Exploring the Attitudes of Patients towards using the Seha Application (Telehealth) in Saudi Arabia during the Coronavirus Epidemic

Mohammed Omar ALOmari1*, Judy Jenkins2

1School of Medicine, Swansea University, Swansea, Swansea SA2 8QA, UNITED KINGDOM
2Program Director & Lecturer of Biomedical Sciences, School of Medicine, Swansea University, Swansea, Swansea SA2 8QA, UNITED KINGDOM

*Corresponding Contact:
Email: 936122@swansea.ac.uk

ABSTRACT

The COVID-19 pandemic that was declared in March 2020, caused profound changes to public life across the globe. Restrictions to reduce the spread of the virus were enforced that included staying at home and minimizing social interaction. These changes saw an environment emerge that demanded remote healthcare, and telehealth platforms and applications quickly began to fulfill this demand. One such platform in Saudi Arabia was Seha, a Ministry of Health smartphone application that provides information, self-evaluation, and teleconsultations. To explore Seha users’ (patients) attitudes toward the Seha smartphone application during the COVID-19 pandemic. A qualitative, grounded theory approach using thematic analysis of data collected through open-ended semi-structured interviews with seventeen residents of Jeddah. Three themes emerged – 1) COVID-19 and usage patterns, as Seha helped patients reduce person-to-person contact and usage increased, especially for emergencies; 2) ease of use and access, especially to approved doctors and reliable information; 3) time and cost savings, although it was also noted that these are more readily available to individuals and areas with access to sufficient internet infrastructure. Concerns were raised about technical issues or misdiagnoses when using Seha for emergency cases, as the platform may prove unsuitable. Traditional barriers to telehealth adoption seemed to be absent, but these may re-emerge when the immediate crisis is over. Further issues concerned the diminishment of the doctor-patient relationship, especially the lack of information on doctors’ profiles, problems that may be experienced by older people, and lack of language variety. These lead to access problems that may be critical in a pandemic or emergency situation. Finally, the ‘digital divide’ may result in increased health inequality, and such an outcome must be avoided. The pandemic has shown telehealth applications like Seha to be a crucial tool in controlling infection rates, but the loss of face-to-face interaction with medical professionals, technical disparities, and access difficulties for certain groups may present problems for the Saudi health system unless they are taken into account and telehealth is carefully implemented into the system along with appropriate investment in infrastructure.

Keywords: Telehealth, telemedicine, telehealth apps, patient attitudes telehealth, telehealth uptake, teleconsultation, smartphone telehealth

This article is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License. Attribution-NonCommercial (CC BY-NC) license lets others remix, tweak, and build upon work non-commercially, and although the new works must also acknowledge & be non-commercial.
INTRODUCTION

When the novel coronavirus COVID-19 was declared a global pandemic by the World Health Organization (WHO) on March 11th, 2020 (WHO, 2020), public life was to change suddenly all over the world. Restrictions on movement and social interaction were enforced as efforts to control the spread of the virus were enacted. Saudi Arabia found itself in a position of preparedness: as a result of the successfully contained MERS-CoV (Middle East Respiratory Syndrome coronavirus) outbreak in 2012 (Hassounah, Raheel & Alhefzi, 2020), the Saudi Vision 2030 plan that began in 2016 (Saudi Vision, 2018) incorporated elements of telehealth transition (Jameel & Baig, 2020) and facilitated a rapid response that included screening and public awareness campaigns as well as curfew measures (MoH, 2020a).

These measures were assisted by nineteen smartphone applications and platforms, five developed by the Saudi Arabian Ministry of Health (MoH) (Hassounah et al., 2020). One of these is the Seha (Arabic for ‘health’) smartphone application, which provides information, self-evaluation and three teleconsultations per month with MoH doctors (MoH, 2020b). This provided over a million consultations over the pandemic period (MoH, 2020c).

Previously used mainly to provide healthcare access to remote or rural areas and self-management of chronic conditions, the role of telehealth quickly expanded during the pandemic (Byrne, 2020). Functions such as teleconsultations allowed people to stay home and prevented overcrowding of healthcare facilities. The pandemic was a “black swan moment” that “set the stage for a telehealth revolution” (Wijesooriya et al., 2020).

This study explores the attitudes of Seha users (patients) in Jeddah, Saudi Arabia during the COVID-19 pandemic. As smartphone telehealth applications like Seha become increasingly popular in the COVID-19 environment, an in-depth exploration of how patients feel about and use it, and what they perceive as its benefits or challenges, can provide insight into the factors driving its use and problems that may arise. To date, there are no qualitative studies examining patients’ attitudes toward telehealth applications during the COVID-19 pandemic in Saudi Arabia, and it is this gap that the present study seeks to fill.

