Annals of R.S.C.B., ISSN:1583-6258, Vol. 26, Issue 1, 2022, Pages. 3412 - 3430
Received 08 November 2021; Accepted 15 December 2021.

Describe the rapid implementation of a Diabetes Telemedicine Clinic during the Coronavirus Disease 2019 Outbreak Our Protocol, Experience, and Satisfaction Reports in Makkah Al-Mukarramah Saudi Arabia 2022

Emtsal Mohammad Doom[1], LujainTalal Hassan[2], Amal Salem Alharbi[3], Abdullah Ali Saleh Alzahrani[4], Faisal Mohammed Ahmed Alzahrani[5], Seham Mohammed Natto[6], Amal Abdullah Basarwan[7], DoaaAbdulrasheedSaleh Mansouri[8], Haneen Ahmed Tajaldeen[8], ShathaAdil Bawazeer[9], Haifa Fahd Alamri[10], FatmaHabib Hawsawi[11], Mona Ahmed Eida Karban[12], AfnanNooreslam Alhndi[13]

[1]Psychologist, Diabetes Center, Al Noor Specialized Hospital, MakkahAlMukarramah, Saudi Arabia.
[2]Obstetrician and gynecologist, Maternity and children hospital in Makkah, Saudi Arabia.
[3]General Dentist, Adam General Hospital, Saudi Arabia.
[4]Epidemiology Technician, Al Sharayee Sector Administration, MAKKAH, MOH, Saudi Arabia.
[5]Nursing technician, Al Sharayee sector administration, MAKKAH, MOH, Saudi Arabia.
[6]Specialist Dental Assistant, King Fahad Hospital, Specialized Dental Center, Madinah, MOH, Saudi Arabia.
[7]Consultant pediatrics, Hera General Hospital Makkah, Saudi Arabia.
[8]Dialysis Nurse, King Fahd Hospital, Jeddah, MOH, Saudi Arabia.
[9]Nursing Specialist, Makkah Health cluster, Saudi Arabia.
[10]Pharmacist technician, Makkah Health cluster, Saudi Arabia.
[11]Nursing, Makkah Health cluster, Saudi Arabia.
[12]Pharmacist, Pharmacy department, Al Mansour Primary health care center, Saudi Arabia.
[13]Nursing Specialist, Department of health programs in the health of Makkah, Saudi Arabia.

Abstract:

Background:

We describe the rapid implementation of a Diabetes Telemedicine Clinic during the Coronavirus disease 2019 Outbreak and satisfaction, intervention for poorly controlled type 2 diabetes (T2D) patients. The importance of telemedicine in diabetes care became more evident during the coronavirus disease 2019. pandemic as many people with diabetes, especially those in areas without well-established telemedicine, lost access to their health care providers (HCPs) during this pandemic. Diabetes Telemedicine health care providers (HCPs) during this pandemic interventionist received regular existing diabetes remote home monitoring data alerts and called patients by telemedicine at scheduled intervals. A graphical report summarizing patient existing diabetes remote home monitoring data was sent to providers to inform clinical decision making during a scheduled clinic follow-up. The results showed consistently high levels of Telemedicine device use during the intervention period, high ratings of usability and program satisfaction from patients, and high ratings of provider satisfaction with the program.**Aim of the study**: Todescribe the rapid implementation of a Diabetes Telemedicine Clinic During the Coronavirus Disease 2019 Outbreak Our Protocol, Experience, and Satisfaction Reports in Makkah Al-Mukarramah Saudi

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Arabia2022.

Method:cross sectional study conducted about Telemedicine during Clinic Coronavirus disease 2019, we We describe a simplified protocol of a Diabetes Telemedicine Clinic uses of telemedicine during the COVID-19 pandemic among diabetes Type 2 using the search terms "Telemedicine" and "Coronavirus-19".Our total participants were (200) patients with Type 2 Diabetes attending a virtual integrated care clinic center

Results:the participant with satisfaction and heave a significant relation between the satisfaction and frequency while P-value<0.001 and $X^2$45.125, participant toward Satisfaction study results show the majority of participant not Satisfied were(74.0%) while satisfied were(26.0 %)**.**

