that but of course like on TikTok, on YouTube, on Facebook to say to get this information you can download this app and all of that. It will be much easier like because many people are on Facebook, many people are

on TikTok, people like your just neh public whatever. (P2, Gay)

There is Google nowadays, you can go to Google, don't ask your friends, you, see? So, I think it will be very beneficial if there would be an app like that. (P19, Enrolled nursing assistant)

If I can get it at the tips of my fingers then I think that's really amazing I mean that's where technology is going, you know, everything is on the phone, there's Uber Eats, there's Mr Delivery, they just want to bring comfort to our own homes. So, if there's something uhm in the healthcare industry that wants to bring that to us, it would be great. (P22, Lesbian)

Enhancing knowledge and education

This additional theme became evident in the responses of the participants that mHealth apps will allow, provide, and empower HCPs, queer individuals and their friends and families with queer health-related matters. Again, participants highlighted that clarification and learning on the queer issues will be provided if mHealth apps are utilized.

Empowering HCPs with information

It was widely noted among participants that not all HCPs are informed with queer-related matters and getting easy access to the information might change the negative attitudes of many people. Furthermore, participants highlighted that HCPs would learn more about queer individuals' community and new terms used, thus reducing surprised and judgmental attitudes.

Yes, even them. Yeah, it's going to help them because not all the professionals who understand from this information. Even them will get more information when there is this app, it will spread so fast this information regarding sexual reproductive healthcare services and needs for queer. Maybe the attitudes towards queer individuals will change in the communities and professional services. (P3, Registered nurse)

You know, like as I was saying that I believe that the healthcare workers should be trained about certain things when it comes to us so now if ever now there's an app, they'll also get to know what to ask, and I think that will be easy for them to. You know I think it's going to help a lot if ever like we were to have it actually because of now obviously it's something that is there. (P13, Transgender woman)

For the healthcare providers I think it will also broaden you guys' knowledge. Maybe there are other stuff that you

maybe don't know that you need in the app so the more people you are exposed to, the more people you engage with you'll be like oh yes maybe let's add this. So, its teaching you guys as well and helping your app grow a little bit more and have more information yah because I don't think my needs are the next person's needs uhm maybe there's a lot of things that I've left out. (P22, Lesbian)

So, I guess that will depend on what is it that the app is trying to address. If the app is trying to- if- is it more of guidelines, that will tell you if there is a queer man, if he comes, complains about this, probably this is the cause or this thing, or probably the app is also about maybe like self-teaching, you know, to teach yourself as a health worker to say probably this will be your approach or this is how you should approach queer, or this- what you need to be aware of and also to- what is it that is more frequent in queer men in terms of sexual reproductive, what are the most complaints?. (P23, Medical doctor)

Queer empowerment through self-learning

A majority of both queer and HCP participants expressed that mHealth apps will enhance queer individuals to learn and acquire knowledge about themselves. HCP participants believed that queer individuals will be able to find more information on themselves and confirm it with what they receive from HCPs. Participants stated that queer individuals will take responsibility of and manage their health thus promotes teamwork between HCPs and queers individuals. Again, queer participants acknowledged that they will be able to learn new conditions and how they spread, whereas some of HCPs indicated that mHealth apps will enable queer clients to learn more about sexuality at large.

Like I don't really know Chlamydia, but I've heard about it. So, let's say it comes to my mind and I am like oh let me actually search what this STI is. I'm literally going to get on that app and then I'm going to get all the information because I'm going to be lazy to walk or Uber to come here and get like a brochure. So, it's very important- an app is quite good, it's quite good and it can literally make people to be aware of different infections and anything that concerns uhm sexual intercourse because yah because most of the time gay people obviously they go through. (P7, Gay)

They will learn more. they will see for themselves gore at least what I didn't know I can look for it and then this is the thing that she was telling me, she wasn't telling me a lie. The benefit that they will have been to look what they didn't know and then they are searching for it, it benefits them gore this is the truth, I can follow these steps. (P12, Registered nurse)