The research question has been formulated: “What are the attitudes of patients towards using the Seha Application (telehealth) during the COVID-19 epidemic in Jeddah, Saudi Arabia?” This paper will first explore the previous research into this topic, before describing the methodology undertaken in this study. The results are then presented and discussed, and finally conclusions are drawn along with limitations and recommendations for future research.

PREVIOUS RESEARCH

Since recognition of the fact that social distancing and limiting face-to-face contact is a requirement to slow the spread of COVID-19 (Jameel & Baig, 2020), research into the effectiveness and potential of smartphone telehealth applications has experienced renewed urgency. Due to early concerns that the software utilized for telehealth (e.g. Skype, Zoom) was not designed for this purpose (Hassounah et al., 2020; Vasileios & Victor, 2020), developing dedicated applications to combat COVID-19 transmission and maintain high-quality continuity of healthcare became a priority. Telehealth applications can help patients adhere to self-isolation requirements (Fisk et al., 2020) and ensure they
are able to receive healthcare without risking themselves and others by attending facilities unless necessary (Hassounah et al., 2020). During the pandemic, telehealth has been found useful for triage (Jameel & Baig, 2020) and reporting and managing symptoms (Keri et al., 2020). Patient satisfaction with the technology is therefore critical to its uptake and successful use (Snoswell et al., 2020).

Research into patients’ attitudes toward telehealth during the pandemic has shown high levels of satisfaction, particularly with regard to mental health self-management and support (Fisk et al., 2020) as it can provide teleconsultations and remote physician contact. Ease of use is a key factor contributing to a positive view (Martinez, 2015). Allaert et al. (2020) have, however, cautioned that improved ease of access and use may lead to overuse of telehealth services and offset time and cost savings. There are also concerns around increased reliance on telehealth applications leading to the “dehumanization of medicine”, and Allaert et al.’s (2020) recommendation that smartphone applications supplement current practices rather than replace them can be found throughout the literature. Teleconsultations, as opposed to face-to-face appointments, can also diminish the doctor-patient relationship. Evaluative reviews of smartphone telehealth applications have scored them high in functionality but low in engagement, with 69% coming from government sources (Singh, Couch & Yap, 2020). While Saudi Arabia was not included in these reviews, studies on patient attitudes to telehealth applications there have shown positive results.

Before the pandemic, a survey by Alshammar and Hassan (2019) found that 70% declared an interest in the technology, although 51% had never used a smartphone for medical advice due to lack of trust (30%) and a preference to know the doctor personally (29%). Research during the pandemic found increased levels of satisfaction and acceptance: 86% of Alruzaiza and Mahrous’ (2020) sample acknowledged the benefits of telehealth applications. As these studies employed questionnaires, the samples are large but the participants had no opportunity to express their own attitudes. Although qualitative studies into patient attitudes toward smartphone-based telehealth have been conducted before, with 43 meeting Vo et al.’s (2019) review criteria, these have tended to focus on chronic or specific conditions rather than telehealth as a method of facilitating general health consultations, and none have been conducted in Saudi Arabia.

**METHODOLOGY**

**Research design**

To explore the attitudes of patients toward the Seha telehealth application in Jeddah, Saudi Arabia, during the COVID-19 pandemic, a qualitative research design was developed. Qualitative research enables the collection of rich textual data and allows questions related to ‘how’ and ‘why’ (Holloway, 2005). This stands in contrast to quantitative research, which gathers quantifiable data that can be statistically analyzed and allows patterns or trends to be identified from a large sample (Choy, 2014). A quantitative approach was rejected as the research question seeks the perspectives of Seha users (patients) due to the lack of previous studies on this. A qualitative design therefore affords a novel view of the phenomenon (Easton et al., 2000).

**Research Approach**

Grounded theory has been selected for this research as it allows a generalizable theory to be developed from collecting data and a process of coding without prejudice from pre-existing knowledge (Corbin & Strauss, 2014). It enables exploration of the ‘how’ and ‘why’
of a phenomenon and is a process characterized by pragmatism from which themes can be developed (Chapman, Hadfield & Chapman, 2015). The narrative approach was rejected as an alternative as this study aims to answer a specific research question using focused interviews, rather than seeking the patients’ own stories. As this research aims to explore the experiences of Seha users (patients), grounded theory was selected as the most appropriate approach (Foley & Timonen, 2015). This research is cross-sectional, so unlike longitudinal studies which compare data points taken across time, data were collected from participants in this study only once.