Conclusion: Most Saudi patients with T2DM have adapted to Telemedicine Clinic consultations, exhibiting good satisfaction and perception, and high preference to continue using this system in the future.The utilization of the service to assist patients with diabetes is highly encouraged, especially during the Coronavirus Disease 2019 Outbreak. Strategies need to be developed to further enhance the patient experience implementation of a Diabetes Telemedicine Clinic

Keywords: Describe, Diabetes, Telemedicine Clinic, Coronavirus 2019, Outbreak, Our Protocol, Experience, Satisfaction,Saudi Arabia in MakkaAl-Mukarramah

Introduction

The coronavirus disease 2019 (COVID-19) pandemic that originated in Wuhan, China, in late 2019 has caused significant impacts on the availability of resources in hospitals, clinics and other medical centres in almost every country in the world.(1) Faced with this situation, healthcare providers are adopting strategies such as social distancing to prevent and reduce the advance of the pandemic(2) In this sense, telemedicine and other digital tools derived from information and communication technologies can help manage the COVID-19 pandemic since these techniques facilitate the treatment of patients at safe distances.(3)

The WorldHealthOrganization (WHO) declared the outbreak of SARS-CoV-2 (COVID-19) a public health emergency of international concern on 30 January 2020, and it was deemed a pandemic on 11 March 2020.(4) The outbreak itself caused major lockdowns in almost all countries, which heavily affected them; it is still affecting the daily lives of individuals, and it causes major management problems in healthcare facilities both for infected patients as well as non-COVID-19 routine visits.(5) As a result of evidence from previous pandemics and the advancements made to the field, the use of telemedicine rapidly increased because of COVID-19,

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especially in big, industrialized countries such as the United Kingdom(6), theUSA, and China(7). The lack of an effective treatment and still large proportion of unvaccinated individuals, social distancing, and lockdown measures suggest that telemedicine is the safer way of patient–doctor interaction (8).

Maintaining an uninterrupted access to health care providers(HCPs) is essential when managing people with diabetes and becomes more important during times of pandemics and disasters.(9) Being confined to home with limited physical activity and hindered access to HCPs and diabetes medications and supply are expected to result in unfavorable metabolic outcomes in people with diabetes.(10) In addition, several reports have linked diabetes to a higher risk of mortality from COVID-19, which added more psychological burden on people with diabetes who are left with no access to their HCPs during a time when this was needed the most.(11,12) Complicating matters, the COVID-19 pandemic broke a few weeks prior to the month of Ramadan, when millions ofMuslims, including those with diabetes, attempt to fast every year. Many diabetes clinics in Muslim-majority countries, including Saudi Arabia (SA), arrange a "Pre-Ramadan" clinic visit for their patients during this time to provide diabetes education and medication adjustments prior to fasting. (13)

As the COVID-19 outbreak escalated rapidly, patients and HCPs in many countries were forced to navigate temporary tools to telecommunicate.(14) Despite the lack of telemedicine infrastructure in areas of the world where diabetes is highly prevalent (eg, the Middle East and South Asia), the wide availability of technological resources such as smartphones in these same countries provides an opportunity to quickly adopt a relatively simple telemedicine clinic that could serve the purpose during pandemics without adding a significant burden on patientsand health systems. Here, we describe our protocol of Diabetes.(15)

Literature Review

Kar, et al.(2018) report that Though most of our patients have not used telemedicine prior to this time, the extremely high use of smart devices and wide availability of access to the internet, including in remote areas in Saudi Arabia, made our transition to telemedicine a relatively smooth one.(16)

Nasser, et al.(2021) report that thanks to telemedicine, several patients with chronic diseases were able to avoid exposure to the COVID-19 infection in healthcare settings and receive their diagnosis, treatment, and monitoring at home. Although telemedicine can offer a wider coverage of healthcare, individuals who are not familiar with technologies, those who do not have broadband fast internet,

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illiterate people, older adults, and people with specific disabilities such as hearing loss and blindness may find difficulties in using telemedicine services (17,18)

American Diabetes Association, (2020). Diabetes care is an area that is well suited to the use of telemedicine, especially with the evolving advances in glucose monitoring devices and remote glucose data sharing features. Even for patients who still depend on SMBG, they can use Bluetooth glucose meters that allow for data upload to the cloud, or they can simply send photos of their daily glucose log to the HCPs via email or phone texts (19)

