



Physical and Mental Well-being and the Role of Telemedicine during the Covid-19 Pandemic in Bahrain

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Abstract

This paper seeks to answer the following questions: How has the Covid-19 crisis and confinement affected people's lives and physical and mental well-being? How effective was the use of telemedicine during Covid-19? And how should telemedicine implementation in Bahrain be improved in the future? This paper uses interviews with a sample of health professionals to gather qualitative evidence regarding the effect of Covid-19 on physical and mental health, and on the effectiveness of telemedicine as an alternative strategy for accessing healthcare services in Bahrain during the pandemic. A sample of users and patients were also interviewed to gain insight on their experiences and attitudes towards the use of telemedicine during the pandemic. The results of this paper will help better understand the effects of confinement on Bahrain's population, give insights into what necessary actions should be taken, and provide recommendations on how to reshape and improve the telemedicine landscape in Bahrain.

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Executive Summary

The purpose of this report is to examine and describe the effect of the Covid-19 confinement on people's lives and their physical and mental well-being as well as the telemedicine services in Bahrain. This report summarizes the results of the qualitative analysis for semi-structured interviews that were conducted between September and November 2020 to gather feedback from five health professionals with different medical specializations and six participants (patients or telemedicine users). These interviews fell under the umbrella of UNDP's international efforts at assessing the socioeconomic impact of the Covid-19 pandemic; the specific project covered by this report is the result of a partnership between Derasat and UNDP Bahrain.

The main results of the interviews were the following:

1. The analysis showed that the Covid-19 pandemic had a significant impact on the lives and physical and mental health of the population in several ways, including alteration in the ability of the individuals to manage their lifestyle, alteration in the ability of the patients to manage health and chronic diseases by themselves, and increase in the number of visits for diabetes and mental health, especially for individuals aged 18-45 years old.
2. Covid-19 confinement and public life restrictions radically affected the lives of individuals and families, causing disruptions to routines and alterations in lifestyles and behaviors, the most noticeable of which were the changes in lifestyle habits; the reduction in visits to doctors for care, especially during the first phases of the Covid-19 pandemic; declined social life and connection; increased social media use; and increased overseeing children's education due to the shift to distance learning.
3. Symptoms of stress and depression increased after the Covid-19 outbreak, especially among young adults aged 18-36 years old, mainly due to the difficulty in adjusting to the new situation and changes brought on their social life and daily activities.
4. The closure of schools and shifting to distance learning added a new role for working mothers with school-age children and more stress and challenges to their daily responsibility, which might have led to negative physical and/or mental health outcomes.

5. Given the great effects of the Covid-19 pandemic on physical and mental well-being, policy makers are required to pay attention to the need for maintaining physical and mental health of the people at all ages.
6. The shift to telemedicine in Bahrain during Covid-19 played a key and effective role in mitigating the disruption of healthcare services and minimizing the transmission risk of Covid-19. Moreover, it has created positive outcomes in healthcare management in hospitals and cooperation among healthcare service providers, insurance firms and pharmacies in Covid-19, leading to improved work models and altered work flows between them, and introduced new services on insurance and medication delivery during the pandemic.
7. But, despite its advantages and the rapid increase in the use of virtual visits for patients' care compared to the in-person visits during the first phases of Covid-19 pandemic, telemedicine is still in its infancy stage and encountered by several limitations which have been found in the pandemic, the most important of which are lack of health insurance, lack of technology skills by some patients or healthcare professionals, and restrictions on prescribing controlled medications. Moreover, the need to integrate mobile healthcare applications (M-Health) and home healthcare monitoring applications into telemedicine systems.
8. For Bahrain, the development of telemedicine is not only of health and social importance, but also economic importance. Therefore, communication and cooperation between all healthcare communities, including official health authorities and regulators, public and private hospitals and clinics, insurance companies and pharmacies, is vital to widespread adoption of telemedicine and its improvement and growth as an industry in the future.

1. Background

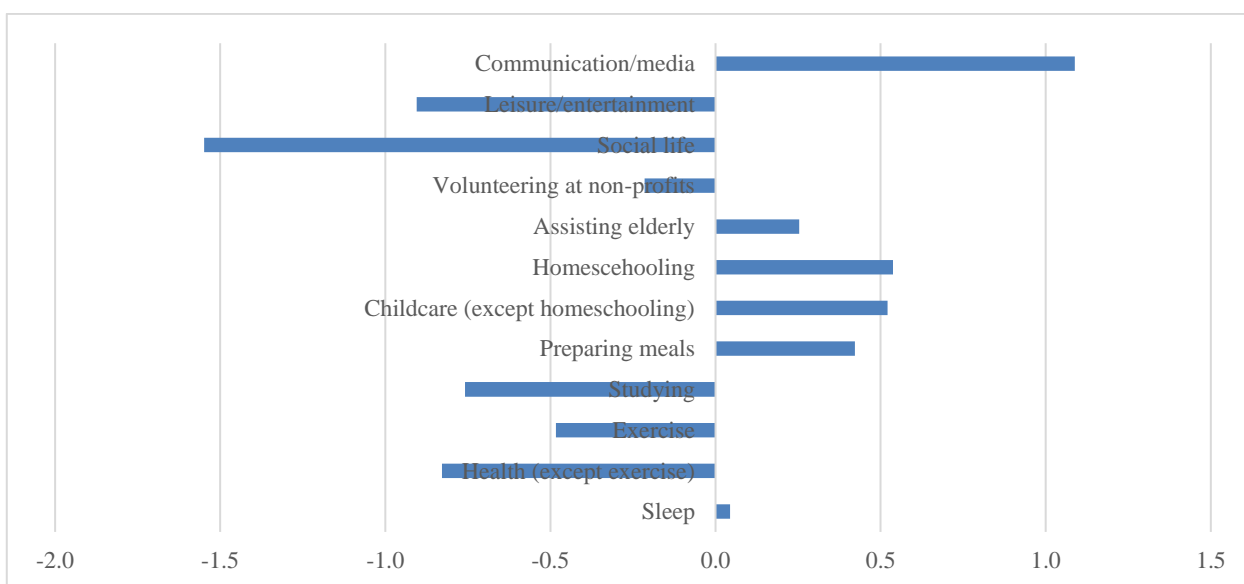
As of 21 December 2020, there have been 88,666 confirmed cases of Covid-19 in the Kingdom of Bahrain, according to statistics published by "BeAware Bahrain", a mobile application owned by the Information and eGovernment Authority and utilized to assist in efforts to contain the spread of Covid-19 in Bahrain.