Population and Sampling

The participants in this research were all Seha users (patients) in Jeddah, Saudi Arabia. The sample contained 17 participants, deemed sufficient for data saturation (Aldiabat & Le Navenec, 2018) as at this point the data gathered were repeated and no further information could be gained from interviewing the initially-considered 21 participants (Mason, 2010).

Convenience sampling was used as it is effective in terms of time and logistics. While purposive sampling would have ensured a sample with a rich variety of experience, it was rejected for this study due to time constraints (Etikan, Musa & Alkassim, 2016).

Access to participants was to take place through pre-notification posters in primary healthcare centers, but due to COVID-19 restrictions this was not possible. Instead, the ‘Patient Experience’ department of the Directorate of Health displayed pre-notification information on screens in five healthcare centers and three hospitals in Jeddah. This requested participation and included the study’s aims and objectives, the participants’ rights (King, Horrocks & Brooks, 2018), and the researcher’s contact information. Participants who fit the inclusion criteria were chosen in the order in which they contacted the researcher to reduce selection bias.

Inclusion and Exclusion Criteria

The inclusion criteria were that the patient was willing to participate and contacted the researcher to provide notification of this, that they were resident in Jeddah and over 18 years old, that they were conversationally fluent in English, and that they had utilized the Seha application during the COVID-19 pandemic. The exclusion criteria included employment with the Ministry of Health, as this may introduce conflict of interest bias and those who were unable to speak conversational English.

Data Collection

The data collection method was online semi-structured interviews via Skype, as this provides secure end-to-end encryption and audio-visual calls (Skype Support, 2018). For reasons of participant confidentiality, only audio calls and recordings were made. During the interviews, written notes were taken to help organize emerging themes and ideas. Online audio interviews were an essential alternative to face-to-face interviews due to COVID-19 restrictions.

The interviews took between 12 and 25 minutes (Jacob & Furgerson, 2012). The questions were open-ended in English, and were adapted from recent similar research (Table 1, below) (Tasneem et al., 2019). This process involved ensuring that the four principles of Credibility, Dependability, Transferability, and Confirmability were adequately applied (Anney, 2014).
Table 1: Interview Questions

|   | Question                                                                 |
|---|-------------------------------------------------------------------------|
| 1 | Could you tell me something about how you access the Seha application? Which way works best for you and why? |
| 2 | How often do you use the Seha application and in what circumstances?    |
| 3 | Could you tell me about your experience of having to communicate with your doctor using telehealth application (Seha application) during the Coronavirus epidemic? |
| 4 | Could you tell me about the specific positive or supportive points about the telehealth application (Seha application) that you have experienced when communicating with your doctor during the Coronavirus epidemic? |
| 5 | Could you tell me about any problems or challenges connected with being unwell and adopting telehealth application (Seha application) to communicate with the doctor during the Coronavirus epidemic? |
| 6 | From your experience, could you tell me how you think the effectiveness of telehealth application (Seha application) could be improved? |

Data Analysis

Thematic analysis was carried out on the data, which involved identifying themes and codes (Braun & Clarke, 2006) with the help of NVivo software, which sorts the unstructured data (Jackson & Bazeley, 2019). The audio recordings of the interviews and the written notes were matched, and transcription of each interview was conducted manually in order to avoid the errors that occur when using audio-to-text conversion software. Following the transcription, each participant was sent a copy of their interview transcript via e-mail to secure their verification of its content and to reduce researcher bias.

Ethical Approval and Considerations

Written approval for this study was obtained from the Research Ethics Committee in the Swansea University Medical School, the Saudi Arabian Ministry of Health and the Saudi Arabian Cultural Bureau. Each healthcare facility that advertised the study provided approval via the Directorate of Health. All ethical considerations of anonymity, confidentiality and harmlessness were adhered to while collecting data (McNamee et al., 2006). Participants’ anonymity was preserved from third parties (Wiles et al., 2008) as access was only to the researcher and participants were anonymized, being referred to only by their participant number. Information sheets and consent forms were sent to participants by e-mail, and all digital documentation signed by the participants was password-protected and encrypted (Speer & Stokoe, 2014). Hard copies of documentation produced during data collection were stored in a locked cupboard. All data gathered will be securely destroyed upon completion of this research study (Swansea University, 2018).

RESULTS

From thematic analysis of the seventeen interviews conducted, three main themes were identified. See Appendix A for further quotations (numbered in brackets).