I think that would also be great because then it allows them autonomy and it allows them to be involved in their own management, and just learning and increasing knowledge for them also helps us manage them because we can work together. (P14, Medical doctor)

Okay, I think on the queer side, obviously, I think it will do a good thing as in inform people about a lot of things because we don't know much just, as just- I mean I'm in the LGBT society community but there's a lot of things I don't know like there's so many terms now, you know what I mean, I mean there's- first it was LGBT maybe and now there's TIQA+. (P21, Lesbian)

Clarity on queer-related topics

A common perspective shared by the majority of HCP participants and queer individuals was about how mHealth apps might provide coherence on different queer-related matters. Some participants mentioned that its clarification using an mHealth app will be immediate and during consultation where they can easily open an app and get some clarity. Some participants added that mHealth app innovation is important for so many aspects including queer like using of correct pronouns and will enable healthcare services integration.

Yah, yah, it's going to help so many people, you know, so many people. Like I said so many people now they don't know what they're doing, you know, so they need something who going to tell them like you know before you do it you have to do this, or it's better to be like that, you know. Yah that kind of help is going to help, yah. I'm just like, about myself, myself if it happens on me now, we just that posting those things on app cause it's going to help, you know. (P4, MSM)

Oh, there would be a lot because right now I don't have a textbook at hand regarding this thing, so how do I tell the next person without having the whole information about something, you see. So, if there's an app, I open that app.... (P19, Enrolled nursing assistant)

Look, it will be useful just clarity on certain aspects. So, I feel coming up with such an initiative can actually go a long way. An initiative where it's able to divulge information on everything that's related, be it mental health, be it child protection, be it the queers, be it everything. I think it can actually play a huge role. (P20, Social worker)

So, I think it will, on our side it will also enlighten us on certain things that even me as somebody that's in the community or not, like the pronoun thing, some people prefer they/them which is very tricky I mean we are just used to

“he and she”. Honestly when we speak the truth we are just used to he and she so now if somebody is going to come and say- like I mean I think I’m not woke but like I think I’m not woke but I think I’m liberal enough as in because I hang out a lot in like homosexual spaces I always ask what are your pronouns before I offend you type of thing. (P21, Lesbian)

Informing significant others

A substantial number of HCP participants reported that the creation and utilization of an mHealth app will help with notifying and empowering queer individual’s friends, family members, and community members on the queer individual’s related topics. Participants stipulated that the information would cater for all the age groups.

It will be very easy for understanding for everybody especially us parents. You find that someone is gay, the family or parents are frustrated, they do not understand, they ask themselves what kind of a child this is, they are confused too what is happening. The App will help them a lot to find information. It will work for many people, older and younger. (P3, Registered nurse)

This app will help in addressing issues like termination of pregnancies for lesbians, like even in the TV side, when they speak about termination there, when you are seated with your mom, she will understand how this thing works. It won’t come across as you are killing, or you are doing something wrong, it is just that you need to protect yourself from some of the things like that. So, it’s going to be so much beneficial to lesbians too. (P6, Registered nurse)

Provide correct and recent information

The prevalent response from HCP participants indicated an mHealth app will have evidence-based, updated, and current information regarding queer individual’s issues. Additionally, participants believed that if mHealth apps would have correct information, it will be more beneficial as it will minimize patients generalizing others’ problems to themselves, since everyone has their own health issues, and other participants anticipating mHealth app as a reference app for providing correct information.

Maybe I’m sitting with you, I am telling you things of 1968 whereas today they developed a new Act, a new provision of information access somewhere, then you don’t have that information because I don’t have that information as your service provider. But if ever we are on the same page, you come and ask, we make a session, we are on the same page. (P13, Social worker)

If that app has all the correct information and everything then it will be great than for queer and us take things and hearsays from the streets because that’s our downfall in everything when it comes to health. You take other people’s experience, and you make it yours. (P19, Enrolled nursing assistant)

Like oh, you can go- always reference back to the app and maybe check and see how you can assist them. And also, drugs. I think we need to also be clued up on the hormones that they are giving transgender’s or for example, in our HIV clinic, what if they are giving someone a hormone that is contraindicated with my medication and I don’t know, then I can always go back to the app and check whether is this safe or is this contraindicated and- yah, it will help us better with that, I think. (P32, Medical doctor)