In line with the guidelines and recommendations outlined by the World Health Organization (WHO) and the National Taskforce for Combating the Coronavirus in Bahrain, over the past months a number of preventative measures have been taken to tackle challenges arising from the spread of the Coronavirus. These measures included closing malls, mosques, schools, universities, fitness centers, swimming pools, cinemas and other entertainment places; closing indoor dining services at restaurants and cafes; calling on people to limit gatherings to members of the same household and closed social circles; and allowing employees to work remotely and students to learn online.

Under such situations, it is understandable that people are experiencing significant changes in their daily lives and increased demand for mental health services (WHO, 2020). Although quarantining and social distancing measures have had a positive effect in reducing the spread of the virus, the application of these measures have been shown to have negative psychological impacts (Antunes, Frontini, Amaro, Salvador, Matos, Morouco & Rebelo-Goncalves, 2020). Quarantining and social distancing measures have potential mental health implications, such as feelings of frustration, low mood, boredom, anxiety and depression. This is because people are detached from their loved ones, deprived of personal liberties, feel devoid of purpose owing to altered routines and livelihoods, and connected to less reliable sources of information which might heighten fear and fearmongering (Venkatesh & Edirappuli, 2020). A Bahraini survey of 1,115 adults aged 18 and above, published by AlSalman, Mubarak, Aljabal, Abdulnabi, Ishaq, Yusuf, Bragazzi & Jahrami (2020) to measure the psychological impact of Covid-19, showed that 30% of respondents were depressed, 18.2% exhibited symptoms of depression, anxiety, and/or stress, and 30.8% reported stress symptoms (AlSalman et al., 2020).

Covid-19 has changed people’s daily lives and routines in many ways in Bahrain. A survey was conducted by Derasat and UNDP Bahrain in September 2020, with a sample size of 700 Bahraini adults, to assess the socio-economic impact of Covid-19 in Bahrain. Results from this survey revealed that time allocations toward preparing meals, assisting or supervising children and the elderly, and consuming social media all received a significantly larger allocation of time, whereas socializing, leisure or entertainment, and “non-essential” health care all witnessed significant declines in time allocations (Abdulla, Almoayyed, Alsebaie & Al-Ubaydli, 2020), as can be seen in Figure 1.

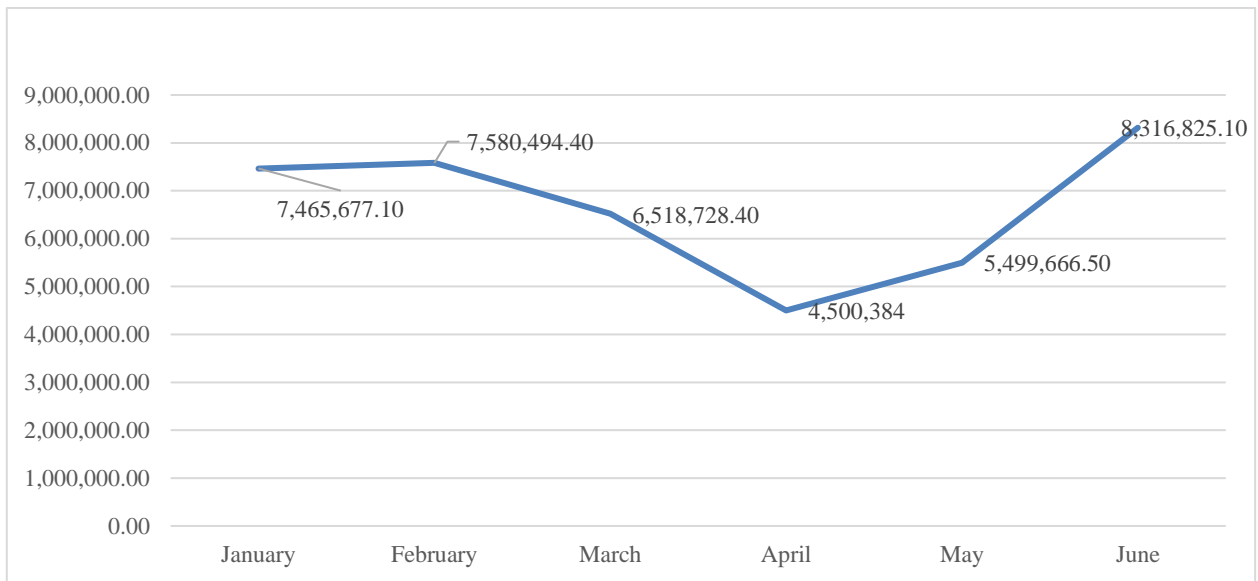
Figure 1: The effect of the Covid-19 pandemic on time allocation in Derasat-UNDP survey



Source: (Abdulla et al., 2020).

Also, the decline in people’s healthcare visits to doctors indicates a change in health-related behavior and the tendency towards obtaining healthcare due to the Covid-19 pandemic. This change is consistent with the decline in Point-Of-Sale (POS) transactions in the healthcare sector during the first three months of the pandemic in Bahrain. Figure 2 presents data requested from the Central Bank of Bahrain (CBB) for the Covid-19 SEIA project, which showed that the value of POS transactions in the healthcare sector in April (partial lockdown) decreased by 65% compared with that of January to BD 4,500,384, indicating a substantial decrease in the tendency towards obtaining healthcare in the first two months of Covid-19 (March and April) in Bahrain.

Figure 2: Total value of POS transactions in health sector (BD)- January-June 2020.