Theme One: COVID-19 concerns and usage patterns

The most commonly-occurring theme (14 participants) was Seha’s role in helping patients adhere to COVID-19 restrictions and reduce person-to-person contact (1) (2):

_I had to undergo a blood test and see a doctor for checkup. Instead of going to a hospital where I might get the virus, I can just use the application_ (Participant 4).
In terms of frequency of use, ten of the participants used it often (two to three times per month), three participants used it occasionally (around once a month) and four used it only once. Of those who used it often, this was usually information access and self-evaluation (3):

[Seha] provides advice on how to be healthy by encouraging us to exercise, eat healthy food, and so on. The health app provides us with useful medical information (Participant 13).

Some participants stated that Seha had replaced visits to the doctor (4):

In terms of consultations, it will be every few months if I have a serious health concern [...] Otherwise, I just look at the information on the app [...] Technically, it has replaced my visits to the doctor (Participant 3).

Ten of the participants used Seha for general medical consultations during the pandemic, with some suggesting this is what it is most suitable for (5) (6):

I would use the application when it’s something really small and not really major (Participant 1).

However, seven used it for emergencies. Participant 8 used it for “severe stomach pain” and Participant 12 used it for “a severe condition”. Five participants stated they were happy with how long they waited for a doctor:

You don’t need to leave your home to meet a doctor. Just three or five minutes and then you’ll get everything you want (Participant 9).

However, Participant 14, who “usually use[d] it during emergency cases”, did not consider teleconsultation appropriate for their knee injury:

The doctor was not able to detect the seriousness of the injury so we were late in the appropriate treatment. The doctor […] couldn’t give me comprehensive advice [as] it needed an X-ray or CT scan.

This participant also expressed concern about waiting times:

Sometimes you need to wait like 30 to 40 minutes just to get an answer. So, if it is an emergency, this means you need to wait before getting an answer from a doctor.

Theme Two: Ease of access and use

Seha’s ease of access was described by 13 participants. Many mentioned that this is due to the fact it is a smartphone application (7) (8):

It’s in my hand all the time and it’s very easy to access (Participant 4).

The app’s functionality in allowing easy access to qualified doctors was described by eight of the participants (9) (10):

Communication was excellent […] Getting a doctor is simpler. No need to wait in a place. You can just communicate directly (Participant 3).

Four participants said Seha enabled them to gain access to reliable and trustworthy information (11):

I want verified information because when I search using Google, although I can find correct information, I can also find wrong information (Participant 4).

For participant 16, the accuracy of the information received through Seha stood in contrast to less reliable information from elsewhere:
I can [...] get the answer from a professional [...] When you have some information from the media that makes you anxious, you can rely on this app.

However, four participants were concerned about the lack of information on doctors’ profiles (12):

There’s not much in terms of where they work, what city, stuff like that. Those things can reassure patients about the legitimacy of everything (Participant 1).

Moreover, Participant 6 was uncomfortable with the medium of teleconsultation:

…it’s different talking to a doctor through a device rather than face-to-face.

Three participants were concerned that the application may not be accessible to the elderly:

Older people cannot access it [...] I asked my parents, and they said it’s quite difficult for them to download and to use the application (Participant 17).

Finally, Participant 7 raised a concern about Seha’s language variety:

I’m pretty sure that there are people who are like Indian or Nigerian who might get sick, people who live in Saudi Arabia who cannot speak Arabic.

**Theme Three: Time and cost savings**

Time and cost savings made by using the functions of Seha rather than travelling to healthcare centers were frequently cited.

Ten participants described time savings, some stating that the experience is better than physical visits (13):

[Seeking healthcare] has become a better experience because now I don’t have to go somewhere to wait and see a doctor (Participant 3).

Six participants described financial savings from using Seha (14):

It’s cost-effective. No need to travel to the hospital and bring money (Participant 15).

Four of the participants described both time and cost savings (15):

I don’t need to go to the clinic and wait [...] for one or two hours. So, it’s time-saving [and] cost-effective (Participant 11).

However, two participants pointed out that such services could only be used with sufficient internet access (16):

[One problem is] limited access to the internet and lack of digital infrastructure (Participant 13).

**DISCUSSION**

**Theme One: COVID-19 concerns and usage patterns**

The first theme identified related to the participants’ views of Seha’s utility in the COVID-19 environment. All participants stated that they had gained benefits from the application’s functions during the pandemic, indicating that it bridged the gap between patients, physicians and the health system that came about as a result of COVID-19 restrictions by enabling them to receive healthcare from home and avoid congregating in healthcare facilities. Participants were particularly pleased about the fact that their families (including children and the elderly) were not put at risk (Joshi & Lewiss, 2020).
The majority of participants used Seha often, and indicated that their use had begun or increased during the pandemic. Although trends indicate that telehealth usage has been increasing in general (Smith, Zhou & Watzlaf, 2017), the dramatic increase in this case was almost certainly driven by the legal and social requirements to stay at home. This reveals that telehealth uptake is influenced by environmental context (Fisk, et al., 2020), as COVID-19 has pushed aside traditional barriers to uptake, although there is contention around these barriers re-emerging in the long term (Vasileios & Victor, 2020).