Positive perception of technological advancements

This final theme originated from a range of participants who stipulated and expressed a positive opinion of the relevance of technological breakthroughs and growth in contemporary days. Participants stated that mHealth apps will be easy to use and understand because of their digital literacy via the use of smartphones and age; some participants linked it to the Fourth Industrial Revolution (4IR); others embraced the world of digital age; and most queer participants emphasized how the use of mHealth apps will save their time of coming to healthcare facilities unnecessarily.

Recognition of digital literacy through smartphones

The greater part of participants accepted that everyone in this day and age is well cultivated and knowledgeable about the use of smartphones. Furthermore, participants indicated that almost everyone in this era has a smartphone and uses it 24/7. The pervasive nature of smartphone use will help people who are lazy to go the hospitals, to access queer healthcare information easily, as they will be able to search anything health-related issues by just a click whenever they are bored. Again, participants believed that it would reduce the challenges that queer people face with other HCPs at the healthcare facilities.

I think that is very smart because like most people now, technology changes everything. This generation now technology, technology evolves, you see and lot of people now they use phones. Lot of people use phones. Lot of people are lazy to go to hospitals and all of that because they would think that like I have to go and queue and all of that. (P2, Gay)

It will be beneficial so much to especially young women and men who are in the ages of childbearing, who are in need of the services, because remember most of these days young women are using cell phones, so they are more accessible to cell phones; they can get all the information from their cell phones; so, it will be beneficial to everyone. (P6, Registered nurse)

I think that would be amazing because our lives are in our phones now, everything is accessible, everything has to be here because we're lazy to be driving out all the time. If I don't need to go to Dischem to ask someone what could be wrong with me and I can just type my symptoms or whatever on the app or get whatever information that I need about a certain thing that I want to do. (P22, Lesbian)

I think it is- okay, my view about the app, it's great, actually, to have web applications. Why? Because if we look at our generation, and yah, even older people these days know how to use their cell phones, so we all have access to smart phones where we have applications, we have this. We can easily download those. (P25, Registered nurse)

Age enabler

HCPs highlighted that younger people have smartphones and are aware of different technological platforms. As a result of being digitally fluent, it will be easier for them to download and navigate through mHealth apps. Additionally, participants believed that having mHealth apps from a younger age will help them to be who they are as they will learn from it about different gender and sexuality issues.

I think it's quite great, you see, especially for those growing girls and boys, you see, again kids of today they have access to these phones, they know how to easily just download it and then it will be more beneficial to them growing up to actually making that decision or maybe sticking to what they truly are. (P19, Enrolled nursing assistant)

I think as a young person, I will identify myself as a young person [Laughter] I mean I am only 30 years old, yeah!!, I am not that old. [Laughter] So, I think as a young person I understand that technology and I know how to use it, yeah is something that would assist, you know. (P29, Clinical psychologist)

Alignment with the 4IR

Most HCP participants related mHealth apps to the 4IR while discussing their thoughts on mHealth apps for addressing queer individual's SRHSN. Some believed that if

mHealth apps are used, it will work perfectly because everyone is talking about and living the 4IR. Furthermore, other participants stated that, in this day and age of the 4IR, SRHSN for gay people should be available online, and that mHealth apps will fill gaps, thereby addressing queer individuals' healthcare challenges.

As you know now with the Fourth Industrial Revolution, all of us are going towards online web, so we can't say certain services cannot be available through that. I mean, we need to also provide our services online, yes, this app is needed too. (P5, Clinical psychologist)

I think, I mean, if we can apply it will work, there won't be problems, it's Fourth Industrial Revolution technology, like really guys, everyone is there. (P17, Medical doctor)

I think, since well we are moving into the Fourth Industrial- we are in the Fourth Industrial Revolution, that is much needed, you know. I think everybody has cell phones or- you know, they are connected to technology nowadays, so having such will help address queer healthcare problems and close gaps. (P28, Social worker)

Embracing the digital world

The bulk of HCP participants endorsed the digital era and world we are living in. Most of the participants supported that people are always having smartphones and have different applications. Specifically, to this sub-theme, participants acknowledged that we are living in a ubiquitous computing society in which people have access to free data and smartphones. As societies are advancing, this will make the use of mHealth apps easily accessible, adopted, and utilized.