Source: *Central Bank of Bahrain (CBB)*.

After the end of partial lockdown in May, the use of healthcare services started to hike and returned to its pre-pandemic levels in Bahrain, as can be seen in Figure 2. This perhaps could be due to the decisions taken by Bahrain's public health officials and procedures applied in healthcare facilities to simultaneously provide timely care, reduce the risk of transmission of Covid-19, and decrease the burden on the healthcare system, in line with initial WHO recommendations to minimize non-urgent facility-based care while tackling the pandemic (Brunier & Harris, 2020). For instance, a combination of procedures were taken by hospitals to avoid healthcare disruptions and safely deliver healthcare to patients, including using telemedicine for non-urgent outpatients visits, rescheduling elective surgeries, and limiting visiting time at hospitals, among others.

During the Covid-19 pandemic, shifting to telemedicine was among the most essential solutions for healthcare management and delivering timely care to patients in a wide range of countries around the world. In Bahrain, the National Health Regulatory Authority (NHRA) issued a circular in March to all healthcare facilities in Bahrain suggesting the use of face-to-face alternatives through providing telemedicine/teleconsultation (telephone or online) in order to provide needed care for all patients at all levels (e.g., home-based care, outpatient) while minimizing the risk of virus transmission by reducing the number of people with symptoms of Covid-19 to have contact with health facilities (NHRA, 2020).

Similarly, the Ministry of Health also called on using telemedicine services to provide online medical consultations using video/telephone calls and allowing people to renew prescriptions online using its website in order to ensure patients' well-being and deliver timely care and medications to patients at home (MOH, 2020). The continuation of the pandemic along with the issuance of the official permission for using telemedicine have prompted many public and private hospitals in Bahrain to leverage the telemedicine options for delivering non-urgent care, like using video calls and platforms for real-time telemedicine and using WhatsApp to send patient data for "store and forward" telemedicine.

Given how the Covid-19 crisis has affected people's ways of life and well-being and led to a shift to telemedicine which became an important tool during the pandemic, this paper aims to examine the effect of the Covid-19 confinement on people's lives and their physical and mental well-being as well as on telemedicine services. In doing so, the paper aims to examine the role and effectiveness of telemedicine during the pandemic, and how to improve the telemedicine implementation in Bahrain in the future. We seek to gain insights on how to help reshape telemedicine in Bahrain in the future based on the experience built during the pandemic and to find ways to mitigate the impact on physical and mental health.

2. Method

2.1. Online interviews method

In this paper, qualitative online semi-structured interviews were conducted with representative health professionals as well as patients. These interviews aimed at using descriptive perceptions and experiences to answer two questions: (1) how Covid-19 confinement affected people's lives and their physical and mental well-being, and (2) how efficient the use of telemedicine was as an alternative strategy for accessing healthcare services in Bahrain during the crisis. These interviews were conducted online because this paper was written during the Covid-19 pandemic and thus social distancing was necessary and critical at that time.

2.2. Participants

The stakeholder committee of the SEIA project includes Bahraini health professionals working in various public and private hospitals in Bahrain. Semi-structured interviews using Zoom’s videoconferencing application were conducted with five representative health professionals: a consultant endocrinologist, a consultant family physician and diabetologist, a consultant psychiatrist, a clinical and behavioral psychologist, and a pediatrician. They were selected for their background experience in chronic diseases and mental health, their practical experience in telemedicine, and their notable efforts in raising community awareness of the importance of physical and mental health during the pandemic.

In addition, the interviewed health professionals in this paper were also asked to help find patients who are willing to participate in the interviews, and these patients were asked to recommend other telemedicine users to participate. Six participants were interviewed over the phone using this word-of-mouth method: one patient of doctor D1, one family member of a patient reviewing doctor D4, and the other participants were recommended by the previous patients. In total, ten participants with different backgrounds were interviewed, as shown in tables 1 and 2. The variety of participants’ backgrounds was essential in learning more about their views of using telemedicine and how to improve its services during and post Covid-19.

Table 1: Demographic data of health professionals

Participants	Job title	Gender	Years of experience	Hospital type
D1	Consultant endocrinologist	Female	16	Public
D2	Clinical psychologist	Female	5	Private
D3	Consultant psychiatrist	Female	14	Private
D4	Family physician and diabetologist	Female	20	Private
D5	Pediatrician	Male	More than 30	Private

Table 2: Demographic data of patients and telemedicine users

Participants	Gender	Age	Telemedicine users	Age and gender of patient(s)	Reason of using telemedicine	Specialist
P1 A	Male	40	Son of patient	72-year old father	Diabetes type 1/ Follow-up visits	
P2 H	Male	33	Patient		Diabetes type 1/ Follow-up visits	
P3 S	Female	40	Mother of patient	11 year old daughter.	Scoliosis/ Orthopedic	Orthopedic
P4 D	Female	45	Patient		Medical issue Acne	Internist Dermatologist
P5 S	Female	25	Mother of patient	2 year old girl	Acute conjunctivitis	Pediatrician
P6 R	Female	32	Patient	-	Cancer/ Follow-up visits	Oncology

2.3. Data collection and analysis

Interviews in this paper were conducted between September and November 2020 with participants, using two sets of leading questions; one for the health professionals and one for the patients and telemedicine users.

In the interviews with health professionals, the results of the households' survey of SEIA project were used as a starting point. Then the following leading questions were asked:

1. How has Covid-19 affected people's health and lives?
 - How has Covid-19 confinement affected your patients' status?
 - How has Covid-19 confinement affected individuals lives, including mothers, teenagers, children, and elderly people, based on your experiences and current evidence?
 - Have you had any patients infected by the coronavirus? What do people feel when infected by the coronavirus?
 - How to maintain physical and mental health during Covid-19?
2. Can you describe the impact of Covid-19 on patients' access to and utilization of healthcare services and telemedicine?