This raises concerns around the suitability of teleconsultations for health issues such as injuries: one participant stated that a scan of their knee injury was required but not offered as a result of a teleconsultation misdiagnosis. It was also stated that a participant waited 30-40 minutes for an emergency teleconsultation, although all other participants only waited between two and seven minutes regardless of medical purpose. This delay may have come about through technical issues (Choi et al., 2014), or increased demand may have meant there were no doctors available at that time. These considerations must be taken into account if use of Seha is sustained after the pandemic. Moreover, any delays or misdiagnoses in an emergency can lead to serious complications or even deaths, raising a potential limitation of the use of Seha for emergencies (Gajarawala & Pelkowski, 2020).

**Theme Two: Ease of access and use**

Every participant found Seha easy to access and use. This is largely because it is a smartphone application, and as smartphone ownership has increased enormously over the last decade (Allaert et al., 2020), the majority of the population has the means of access. Participants appreciated the ease of access to consultations with qualified, MoH-approved doctors, who can refer the patient to specialists (MoH, 2020b). However, several participants stated that they would have preferred more information on the doctors’ profiles, particularly concerning their location and background as this would legitimize the process further. One described their discomfort at the teleconsultation and a preference for face-to-face consultations, concerns which have been raised before (Allaert et al., 2020), although other studies have found that patients are generally satisfied with telehealth consultations (Choi et al., 2014). The telehealth consultation model stands in contrast to the traditional one as an unknown doctor makes judgements based on remote examination of or verbal description from the patient as opposed to a physical appointment with a family or local doctor known to the patient. Therefore, while this model is essential in unique circumstances like the COVID-19 pandemic (Oh, 2020), it cannot replace face-to-face patient-doctor relationships long term.

The participants welcomed Seha’s informational reliability. It was noted that the media and the internet are not necessarily accurate sources of public health information (Kothari & Moolani, 2015), and this has been recognized by the Saudi government, as spreading misinformation about COVID-19 has been declared illegal under the Anti-Cyber Crime Law (Communication and Information Technology Commission, 2007). Access to trustworthy information via telehealth can therefore be an antidote to ‘cyberchondria’ and increase health compliance (Lu, Zhang, Wu, Shang & Liu, 2018). In this study, none of the participants mentioned concerns about the reliability of the information on Seha, in fact expressing the opposite.

Several participants believed that Seha was not accessible to older people. As older people are more vulnerable to COVID-19 (Fisk et al., 2020), this raises a limitation of the use of smartphone applications in the pandemic as older people are less likely to use...
smartphones. Finally, the lack of language variety in Seha magnifies the problems surrounding its utility with regard to emergencies, as not everybody is able to understand Arabic or English, especially considering the fact that over a third of the population of Saudi Arabia is non-Saudi (General Authority for Statistics, 2016).

**Theme Three: Time and Cost Savings**

Many participants were pleased about the time and cost savings that Seha had made possible. However, other participants pointed out that these savings, and access to telehealth at all, are only possible in places with sufficiently advanced internet infrastructure. This raises the issue of ‘digital divide’, whereby some regions and groups have greater access to internet infrastructure than others (Blandford et al., 2020). Therefore, if applications like Seha are to replace traditional healthcare methods, as they already are for several participants in this study, then this digital divide may lead to increased healthcare inequality (Allaert et al., 2020).

**Limitations**

This study was qualitative in nature, which meant that a small sample was used, all of whom were urban dwellers self-selected by convenience sampling. This means that the results cannot be easily generalized to rural populations or to populations outside Saudi Arabia (Atieno, 2009). In addition, sampling bias may have been introduced as all participants were recruited through a notice in primary care centers and hospitals: this means that only those capable and willing to attend these facilities would have been included. Finally, all interviews were conducted in English, which was the participants’ second language, which may have led to misunderstanding or miscommunication that may have gone unnoticed or unaddressed. This is compounded by the fact that the interviews were audio-only, therefore essentially telephone interviews, therefore making it harder for rapport to build and credibility to be established (Block & Erskine, 2012).