I think it will be a great idea because we are living in a digital world these days, everything, technology, everyone almost has a smart phone, everyone has access to data, so I think even if it's a data-free app it will assist them a lot. (P8, Registered nurse)

I think it will be great if we were to have apps like that because then it would also sort of... you know, we are in an advancing society, everything is technological. (P14, Medical doctor)

Time saving

This sub-theme was mainly stated by queer participants that mHealth apps will make their lives easier thus saving time and money for transport by just one click and finding information related to their health or engage with other people on the mHealth app.

I mean that is, I feel like it makes things easy, it makes life easy, it saves time, it makes things easy, like honestly, yah. (P1, Gay)

It's a need, I think it's a need. So saves time, saves energy, saves- I want to say saves money but I mean somebody has to pay for it. Uhm but I think it- so there's a need. (P5, Gay)

Time management, first things first, time management and money, another cost, less of money- because we will cut cost of rushing to the taxis because I come from far, I will easily go to the app and just one click to ask a question about my body there's something that I don't understand or I can also ask somebody else ko on an app. (P14, Transgender woman)

Discussion

Our findings imply that developing mHealth apps offer considerable promise for improving healthcare consultations and treatment for queer individuals. Participants, both HCPs and queer individuals, were positive about the potential benefits of such apps. Both HCPs and queer participants thought apps may speed up the appointment process by reducing wait times and provide a more convenient way to book and manage healthcare appointments. Our findings are in line with the growing body of literature suggesting that mHealth apps support appointment reminders across different health conditions.^{26–29} Furthermore, another study highlighted that participants expressed acceptance for healthcare apps that provide appointment reminders.³⁰ Our findings are also consistent with previous studies that mHealth apps reduce waiting times in different departments, like outpatients.^{31–33} On the other hand,³⁴ it stated that older persons from the age of 63–87 found booking appointments via online systems difficult and complex, because it needed the first step of creating an account and the capture of demographic characteristics such as name, age, gender, ID card number, and so on. The app was envisioned by participants as a way to increase communication between healthcare practitioners and queer individuals, resulting in a more individualized and thorough medical experience. Supporting evidence from other studies indicates that mHealth apps might influence communication and relationships between patients and providers positively^{35,36} and have been evidently seen as an improver for regular communication and monitoring between healthcare workers and their patients.^{37,38} Additionally, our study is aligned with the findings from a study³⁹ that showed that almost half of the participants mentioned a need for mobile and web-based simulations to support their communication with healthcare providers.

Again, mHealth apps were anticipated to provide information on service locations. An app, according to