- How has Covid-19 affected your follow-up patients' visits to your clinic?
 - Did you see new cases in your clinic during Covid-19?
 - Which is the most-used method in your clinic (in-person visits or phone calls)?
3. How would you describe the use of telemedicine in Bahrain before and after the pandemic?
- How efficient was the use of telemedicine as a strategy for accessing health services in the time of Covid-19?
 - What are the advantages and issues of using telemedicine services in your clinic?
 - How could existing telemedicine services and solutions in Bahrain be improved?

In the interviews with the patients and telemedicine users, other questions were formulated and used to describe their experience in using telemedicine and understand their thoughts on telemedicine in the time of Covid-19:

1. Have you needed to visit a doctor during Covid-19? If yes, what was the reason?
2. How has your health condition been during the time of Covid-19 compared to what it was before the pandemic? Have your scheduled medical appointments or any necessary medical services for you been disrupted during Covid-19 crisis? (If the participant has a chronic condition e.g. diabetes, cancer, etc.)
3. Have you personally visited the doctor or used telemedicine services? Why did you choose that option? Have you been offered to use the telemedicine service or not?
4. Describe how efficient the use of telemedicine was? Are you satisfied with the telemedicine service and virtual visits? Do you intend to use the telemedicine services after the pandemic?

Before each interview, the researcher sent a document to the participant that provides a brief explanation of the Derasat-UNDP's Covid-19 SEIA project, the confidentiality of the process, and a consent form to carefully read then sign. Interviews with health professionals were recorded using the Zoom application and took on average of 35 minutes; the shortest interview was 20 minutes, and the longest one was 48 minutes. Phone interviews with patients and telemedicine users were recorded with a mobile application and took an average of seven minutes; the shortest interview was four minutes, and the longest one was 14 minutes. All interviews were transcribed in preparation for coding and analysis. In analysis

procedures, the interviews were coded to discover the emerging themes and analyzed with regard to the paper questions and goals.

3. Results

This paper aims to answer three questions: (1) How Covid-19 crisis and confinement affected people's lives and physical and mental well-being, (2) How effective the use of telemedicine was during the pandemic; and (3) How to improve telemedicine implementation in Bahrain in future. Thematic analyses revealed seven main themes categorized into the following two groups: impact of Covid-19 confinement on people's physical and mental well-being, and use of telemedicine during Covid-19 pandemic.

3.1. Impact of Covid-19 on people's physical and mental well-being

The first segment of the analysis examined the impact of Covid-19 on how Covid-19 affected people's lives and well-being. Three themes emerged from the thematic analysis: (1) health-related behavior changes and a rise in chronic cases, (2) rise in stress and depression levels, and (3) lifestyle and behavior changes.

3.1.1. Health-related behavior changes and rise in chronic cases

Covid-19 confinement influenced the ability and skills of patients to manage their chronic status, such as diabetes, high blood pressure, etc. Doctors (D1, D2) in this paper showed that confinement affected their patients' knowledge and self-management of the diabetes in two ways. First, the fear of coronavirus among people with diabetes, a group with high risk of severe illness from the virus, has motivated some patients to change their health behaviors (diabetes diet, walking, exercising, and sleep) in the duration of confinement, thus making them better at controlling their diabetes and reducing their blood sugar comparing to before the pandemic. In contrast, some patients deteriorated their health behaviors, including less exercising and physical activity and more eating. That, alongside age and stress factors, has impacted these patients' abilities to manage their diabetes and hypertension in the duration of

confinement, especially among patients aged 18-45 years old, and working mothers with school-age children.

The following table (table 3) summarizes the impact of confinement on patients' health status, as described by the doctors who participated in this paper.

Table3: Impact of Covid-19 pandemic on patients' health status as described by the doctors participated in this paper.

Covid-19 Influence on patients' health status	Patient visits	Patient group	Doctor	Leading causes
-Change in the level of blood sugar and/or pressure. -Increase in type 1 diabetes cases. -Increase in type 2 diabetes cases	Increased	-Patients aged 20-45 years. -Working mothers with school age children. - Overweight patients/ susceptibility to diabetes	D1 D4 D4	-Changes in lifestyle (including eating, exercising, and sleep patterns) -Fear of coronavirus infection. -Information on the impact of Covid-19 on diabetes patients. -Stress and anxiety
-Showing or exacerbation of psychological symptoms and adjustment disorder (including increase in stress, anxiety, distress, depression level). - Obsessive compulsive	Increased	-Young adults 18-36 years old. -Mothers who take care of family members with pre-existing mental problems. -Obsessive-compulsive disorder patients -Panic attack patients.	D2, D3 D2 D2	-Covid-19 related adjustment disorder (e.g. lockdown, confinement, changes in daily routine and social life, decrease of personal and social activities). -Sense of uncertainty about Covid-19. -Disease related fear.
Flu cases	Declined	Children	D5	School closures and staying at home

Source: data based on interviews analysis.

The number of new cases diagnosed by doctors has increased after Covid-19 confinement and strict lockdown measures, except for the pediatrician (see table 3). Doctor D1 noticed an increase in diabetes type 1 in the first two months of Covid-19, and doctor D2 noticed an increase in diabetes in type 2,

especially in people who were already overweight before the pandemic and have a susceptibility to the disease.

3.1.2. Rise in stress and depression levels.

Psychiatrists (D2, D3) in this paper noticed an increase in the number of newly diagnosed stress, anxiety, depression and adjustment disorder cases after the Covid-19 outbreak, mostly among 18-36 year-olds (see table 3). They believe the reason behind that increase in stress and depression among this age group is that they struggle with adjusting to the new situation and changes brought in their social life and daily activities, especially staying at home, practicing social distancing, and the closure of restaurants, cafes, and cinemas. Also, some new cases of stress and depression were seen among mothers who take care of family members with pre-existing mental problems.

Interestingly, psychiatrists (D2, D3) stated that most patients with pre-existing depression showed no deterioration in their mental status, such as increase in anxiety symptoms, during the pandemic. However, some people with prior mental disorders have been found to relapse during the period of Covid-19. For example, psychiatrist D2 found that obsessive-compulsive disorder and panic attack patients experienced higher stress levels and exaggerated fears of going outside or leaving home. They also pointed to the potential long-term psychological effect of the loss of a close family member or loved one because of Covid-19, which can lead to depression and post-traumatic depression disorder, especially in people who caused the infection.