The COVID-19 pandemic, two studies from Japan[20] and Saudi Arabia (21) reported similar positive clinical outcomes in terms of glycemic control. In addition, it has been shown that increasing patient contact through frequent Telemedicine calls improves patient therapy adherence, motivation, and metabolic control.(22) However, only limited literature is currently available on the cost-effectiveness of telemedicine for diabetes care.(23)

In general, other studies agree with this opinion and suggest that telemedicine plays an important role in treating patients affected by the COVID-19 pandemic.(24)

In Saudi Arabia, a study assessing the use of the Seha application that provides telemedicine services in the country, revealed that older adults, women, and people living in regions with inadequate internet services were less likely to use the application(25)

Though most of our patients have not used telemedicine prior to this time, the extremely high use of smart devices and wide availability of access to the internet, including in remote areas in Saudi Arabia, made our transition to telemedicine a relatively smooth one.(26) Moreover, diabetes care is an area that is well suited to the use of telemedicine(27)

It should be noted that there were a few national studies that assessed knowledge and perceptions about telemedicine before the time of the COVID-19 pandemic, and those studies showed, compared with the post-COVID-19 studies, inadequate knowledge and negative attitudes towards telemedicine in Saudi Arabia (28)

A limited-scale study including 25 physicians in two hospitals in Taif, Saudi Arabia, showed that 16 of them had fair to good knowledge about telemedicine (29). Although only 19 physicians reported that their hospitals provided information and training on telemedicine, all participating physicians have used sorts of telemedicine services during the COVID-19 pandemic (14 telephone, 12 video, 11 social media, 4 text messages, and 3 e-mails) (30).

More than a third of physicians praised the advantages of telemedicine in the form of reducing time, saving money, and enhancing the quality of healthcare. Most physicians held a belief that telemedicine services should be continued in the Saudi healthcare settings after the COVID-19

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pandemic (31).

The aforementioned studies show that telemedicine is one of the main tools that can provide effective health services to patients during the COVID-19 pandemic. Also, a previous study revealed that a group of patients affected by COVID-19 showed an acceptable attitude and satisfaction towards the telemedicine processes applied in Saudi Arabia during the pandemic.(32) Thus several hospitals in Saudi Arabia are using telemedicine programs to treat patients during the COVID-19 pandemic.(33)

Rationale:

Due to the increased risk of serious disease with COVID-19 in people with In several healthcare settings worldwide, telemedicine was used to efficiently provide medical services during the COVID-19 pandemic. This telemedicine system included video meetings with patients, triage of patients via telemedicine, giving home isolation instructions for COVID-19 patients, tracking COVID-19-related infections, screening and treating urgent cases, and providing decision support for patients and junior physicians, due to the increased risk of serious disease with COVID-19 in people with Type 2 Diabetes during the COVID-19 Pandemic, it is important that patients are well informed on the importance of optimal metabolic and glycemic control. the researcher found that patients with Type 2 Diabetes During the COVID-19 Pandemic is not welcome to the approach telehealth.

Aim of the study:

Todescribe the rapid implementation of a Diabetes Telemedicine Clinic During the Coronavirus Disease 2019 Outbreak Our Protocol, Experience, and Satisfaction Reports in Makkah Al-Mukarramah Saudi Arabia2022.

Objectives:

This study describe the rapid implementation of a Diabetes Telemedicine Clinic During the Coronavirus Disease 2019 Outbreak Our Protocol, Experience, and Satisfaction Reports in Makkah Al-Mukarramah Saudi Arabia2022.

Methodology:

Study design:

This study is a cross sectional descriptivestudy

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Study Area

Patients aged 35 to >64 years and above with type 2 DM during the Coronavirus Disease 2019 Outbreak attending in primary health care outpatient in the diabetes center, the patients were recruited from an integrated care clinic at the diabetes center and clinics of the Family and Community Medicine Department at Makkah Al-Mokarrama, Saudi Arabia at diabetes center and clinics of the Family and Community Medicine Department, high-risk patients with type 2 diabetes during the COVID-19 Pandemic are referred to this diabetes center and clinics of the Family and Community Medicine Department from, the patients receive comprehensive diabetes care during the Coronavirus Disease 2019 Outbreak.