**Conclusion**

This study has sought to answer the question: “What are the attitudes of patients towards using the Seha Application (telehealth) during the COVID-19 epidemic in Jeddah, Saudi Arabia?” through thematic analysis of semi-structured interviews with seventeen residents of Jeddah. Seha is a free Ministry of Health smartphone telehealth application that allows access to information, self-evaluations for physical and mental health, and teleconsultations with approved doctors. With the restrictions on public life and movement as a result of efforts to reduce COVID-19 infection rates, the functions of Seha were suddenly transformed from a slowly-developing niche into a medical necessity.

Three broad themes emerged from the results. The first centered on the utility and usage patterns of Seha in the COVID-19 environment. It was universally stated that Seha had been invaluable in helping the participants stay at home and avoid healthcare facilities. Uptake and use of the Seha application increased during this period, with few of the participants being influenced by traditional barriers to adopting telehealth, so the crisis of the pandemic overrode these. Several participants used Seha for emergencies, although concerns were raised about technical issues, waiting times and the potential for misdiagnosis. There is optimism over whether this level of usage will continue in the long term if COVID-19 is brought under control, but these concerns cannot be ignored.
The second theme related to Seha’s ease of use and access, particularly to approved doctors and reliable health information. High rates of smartphone ownership mean the majority of the population is able to access Seha, although the issue of the digital divide was raised, as this may ultimately increase health inequality. Similar concerns were mentioned about use of Seha by older people, who are less likely to be familiar with smartphones, and the lack of language variety, as not everybody in Saudi Arabia is conversant in Arabic or English. The need for more information about doctors was raised, as teleconsultations negate the traditional patient-doctor relationship and may compromise the legitimacy of the process. Access to reliable health information was cited as a benefit of Seha, as the internet and media are viewed as increasingly untrustworthy, but the government must ensure continuous updating of the available information to retain public confidence.

Seha’s potential to save time and money for patients comprised the third theme. Not having to attend a healthcare facility for consultations means that travel and waiting times and fuel costs are eliminated. This is likely to be a motivator for many to continue to use telehealth in this way after the pandemic, although this must again be considered in terms of minimizing the digital divide, especially between urban and rural areas. Integrating telehealth into health systems must therefore be accompanied by infrastructural investment.

Future research should explore the use of telehealth applications in rural areas, and large-scale surveys should be carried out to obtain quantifiable data allowing comparison between different groups and areas.

The COVID-19 pandemic has formed the proving ground for telehealth applications like Seha, and its utility in these circumstances has been profound. However, as the crisis lessens, it should be implemented carefully into healthcare systems as a facilitator of rather than a replacement for traditional healthcare, and it must be ensured that this technology narrows rather than widens health inequalities.

REFERENCES

Aldiabat, K. M., & Le Navenec, C. L. (2018). Data saturation: The mysterious step in grounded theory methodology. The Qualitative Report, 23(1), 245-261.

Allaert, F. A., Legrand, L., Carime, N. A., & Quantin, C. (2020). Will applications on smartphones allow a generalization of telemedicine?. BMC Medical Informatics and Decision Making, 20(1), 30. DOI: 10.1186/s12911-020-1036-0.

Alruzaiza, S. A., &Mahrous, R. M. (2020). Assessment of knowledge, attitude, and practice on level of awareness among pediatric emergency department visitors-Makkah City, Saudi Arabia: Cross-sectional study. Int J Psychosoc Rehabil, 24, 5186-5202.

Alshammari, F. & Hassan, S. (2019). Perceptions, Preferences and Experiences of Telemedicine among Users of Information and Communication Technology in Saudi Arabia. Journal of Health Informatics in Developing Countries, 13(1).

Anney, V. N. (2014). Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria. Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS), 5(2), 272-281.

Atieno, O.P. (2009). An analysis of the strengths and limitation of qualitative and quantitative research paradigms. Problems of Education in the 21st Century, 13, 13.

Blandford, A., Wesson, J., Amalberti, R., AlHazme, R., & Allwihan, R. (2020). Opportunities and challenges for telehealth within, and beyond, a pandemic. The Lancet Global Health (10th August, 2020). doi: 10.1016/S2214-109X(20)30362-4.
Block, E. S., & Erskine, L. (2012). Interviewing by telephone: Specific considerations, opportunities, and challenges. *International journal of qualitative methods, 11*(4), 428-445. DOI: 10.1177/160940691201100409.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.

Byrne, M. D. (2020). Telehealth and the COVID-19 Pandemic. *Journal of PeriAnesthesia Nursing, 35*(5), 548-551. doi.org/10.1016/j.jopan.2020.06.023

Chapman, A. L., Hadfield, M., & Chapman, C. J. (2015). Qualitative research in healthcare: an introduction to grounded theory using thematic analysis. *Journal of the Royal College of Physicians of Edinburgh, 45*(3), 201-205. doi: 10.4997/JRCPE.2015.305.