Patients infected by the coronavirus are at risk of high stress or developing mental health symptoms. Three doctors have patients who were infected by the coronavirus, and noticed that they experienced several psychological symptoms, ranging from severe stress to fears of complications or stigma to delusion. Table 4 summarizes the psychological effects of Covid-19 infection on some patients of the doctors who participated in this paper.

Table 4: Psychological effects of Covid-19 infection on following-up patients

Doctor	Type of patient	Effects on patient's mental health
D1	Chronic	-Severe stress and fear of complications. -Frequent and unnecessary hospital visits. -Expectation of the worst. -Feeling stigmatized and blamed.
D2	Psychiatry	-Expectation of the worst and fear of the future. -Feeling stigmatized and blamed. -Reduced sleep -Loss of appetite
D3	Psychiatry	- 2 delusion cases.

Source: data based on interviews analysis

3.1.3. Behavior and lifestyle change

The Covid-19 pandemic and subsequent lockdown and public life restrictions to slow its spread have radically impacted the lives of individuals and families, completely disrupting lifestyles and routines and challenging them to adjust to new changes in health, work and family demands. Table 5 summarizes the altered lifestyle and behaviors during the pandemic reported by doctors.

Lifestyle change. Doctors grouped people into two categories based on their behavior and adjustment to changes in their lives during the duration of pandemic. The first category includes those who became more aware of health habits like healthy eating, regularly exercising, getting adequate sleep, and adopted more active lifestyles compared to before the Covid-19 outbreak. This category showed a high flexibility to adjust to Covid-19 related circumstances and changes, which led to them experiencing some benefits and outcomes during the pandemic. The second category includes those who showed problematic lifestyle behaviors (related eating, sleeping, exercise, etc.), and experienced difficulties adjusting to the changing demands of work, family and life, causing to them physical and mental health problems during the pandemic.

Reducing primary care doctors' visits. Fear and risk of Covid-19 infection has kept people from going to doctors and seeking medical care at hospitals. Doctors D1, D2, and D3 in this paper noticed a great

reluctance from their patients to come to the hospital for necessary procedures, such as for routine blood testing, X-ray exams, or follow-up visits, even after being told that all coronavirus precautions and safety measures were applied at these hospitals. Doctor D1 attributed the reason of this reluctance to the rumors on the spread of coronavirus in hospitals and misinformation circulated among and by their social groups or community.

Table 5: Altered lifestyle and behavior during the pandemic.

Altered lifestyle and behavior during the Covid-19 pandemic	Affected group	Physical and/or mental health related effects	Participants
Lifestyle: exercise/ physical activity, eating, and sleep	Adults	-Health-related quality of life.	D1, D4 D3, D2
Reduce primary care doctors' visits	-Adults -Chronic patients -Elderly	-Physical health status	D2 D1 D4 D3
Declined social life and connection.	-Adults and adolescents -Elderly	-Anxiety and depression due to declined social life and activities. -Sense of loneliness and distress due to declined personal contact with family members.	D2 D3
Increase of social media use	-Individuals at high risk -Infected individuals	-Stress, anxiety and fears from Covid-19 related information disseminated through social media. -Stress and distress from stigmatizing infected people. -Conspiracy theories connected to Covid-19. -Fear and anxiety due to vulnerability and health related misinformation.	D3 D2 D2 D3 D3
Overseeing children's distance learning.	-Working mothers (on-site or remote work)	-Burnout and stress due to the responsibility of overseeing their children's distanced learning. -Physical health status	D3, D2 D4, D2

Source: data based on interviews analysis.

Declined social life and connection. There is a common view that young adults are more likely than children and adolescents to be impacted by the lockdown and public life restrictions, as socializing is

considered a fundamental part of their lives and routines. Social distancing, lack of interaction, and lack of social support can negatively affect their quality of life and ability to do activities they enjoy doing before the pandemic, leading to isolation and depression. Elderly people may also experience isolation, loneliness and distress as a result of limited family visits due to risk of infection on them and social distancing measures.

Increase of social media use. The Covid-19 outbreak and subsequent social distancing measures have increased the time people spend on social media platforms, as they are being used as communication channels between social groups and main sources for Covid-19 news and related information. However, psychiatrists (D2, D3) believe that stress, anxiety, and distress become higher when people, especially those at high risk like chronic and long-term condition patients, increase their use of social media platforms, as it makes them more vulnerable to health related misinformation, rumors, stigma and conspiracy theories connected to Covid-19 that are being disseminated through social media platforms.

Overseeing children's distance learning. The closure of schools and shifting to distance learning to reduce the spread of the virus added new roles for working mothers, as well as more challenges and stress to their daily responsibilities. Doctor D4 noticed an increase in the levels of blood sugar and blood pressure of a group of women patients who work as teachers, during the three to two months before schools reopened as they were stressed and had fears about who will oversee their own children if they were to return to work.

3.1.4. How to maintain physical and mental health during Covid-19 time?

As can be seen from the above, the pandemic circumstances can negatively affect lifestyles and behaviors and create feelings of anxiety, stress and depression. Doctors outlined the following strategies for maintaining physical and mental health during Covid-19:

- **Necessary medication or supplies.** Giving chronic and long-term conditions patients enough pills and at-home testing supplies (lancets, test strips) for three months' consumption by health care providers to ensure that they follow their regular care plan and are not impacted by any potential disruptions to healthcare during Covid-19.