participants, should provide clear directions to sexual and reproductive health service locations, reducing unnecessary visits and searches within healthcare institutions. This function was supposed to be especially useful for both HCPs and queer individuals, allowing for quick access to essential information without the need for physical queries within hospitals. A study⁴⁰ demonstrated that a feature of finding services is crucial since it was included in the creation's ultimate aim, which covered services connected to health, testing, psychological wellness, dependence on drugs, housing, food, employment opportunities, and clothes.⁴⁰ The current study affirms the conclusions drawn by a study⁴¹ that service locators can promote use of key HIV prevention services by helping users identify the right type of service that is in close proximity. The distance to a service location for HIV services matters. Furthermore, our findings echo the sentiments expressed by a study⁴² that for HIV prevention and care, locators can provide geolocation-informed referrals to HIV testing, STI testing, HIV care, and Pre-Exposure Prophylaxis (PrEP) services. Our study is also in support of the conclusions drawn by a study⁴¹ that if additional information about service facilities, such as forms of insurance accepted, services offered in multiple languages, times of operation, or whether the facility near a bus stop are available, faceted searches can be offered to help tailor service locations. Participants said mHealth apps could help people who are too shy or uncomfortable to voice their health issues in person. Our study is in line with a quotation from a study⁴³ that even talking with someone about things you cannot talk to your friends or family about, mHealth apps are a big plus and are private. Additionally, in another study participants voiced that anonymous feedback and advice would be helpful, and they saw value in being able to say things that they would not normally tell others.³⁰ Evidence by a study⁴⁴ indicated that participants acknowledge that information from mHealth apps will be reliable, and they would not be afraid to ask people anymore, as it will be at their comfort thus giving them freedom to access simple information. Furthermore, mHealth apps were seen as a useful tool for facilitating consultations with the possibility of remote consultations and service access was mentioned. Our study extends the findings of⁴⁵ that highlighted an expression of some participants' preference to look for a health app as a digital behavior change intervention instead of a face-to-face intervention because of the availability and low cost of an app. This means that costs can be saved for queer individuals to travel to the healthcare facilities if app costs are cheaper. Remote consultations were promoted as convenient, perhaps eliminating unnecessary hospital trips, and providing a platform for instant health-related inquiries. Establishing a connection with the DrCovid+ app that was developed by the authors⁴⁶ that aimed at collecting patients' vital signs for remote monitoring and continuity

of care supported the notion that our study is in line with the fact that mHealth apps will improve remote consultation. Additionally, the findings of this study corroborate the results of previous research that showed the how an mHealth app was more helpful and attractive due to its possibilities of remote monitoring across different entities such as governments, health professionals, and healthcare organizations,^{47–49} as cited by the study.⁵⁰ In addition, a sub-Saharan African app called Vula was found to be enabling HCPs remote communicating and access real-time information for their clients.⁵¹ The evidence presented here reinforces the notion that mHealth apps will indeed promote virtual consultations for queer individuals if developed and implemented.

The participants in our study consistently drew parallels between the mHealth app and numerous technologies in various industries, emphasizing its potential benefits. Comparisons were made similar to how financial transactions are handled through mobile applications, comparisons were drawn with banking apps, stressing the convenience and efficiency of maintaining health-related information. The findings of our study corroborate gaps identified by other authors, such as the raising global entry of mobile communication and devices in every other sector, such as commerce and banking, but that the utilization of mHealth apps by HCPs at point of care in hospital settings is rarely investigated.^{51,52} However, this study calls into question a statement highlighted by a study⁵³ that mHealth apps have various distinct characteristics as compared to apps that provide electronic commerce services, and these distinct characteristics influence physicians' intentions and behaviors when utilizing mHealth apps.

Participants emphasized the importance of mHealth apps for people with busy schedules, particularly queer individuals who may find it difficult to seek healthcare during standard working hours. The findings of this study corroborate a view described by a study⁵⁴ that the televideo technology on mobile devices deserves additional comment and would be beneficial for patients who are physically disabled, lack transportation, and have busy schedules.⁵⁴

Additionally, other web tools and online platforms mentioned by participants were social media (Instagram, TikTok, and Facebook), internet search engines like Google, and commercial apps like Uber Eats. The present era's reliance on technology, such as dating apps and online platforms for a variety of services, was stated as justification for the need of marketing and adopting mHealth apps. Our findings are in line with the growing body of literature suggesting that most participants regularly used social media channels such as Facebook, Instagram, Snapchat, and various social and sexual networking apps to connect with friends, family, romantic/sexual partners, and work opportunities.⁵⁵ Additionally, our results concur with those reported by a study⁴⁰ in 2020 that many people use YouTube, Google Maps, Facebook/Instagram,

Snapchat, and Sound Cloud apps. Another study³⁰ indicated that all participants used apps such as TikTok, Facebook, Instagram, Twitter, and Grindr and apps for their banks and they reported using apps to stay up-to-date with the times and to connect or reconnect with one another. Repeating the established patterns identified in previous studies where participants recognized that with the widespread use of social media apps, such as with TikTok, many youths tended to give their attention to shorter videos.³⁹ A study⁵⁶ showed that most common activities that participants used the internet on their smartphones for were social networking, and sending or receiving emails, also used their smartphones to access geosocial networking apps or websites, search for health-related information, use health-related apps and the majority of participants used geosocial networking apps, with Grindr, Blued, and Hornet being the most popular. This study is in agreement with previous research that highlights many participants reporting their enjoyment of the familiar technological platform to exchange sensitive information confidentially and comfortably within a group that they trust such as Facebook and WhatsApp.⁵⁷