Choi, N. G., Hegel, M. T., Marti, C. N., Marinucci, M. L., Sirrianni, L., & Bruce, M. L. (2014). Telehealth problem-solving therapy for depressed low-income homebound older adults. *The American Journal of Geriatric Psychiatry, 22*(3), 263-271. doi: 10.1097/JGP.0b013e318266b356.

Choy, L. T. (2014). The strengths and weaknesses of research methodology: Comparison and complimentary between qualitative and quantitative approaches. *IOSR Journal of Humanities and Social Science, 19*(4), 99-104. DOI: 10.9790/0837-194399104.

Communication and Information Technology Commission (CITC), Saudi Arabia. (2007). Anti-Cyber Crime Law. Full text accessed 01/11/2020 at https://www.citc.gov.sa/en/RulesandSystems/CITCSys tem/Documents/LA_004_%20E_%20Anti-Cyber%20Crime%20Law.pdf.

Corbin, J., & Strauss, A. (2014). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage Publications.

Easton, K. L., McComish, J. F., & Greenberg, R. (2000). Avoiding common pitfalls in qualitative data collection and transcription. *Qualitative health research, 10*(5), 703-707. doi: 10.1177/104973200129118651.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1-4.

Fisk, M., Livingstone, A., & Pit, S. W. (2020). Telehealth in the Context of COVID-19: Changing Perspectives in Australia, the United Kingdom, and the United States. *Journal of Medical Internet Research, 22*(6), e19264. doi: 10.2196/19264.

Foley, G., & Timonen, V. (2015). Using grounded theory method to capture and analyze health care experiences. *Health Services Research, 50*(4), 1195-1210. doi: 10.1111/1475-6773.12275.

Gajarawala, S. N., & Pelkowski, J. N. (2020). Telehealth Benefits and Barriers. *The Journal for Nurse Practitioners, 2020*. doi: org/10.1016/j.nurpra.2020.09.013.

General Authority for Statistics, Kingdom of Saudi Arabia. (2016). Statistical Yearbook of 2016, Issue No. 52. Retrieved from https://www.stats.gov.sa/en/5305.

Hassounah, M., Raheel, H., & Alhefzi, M. (2020). Digital Response during the COVID-19 Pandemic in Saudi Arabia. *Journal of Medical Internet Research, 22*(9), e19338. doi: 10.2196/19338.

Holloway, I. (2005). Qualitative research in health care. McGraw-Hill Education (UK).

Jackson, K., & Bazeley, P. (2019). *Qualitative data analysis with NVivo*. Sage Publications.

Jacob, S. A., & Furgerson, S. P. (2012). Writing interview protocols and conducting interviews: Tips for students new to the field of qualitative research. * Qualitative Report, 17*, 6.

Jameel, T., & Baig, M. (2020). Telemedicine in Saudi Arabia during COVID-19 pandemic. *Journal of Medical Internet Research*. DOI: 10.2196/preprints.20722.

Joshi, A. U., & Lewiss, R. E. (2020). Telehealth in the time of COVID-19. *Emergency Medicine Journal, 37*(10), 637-638.
Keri, V. C., Brunda, R. L., Sinha, T. P., Wig, N., & Bhoi, S. (2020). Tele-healthcare to combat COVID-19 pandemic in developing countries: a proposed single centre and integrated national level model. *The International Journal of Health Planning and Management, 2020*, 1-3.

King, N., Horrocks, C., & Brooks, J. (2018). *Interviews in qualitative research*. Sage Publications.

Kothari, M., & Moolani, S. (2015). Reliability of “Google” for obtaining medical information. *Indian Journal of Ophthalmology, 63*(3), 267. DOI: 10.4103/0301-4738.156934.

Lu, X., Zhang, R., Wu, W., Shang, X., & Liu, M. (2018). Relationship between internet health information and patient compliance based on trust: empirical study. *Journal of Medical Internet Research, 20*(8), e253. doi: 10.2196/jmir.9364.

Martinez, P. R. (2015). *A qualitative study on patient perceptions towards mHealth technology among high risk, chronic disease patients* (Doctoral dissertation).

Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. In *Forum qualitative Sozialforschung/Forum: qualitative social research* (Vol. 11, No. 3).

McNamee, M. J., Olivier, S., & Wainwright, P. (2006). *Research Ethics in Exercise, Health and Sports Sciences*. Routledge.