- **Psycho-education and mental health investment.** Providing communities with education resources and psychoeducational webinars on mental health promotion during the pandemic developed by mental health experts.
- **Healthy lifestyle.** Pursuing a healthy lifestyle (sleep, eating, and exercise) would help chronic patients control their chronic conditions and individuals improve their physical and mental health related-quality of life during Covid-19.
- **Flexibility and mental health improvement.** Being flexible and making adjustments to the changes brought by Covid-19 in work contexts as well as in social and family contexts, and allocating daily time for self-care and renewal to reduce burnout and minimize the effects of anxiety and stress associated with changes.
- **Social connectedness and staying in touch with family and friends.** Maintaining social connectedness while social distancing by contacting and interacting with close relatives and friends using digital means, like phone or video calls and social media.
- **Continuous monitoring of the behavior of children and adolescents.** Calming children and adolescents' fears on coronavirus and monitoring whether any changes in their behavior have occurred due to Covid-19- related situations or changes.

3.2. Use of Telemedicine during the Covid-19 pandemic

The second set of analysis examined patients' access to healthcare services and telemedicine during the time of Covid-19, how effective the use of telemedicine was during this time, and how to improve telemedicine in Bahrain based on attitudes and experiences of doctors and patients.

Telemedicine is defined broadly by the World Health Organization as “the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities” (WHO Global Observatory for eHealth, 2010, p.9).

Four themes emerged from the thematic analysis: (1) telemedicine is more in-demand during Covid-19 than in-person visits, (2) adoption of telemedicine has created positive outcomes in the management of healthcare services and cooperation among healthcare service providers, insurance firms and pharmacies during the Covid-19 pandemic, (3) telemedicine helped maintain continuity of healthcare and provide patients with planned treatments during the pandemic, and (4) the need to adopt hybrid in-person and virtual models for healthcare in the future.

3.2.1. Telemedicine is more in-demand during the Covid-19 pandemic.

Table 6: Impact of Covid-19 on patients' access to and utilization of healthcare services and telemedicine.

Participant	Rank/ Profession	Patient visits	Most used type of visits patients during Covid-19: in-person visits vs. virtual visits	Previous experience with telemedicine services	Methods used in telemedicine service.	Tendency to provide telemedicine after Covid-19
D1	Consultant endocrinologist	Increased	Telemedicine	No	Telemedicine solution	Strong
D2	Clinical psychologist	Increased	In-person visits	No	Video conferencing and email	Moderate
D3	Consultant psychiatrist	Increased	Telemedicine	Yes/unofficial	-Video conferencing -Telemedicine platform	Strong
D4	Family physician and diabetologist	Increased	Telemedicine	No	-Telemedicine platform -Video conferencing -Store and forward	Strong
D5	Pediatrician	Declined largely	In-person visits	No	-Video conferencing -Store and forward	Low

Source: data based on interviews analysis.

Doctors in this paper showed that shifting to telemedicine and online medical prescription and delivery services prevented or mitigated disruption in healthcare access during Covid-19. As the data of interviews proved, they found the number of telemedicine visits was higher than in-person visits in their clinics during the time of lockdown and social distancing. The first official use of telemedicine by doctors in this paper began during the Covid-19 crisis, using different methods of communicating with their patients, and real-time (e.g. video conferencing calls) and store and forward approaches (e.g. WhatsApp) were used the most by them (see table 6). Additionally, they had a strong desire and tendency to adopt telemedicine services in the future if it these services continue to be offered after the pandemic.

3.2.2. Adoption of telemedicine has created positive outcomes in the management of healthcare services and cooperation among healthcare service providers, insurance firms and pharmacies during the Covid-19 pandemic.

According to participants' views, shifting to telemedicine during the pandemic yielded positive outcomes for healthcare professionals, hospitals, and patients alike, including:

- Expanding access to public and private healthcare services and more doctors through digital means, and allowing out of town patients to take advantage of teleconsultation services.
- Minimizing the transmission risk of Covid-19 and promoting the safety of clinical staff and patients.
- Minimizing unnecessary visits to emergency rooms and/or follow-ups in hospitals and clinics.
- Safely delivering follow-up care and/or medications to high-risk patients who have certain health condition such as diabetes, cancer and hypertension.
- Allowing public and private hospitals to focus on essential and urgent medical services and important aspects.
- Launching home delivery service for prescription medicine from doctors working in public health centers and some private hospitals/clinics.
- Shifting to electronic health insurance solution and e-cards in coordination with and cooperation between health insurance firms, pharmacies and healthcare services providers.

3.2.3. Advantages and limitations of current practices of telemedicine from doctors' perspectives.

For the first time, telemedicine platforms and services are extensively used by many patients and doctors in public and private hospitals in Bahrain due to the Covid-19 pandemic. Thus, this experience can highlight some of the advantages and limitations of telemedicine systems. Table 7 summarizes some of telemedicine's advantages and limitations found in the interviews. Improved healthcare efficiency and patient load balancing are the most important advantages of telemedicine from doctors' point view. Doctors in this study believe that telemedicine, combined with remote monitoring applications and devices used for management of chronic conditions like chronic heart failure (CHF), diabetes, and hypertension etc., can play a key role in helping health administrators and authorities to improve the efficiency of healthcare by reducing its annual direct cost in Bahrain. Moreover, home monitoring applications and devices offer potential benefits for patients, like allowing more frequent and convenient monitoring, giving more control over their own health, and providing more confidentiality in mental health care.

Table 7: Advantages and limitations of telemedicine found in interviews

Advantages	Limitations
<ul style="list-style-type: none"> ● Improved healthcare efficiency and cost reduction for health administration and authorities. ● Maximized daily number of patients receiving urgent healthcare in the hospital. ● More convenient and efficient appointment scheduling for patients. ● Reduced time spent on following-up care. ● Reduced or eliminated travel time to healthcare facilities. ● More confidentiality and privacy in the service of mental healthcare. 	<ul style="list-style-type: none"> ● Difficulty in scheduling and making doctor-patient calls on time. ● Bandwidth and poor connectivity or quality of video conferencing and lack of knowledge on how to access telemedicine services. ● Assistance of family or other support is required to assist elderly in accessing telemedicine services. ● Prescription of controlled medicines is restricted by telemedicine guidelines issued by health authorities. ● Dispensing of controlled medications is not permitted in pharmacies outside the state. ● Telemedicine approaches are not covered by health insurance. ● Some clinical activities involving face to face interaction in mental healthcare.