Our study's findings highlight the potential of mHealth apps to improve knowledge and education on queer health issues. Participants stressed the importance of these apps in empowering HCPs by offering complete information on queer topics. As a result, negative attitudes and judgmental behaviors may be reduced. Participants, notably registered nurses, and a transgender woman, expressed hope that such apps will enhance HCPs' expertise, enabling them to meet the queer individual's specific needs and concerns more effectively. We agree with the conclusion that was drawn by a study⁵⁷ that scaled-up mHealth interventions can lower SRH stigma by expanding access to sexual education and peer support, supplementing adolescents' existing SRH education.

In addition, the study found that mHealth apps could empower queer individuals through self-learning. Participants anticipated that these apps would empower queer individuals to take charge of their health, promoting a collaborative interaction between HCPs and the queer individuals. Conforming our study finding³⁹ showed that mHealth apps improved information presentation and led to participants being very enthusiastic about a design that would allow them to explore their own sexual identity while learning more about sexual health. Additionally, a study³⁰ stated that a participant thought that it would be very valuable to "open up general lines of communication and help folks who are in situations that they feel unsure about." The anonymous aspect of the forum was important. The availability of information on numerous sexual health topics, including STIs, was regarded as a useful feature, promoting informed decision-making, and removing barriers to knowledge acquisition. Reinforcing the idea that mHealth apps helps can act as a medium to improve

access and awareness to different STIs like HIV prevention.³⁹ The acceptability of mHealth apps was also shown by a study⁵⁶ that majority of participants were interested in receiving HIV prevention information and health tips on a monthly basis.

Participants also felt that mHealth apps could be a useful tool for informing significant individuals, such as friends, family, and community members, about queer-related issues. The inclusive feature of these mHealth apps was underlined, as they cater to people of all ages and promote greater understanding and acceptance among families. Relatable to the findings of mHealth apps helping families and parents in care of their loved ones, few studies cited in⁵⁸ showed that using mHealth apps could be especially valuable to parents who feel isolated, a lack of control over their circumstances, or stymied in their efforts to prepare for their critically ill infants.^{59,60}

Ultimately, participants stressed the importance of mHealth apps offering accurate and up-to-date information. It was expected that these apps will provide evidence-based and up-to-date information, reducing reliance on hearsay and circumstantial experiences. HCPs noticed the potential for these apps to serve as a trustworthy reference source for assuring the accuracy of information about queer health issues. Our findings are in line with the findings from a study⁴⁴ that showed participant's acknowledgment about the information availability in Thai on the internet and social media sites but felt that lacked reliability hence they felt that it will be better to receive information from doctors.

The study found that queer individuals had a generally positive opinion of technological improvements, particularly when it comes to the usage of mHealth apps for sexual and reproductive health. Participants, especially HCPs, stressed the age advantage, implying that younger people would find it easier to embrace and use mHealth apps due to their familiarity with technology and digital fluency. In contrast, this shows that regardless of age, as long as people use other social media platforms they will be excited and ready to use mHealth apps, as shown in a study³⁴ that older interviewees, most of them use mainly the leisure and social functions of their smartphone (e.g., using WeChat to chat, making video/phone calls, watching videos, and reading the news), and some also use mobile payment. Again, the same study³⁴ found that factors such as technology literacy, education level, previous working experiences, and age all have an impact on older people's technology adoption. For example, one of the 75-year-old participants was able to teach others how to use it because she was a teacher at a local university and used computers quite frequently in her daily life, which was an unusual case among older people in the same age group and those who use computers.³⁴ Another prominent topic was the linkage with the 4IR, with participants expressing optimism that incorporating mHealth apps would