Ministry of Health. (2020). MoH Apps for Smartphones. Retrieved from https://www.moh.gov.sa/en/Support/Pages/MobileApp.aspx.

Oh, I. Y. (2020). Telehealth Is Not Optional but Essential. *International Journal of Heart Failure, 2*(4), 242-243.

Saudi Vision. (2018). National Transformation Program – Delivery Plan 2018-2020. Retrieved from https://vision2030.gov.sa/sites/default/files/attachments/NTP%20English%20Public%20Document_2810.pdf

Singh, H. J. L., Couch, D., & Yap, K. (2020). Mobile Health Apps That Help With COVID-19 Management: Scoping Review. *Jmir Nursing, 3*(1), e20596. doi: 10.2196/20596.

Skype Support. (2018). Does Skype use encryption. Retrieved 19 October 2020, from https://support.skype.com/en/faq/FA31/does-skype-use-encryption.

Smith, K. A., Zhou, L., & Watzlaf, V. J. (2017). User authentication in smartphones for telehealth. *International Journal of Telehabilitation, 9*(2), 3. doi: 10.5195/ijt.2017.6226.

Snoswell, C. L., Caffery, L. J., Haydon, H. M., Thomas, E. E., & Smith, A. C. (2020). Telehealth uptake in general practice as a result of the coronavirus (COVID-19) pandemic. *Australian Health Review, 44*(5), 737-740. doi: 10.1071/AH20183.

Speer, S. A., & Stokoe, E. (2014). Ethics in action: Consent-gaining interactions and implications for research practice. *British Journal of Social Psychology, 53*(1), 54-73. DOI: 10.1111/bjso.12009.

Swansea University. (2018). Data Protection Policy. Swansea University.

Tasneem, S., Kim, A., Bagheri, A., & Lebret, J. (2019). Telemedicine Video Visits for patients receiving palliative care: A qualitative study. *American Journal of Hospice and Palliative Medicine, 36*(9), 789-794. doi: 10.1177/1049901919846843.

Vasileios, N., & Viktor, W. (2020). COVID-19 and telehealth: a window of opportunity and its challenges. *Swiss Medical Weekly, 150.*

Wiles, R., Crow, G., Heath, S., & Charles, V. (2008). The management of confidentiality and anonymity in social research. *International Journal of Social Research Methodology, 11*(5), 417-428.

World Health Organization (2020). Timeline of WHO's response to COVID-19. Retrieved from https://www.who.int/news/item/29-06-2020-covidtimeline

--0--
Appendix A: Supporting Quotations from Interviews

(1) …during the pandemic, no one wants to go outside and interact with people. And when you go to hospital […] it is crazy. No one wants to be there. […] When we used the Seha application, alhamdulillah, we were so happy, sitting in a very safe environment […] and talking to the doctor through the phone (Participant 7).

(2) …the most positive thing is that it saved our lives by helping us avoid exposure to hospitals in the middle of this coronavirus epidemic (Participant 8).

(3) I use it to get a self-assessment consultation from the app weekly for my general and mental health (Participant 12).

(4) When I called the doctor he said you can follow up with us anytime […] They said in my situation, I don’t need to go to the hospital […] They said you can stay at home and you’ll be fine (Participant 17).

(5) I use it […] when we have a cold in the family, which does not need emergency treatment (Participant 11).

(6) [I use it] for cases of colds, which don’t require emergency treatment (Participant 15).

(7) I think one of the major positive points of the application is that it’s really user-friendly. […] I think anyone whether you’re accustomed to using apps or not would be able to use it easily and communicate with a doctor clearly (Participant 1).

(8) The easiest way possible since my phone is always […] available (Participant 8).

(9) It was very easy, very smooth. The doctor replied very fast. Her questions were very specific and on point (Participant 5).

(10) The greatest thing is that you’re going to talk with a much specialised consultant […] one time I talked with a general practitioner and he referred me to a proper consultant (Participant 10).

(11) The accuracy of the information that I get from the application is very important for me. It’s not just about the chance to communicate [with] doctors (Participant 5).

(12) They need to show the patient […] their qualification and their work experience, how many hours they are working and in which hospitals (Participant 16).
It also saves you time. No need to travel like 10 to 30 minutes going to a hospital (Participant 14).

It saved the cost of going out. So, I didn’t have to [...] pay for travel or for parking (Participant 10).

…it saves us time, money and keeps us healthy [...] we don’t need to travel or anything. It even saves us gas for the car. Gas is getting expensive (Participant 7).

[Issues include] infrastructure which includes the lack of internet because sometimes when I want to talk with a doctor, I cannot (Participant 15).