Source: data based on interviews analysis.

As doctors (D1, D3, D4) in this paper illustrated, most diabetes (70%) and mental health patients can use telemedicine and/or telemonitoring systems for follow-up care, which allows for daily patient load balancing, reducing costs and time spent on follow-ups as doctors can access online patients' home readings, and more time for priorities and healthcare management, planning, and research in hospitals.

In addition, shifting to telemedicine during Covid-19 has increased the average daily patients treated in the hospital. There is a common view between doctors in this paper that due to the availability of telemedicine services, patients became more willing to show up and less likely to miss appointments. For example, the daily average number of patients receiving healthcare in doctor D1's hospital increased by about 16% compared to before applying telemedicine and the pandemic. The same doctor also noticed that appointment cancellation rates in the hospital declined from 20% to 4% compared to before. This is attributed to the convenience and efficiency of scheduling appointments and virtual visits. Moreover, telemedicine provides more options for accessing mental healthcare services while maintaining confidentiality and privacy.

Accordingly, in order to achieve the aforementioned advantages and objectives in the future, doctors in this paper emphasize the importance of developing appropriate telemedicine strategies, enhancing the adoption of telemedicine and telemonitoring best practices in hospitals, developing remote monitoring-based models of care, and giving the necessary hospital training to doctors and nurses who will use telemedicine and remote monitoring applications.

However, as doctors mentioned, telemedicine approaches also have limitations of calling schedules, bandwidth, technology skills, health insurance coverage, and controlled medicine. Doctors saw that they faced difficulty in controlling virtual visits schedule and calling patients on time, i.e. when a doctor is unable to make the scheduled call on time, the patient has to wait between one and one and a half (maybe more) hours for the doctor's call. They found also that patients sometimes suffer from poor internet connectivity or quality of video conferencing or need assistance or support in accessing telemedicine services, especially the elderly. Also, doctors faced the issue of lack of health insurance in telemedicine, which prompted hospitals and insurance companies to communicate and find immediate solutions. In addition, with respect to prescription medicine abuse, psychiatrists and pharmacists are

unauthorized to prescribe controlled medicine by telemedicine guidelines issued by health authorities during the pandemic, but they argued that telemedicine networks and records should be seen in the future as a new way to electronically administer and control medication prescription and purchases.

3.2.4. Recommendations for improving telemedicine from doctors' perspectives.

Building on the aforementioned perspectives on outcomes and limitations found in telemedicine after the first official use in Covid-19, doctors in this paper identified factors to be considered and required actions to be taken to improve telemedicine after the pandemic, including:

- Comprehensive communication and cooperation between all healthcare providers, including official health authorities and regulators, public and private hospitals and clinics, insurance companies and pharmacies, is vital for the widespread adoption of telemedicine and its growth as an industry.
- Health insurance companies have to provide coverage for telehealth access to all in-network providers.
- Telemedicine providers have to use reliable and secure telemedicine systems/solutions including patients' data, videoconferencing, chat, scheduling, claims and billing management, and electronic prescription applications.
- Establish regulations for telemedicine service implementation, security and privacy, as well as technical standards for telemedicine systems and records interoperability.
- Establish a national network for telemedicine services and electronic prescription systems, to control and monitor the prescription of controlled medicines by licensed private telemedicine providers and dispensation of these medicines by pharmacists.
- Integrate mobile healthcare applications (M-Health) and home healthcare monitoring applications into telemedicine systems, which can be used for remote patient monitoring and accessing patients' home readings (e.g., glucose, blood pressure, weight, moods and etc.).

3.2.5. Telemedicine helped maintain continuity of healthcare and pre-planned treatments during the pandemic- patients end users' perspectives.

A common view among participants was that healthcare access and receiving planned treatments were not impacted during the Covid-19 pandemic. For example, participants with cancer and diabetes stated that the Covid-19 pandemic did not affect the delivery of cancer and diabetes care or delay needed treatments, because the hospitals redefined the care delivery models using telemedicine to replace (non-urgent) in-person follow-ups, sending medicines to patients' homes, in addition to taking intensified safety measures in hospitals to reduce the risk of Covid-19 transmission during in-person visits.

This indicates that telemedicine helped maintain continuity of care and treatment needed by individuals and chronic patients during the pandemic. While all of the participants in this paper have used real-time (phone/video call) and store and forward telemedicine during Covid-19 as patients or end users, they have different reasons for doing so, including:

- In-person visits were temporarily disallowed by the required doctor.
- The hospital made a proactive call to the chronic patient for follow-up care.
- Ordering medical prescriptions through the delivery service.
- Avoiding going to the hospital because of fears about Covid-19.
- Requesting teleconsultations from out of state hospitals.
- More convenient and easier than in-person visits in current Covid-19 circumstances.
- Taking advantage of free teleconsultations offered by a group of doctors during the lockdown.

The aforementioned reasons by participants show that providing easy mobile-based telemedicine services for follow-up care, consultations and medical prescription combined with economic incentives can be taken as approaches to increase demand for telemedicine services in the future.

3.2.6. Need to adopt hybrid in-person and virtual models for healthcare in future.

While patients and end users rated their telehealth experiences highly, and they expressed a desire for hybrid in-person and telemedicine models for healthcare by hospitals in the future, they still prefer in-person care. Overall, participants in this paper hold supportive and positive attitudes toward telemedicine adoption during the pandemic and expressed their satisfaction with telemedicine in services they already used. They ranked their satisfaction with telemedicine as excellent or very good, and all of them are likely to use telemedicine in the future as they see it more convenient, easier, and time- and effort-saving compared to in-person visits for chronic disease management, follow-up, less acute conditions and medication prescription ordering. That said, one participant (family member) was uncertain about using telemedicine for his elderly father (patient) in the future as he feels that it is uncomfortable and psychologically unsuitable for elderly people.