successfully solve healthcare concerns for queer individuals. It is clear that our study participants understand how important 4IR is to the world and healthcare; this is consistent with previous studies demonstrating and acknowledging that 4IR is influencing the manner in which health is perceived, converting treatment and diagnosis methods, as well as the connection between health professionals and patients, and affecting the management and organization within healthcare systems.⁶¹ According to a study,⁶² during the pandemic, researchers have turned to 4IR technologies since they are the most recent among the cutting-edge advancements that are supposed to be altering medicine. According to a study,⁶³ the 4IR is the next generation of intelligent medical equipment that allow physicians and other professionals to more efficiently handle disease transmission, protect the people they treat from dangerous illnesses, and receive immediate support when it is most needed, and⁶⁴ mHealth apps have become crucial in the rapidly changing field of digital healthcare in tandem with the 4IR.

Embracing the digital world appeared as a prominent sub-theme, with participants recognizing the dominance of cell phones and digital applications in modern culture. The importance of digital literacy through smartphones was emphasized, demonstrating that the majority of people in the modern period are comfortable using smartphones, making mHealth apps easily accessible. Participants believed that with a single click, these apps might overcome gaps in healthcare services and provide information on queer health issues. Consolidating these results with prior research⁵⁶ that many people own and have access to smartphones with internet and spend most of their time on the internet, e.g.,⁵⁶ indicated an average 9.4 hours per week. Our study is in agreement with the findings from a study⁴⁵ that outlined participants who presented a higher level of technological competency were able to better navigate on their phones was one of the capability factors related to the uptake of health and well-being apps in general.

Finally, the study discovered a favorable reaction to the concept of saving time via mHealth apps. Queer participants emphasized the ease of receiving health information or interacting with others on the app, saving time and decreasing the need for transit to healthcare institutions. This research builds upon the foundational work⁴⁵ that motivational factors related to the uptake of health and well-being apps in general was preference of using apps over face-to-face requiring less time commitment and saving time as it appeared to be a particularly valuable resource for all participants, and they believed apps to have this advantage. Overall, the findings support mHealth apps as a beneficial tool for increasing queer people's access to sexual and reproductive health information and services. However, our results seem to contradict the established findings of³⁹ that not only information should be available,

but also identified a need of web-based simulation with concise and practical prevention as participants desired immediate access to local resources and information and had limited time and motivation to engage with digital programming.

Strengths and limitations

The qualitative method was well-suited for in-depth exploration of the perspectives of queer individuals and HCPs on the usage of web-based tools and mHealth apps in addressing SRHSN for queer individuals. The study provided complete insights and rich data about SRHSN for queer individuals by targeting both HCPs and queer individuals. The study gained inputs from experts with relevant experience thanks to a purposeful sampling of HCPs specialized in SRHSN. RDS, on the other hand, is a purposeful strategy for accessing a hidden community, such as queer individuals, hence increasing the study's inclusion.

Although RDS is effective for accessing hidden populations, ensuring a properly representative sample was difficult, and several sub-groups, such as intersex, pansexual, and those who fall under plus, were underrepresented. Because of the purposeful sampling approach and the nature of the hidden population, the study's findings have limited generalizability beyond the unique study contexts. Participants, both HCPs and queer people, may have given replies that were socially acceptable rather than representing their true emotions or experiences.

Future directions

As part of the PhD study for the development of an mHealth app to address SRHSN for queer people in South Africa's Gauteng province, we will use findings from the current study to guide cycle 2 of the study, which will include a group of experts assisting in the development and customization of mHealth apps to address SRHSN for queer people. Future research can concentrate on studies that will introduce unique technologies to improve healthcare services for gay people, hence enhancing equality within the country and African continent.

Conclusion

Our study found that HCPs and queer individuals are all positive, ready, and perceive mHealth apps as a way to address SRHSN for gay people in Gauteng and across the country. Based on our findings, it is undeniable that following the construction of an mHealth app for queer people, users will be eager to upload and use it, hence improving healthcare services for queer people and the well-being of HCPs at their workplaces because it will be convenient.

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