Despite that most participants have a strong intention to use telemedicine after Covid-19 for reducing the time and effort required for follow-ups, they see that in-person visits are still preferable and can offer more benefits to the patient when compared to virtual visits:

- Ability to immediately do the necessary clinical or radiology examinations and laboratory tests, especially at the first diagnosis or when chronic patients' home readings are abnormal.
- Allows the patient to have stronger conviction about the doctor's consultation and advice, and provides elderly patients psychological satisfaction and a sense of social inclusion and family care.
- Avoiding discomfort with the use of technology and applications, like video calls or telemedicine platforms, required in communication and making the virtual visits between the patient and doctor or service provider.
- Convenient face-to-face interactions between doctors and patients and ability to have more control over the discussion and asking the doctor more questions and discussing more problems during in-person visits.

4. Summary and conclusion

This paper attempts to shed light on three major questions: how Covid-19 crisis and confinement affected people's lives and physical and mental well-being; how effective the use of telemedicine was during the pandemic; and how to improve the telemedicine implementation in Bahrain in the future. The analysis of the interviews with healthcare professionals and patients who participated in this paper revealed key findings, summarized as follows:

First, the analysis showed that the lives and physical and mental health of the Bahraini population appear to have been affected by the Covid-19 pandemic in several ways, including:

- After the Covid-19 outbreak, the number of visits for diabetes diagnosis (diabetes type 2) or complications and mental health increased, while the number of visits in pediatric clinics overall reduced due to school closures and stay-at-home measures.
- The ability of chronic disease management, like diabetes and hypertension, was affected by the Covid-19 pandemic in two opposite ways: either the confinement raised the awareness of some patients about their health and well-being, leading to better management and control over their health conditions; or the confinement hindered some patients' self-care and management behaviors, like eating healthy meals and engaging in physical activity, hence negatively affecting their health and increased diabetes complications, especially for patients aged 18-45 years old.
- Symptoms of stress and depression increased after the Covid-19 outbreak, especially among young adults aged 18-36 years old, mainly due to the difficulty in adjusting to the new situation and changes brought on their social life and daily activities, like staying at home, practicing social distancing, and public life restrictions (closure of restaurants, cafes and cinemas, etc.). Elderly people or those at high risk of infection or serious disease may also experience isolation, loneliness and distress as a result of limited family visits and reducing contact and communication with them.
- Patients infected by the coronavirus are at risk of high stress or developing mental health symptoms, especially patients with pre-existing chronic diseases or mental health problem like obsessive-compulsive disorder and depression. Mothers who take care of family members with pre-existing

mental problems are also at risk of depression or developing mental health problem due to the changes brought by the pandemic on their family life and its effect on their family members' mental conditions.

- Covid-19 confinement and public life restrictions radically affected the lives of individuals and families, causing disruptions to routines and alterations in lifestyles and behaviors, the most noticeable of which were the changes in lifestyle habits; the reduction in visits to doctors for care, especially during the first phases of the Covid-19 pandemic; declined social life and connection; increased social media use; and increased overseeing children's education due to the shift to distance learning.
- People can be categorized into two groups based on how they adjust to Covid-19- related circumstances and changes. The first group includes those who became more health aware compared to before the Covid-19 outbreak and created healthy habits such as healthy eating, regular exercise, adequate sleep, and an active lifestyle. This group was also more flexible and adaptable to Covid-19 related circumstances and changes, therefore obtaining some personal benefits and outcomes due to the crisis. The second group includes those who showed problematic lifestyle behaviors (eating, sleeping, exercise, etc.), and had difficulties adjusting to the changing demands of work, family and life, causing them physical and mental health problems during the pandemic.
- The closure of schools and shifting to distance learning added a new role for working mothers with school-age children and more stress and challenges to their daily responsibility, which might have led to negative physical and/or mental health outcomes (e.g. level of blood sugar and pressure, depression, distress and etc.).
- Health misinformation, rumors, stigma and conspiracy theories connected to Covid-19 that are being disseminated through social media platforms may increase stress and anxiety considerably, especially in high risk individuals like chronic and long-term conditions patients.

Second, findings of the interviews showed that shifting to telemedicine in Bahrain during Covid-19 played a key and effective role in mitigating the disruption of healthcare services and minimizing the transmission risk of Covid-19. This has been inferred based on the following:

- Telemedicine/teleconsultation for non-urgent care and medication delivery services were more in demand compared to in-office visits during the first phase of the pandemic. Both healthcare professionals and patients or end users rated their telehealth experiences with telemedicine highly, and they expressed a desire of hybrid in-person and telemedicine models for healthcare by hospitals in the future.
- Shifting to telemedicine has revealed several advantages during the pandemic, including maintaining continuity of healthcare and chronic and long-term conditions patients' pre-planned treatments, maximizing the daily number of patients receiving urgent care in the hospital, convenient and efficient appointment scheduling for patients, reducing time spent on follow-up care, and eliminating travel to healthcare facilities and promoting the safety of medical staff and patients.
- The adoption of telemedicine has created positive outcomes in healthcare management in hospitals and cooperation among healthcare service providers, insurance firms and pharmacies in Covid-19, leading to improved work models and altered work flows between them, and introduced new services on insurance and medication delivery during the pandemic.

Third, despite the advantages listed, telemedicine is still in its infancy stage and encountered by several limitations which have been found in the pandemic, the most important of which are lack of health insurance, lack of technology skills by some patients or healthcare professionals, and restrictions on prescribing controlled medications. Moreover, the need to integrate mobile healthcare applications (M-Health) and home healthcare monitoring applications into telemedicine systems.

Finally, given the great effects of the Covid-19 pandemic on physical and mental well-being, policy makers are required to pay attention to the need for maintaining physical and mental health of the people at all ages. Providing psychoeducation and investing in mental health promotion by corporates and organisations are important and useful, as it can help communities know how to reduce or prevent mental health problems during the pandemic.

For Bahrain, the development of telemedicine is not only of health and social importance, but also economic importance. Therefore, communication and cooperation between all healthcare communities, including official health authorities and regulators, public and private hospitals and clinics, insurance

companies, and pharmacies is vital to widespread adoption of telemedicine and its improvement and growth as an industry in the future.

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