Study Population

The study has been conducted among patients aged 35 to >64 years and above with type 2 DM during the Coronavirus Disease 2019 Outbreakattending in primary health care outpatient in the Diabetic Center, family and Community Medicine Department in the Makkah, from August and September 2022

Selection criteria:

Inclusion criteria

- In this study, the inclusion criteria included the following: patients aged 35 to >64 years with Type 2 Diabetes during the Coronavirus Disease 2019 Outbreak.

Exclusion criteria :

- All patients with Type 2 Diabetes during the Coronavirus Disease 2019 Outbreakand after receiving telemedicine care or traditional care were excluded. Based on these inclusion and exclusion criteria, in the traditional care model, we included all the first 50 patients who met the criteria. Socio economic and clinical characteristics, such as age, sex, and comorbidities, were included in the Telemedicine. Hence, to include the patientsmanaged through Telemedicine. (200 patients).

Sample size

The sample size has been calculated by applying Raosoft sample size calculator based on (The margin of error: 5%, Confidence level: 95%, and the response distribution was considered to be 20%) accordingly the Sample size is 250 of diabetic patients attending and adding 10 more to

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decrease margin of error. After adding 5% oversampling, the minimum calculated sample has been (200). Computer generated simple random sampling technique was used to select the study participants.

Sampling technique :

Systematic random sampling technique is adopted. By using systematic sampling random as dividing the total population by the required sample size; (200)

Data collection tool

- patients with Type 2 Diabetes during the Coronavirus Disease 2019 Outbreakwho were managed using Telemedicineto Deliver Follow-up Care. Patients were followed for at least 3month to assess the telemedicine.to deliver care for diabetic patients with Type 2 Diabetes .
- Diabetic patients' age, sex, disease duration, follow-up period, comorbidities, shipping, and the frequency of Telemedicine. Visits were collected.
- Consequently, the medications, laboratory tests, medical supplies, shipping, phone calls, and clinic visits were collected. The visits to the clinic and laboratory tests were retrieved from the Ministry of Health, Saudi Arabia.

Data collection technique:

Researcher has been visits the selected Diabetic Center after getting the approval from the ministry of health.She has been explained the purpose of the study to all participants attending the clinic. The data has been collect from August and September 2022.

Data entry and analysis:

The Statistical Package for Social Sciences (SPSS) software version 24.0 has been used for data entry and analysis. Descriptive statistics (e.g., number, percentage) and analytic statistics using test for the association and the difference between two categorical variables were applied. A p-value $\leq$ 0.05 has been considered statistically significant.

Pilot study:

A pilot study has been conducted to test the methodology of the study, the questionnaire has been clear **.**

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Ethical considerations:

- Permission has been obtained, and has been Verbal consents from all participants in the questionnaire were obtained.
- All information was kept confidential, and a result has been submitted to the department as feedback.

Budget:

Self-funded

Results

Table 1: Distribution of Socio-demographic characteristicsof the study participants

	N	%
Age (year)		
35-44	58	29
45-54	38	19
55-64	80	40
>65	24	12
Gender		
Male	70	35
Female	130	65
Nationality		
Saudi	176	88
Non-Saudi	24	12
Educational level		
Primary school/below	58	29
Intermediate school	32	16
High school	26	13
University	58	29
Postgraduate	26	13
Job		
Governmental employee	38	19
Private sector employee	58	29
Professional worker	24	12
House wife	22	11
Not working	58	29

Table 1 shows that most of the participants (40.0%) were in the age group 55-64 years follow by the (29.0%) were the age group 35-44 years, the majority of them were female (65.0%) while male(35.0%), also regarding Nationality the majority of participant are Saudi were(88.0%) while

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Non- Saudi were(12.0%). regarding Educational levelthe majority of participant are University were(29.0%) while Primary school/below were(29.0%). Regarding the Job the majority of participant Private sector employee were (29.0%) while Not workingwere(29.0%) .

Table 2. Distribution of details of complications suffered by study participantsDue to Diabetes Mellitus in the in rapid implementation of a Diabetes Telemedicine Clinic during the Coronavirus Disease 2019 Outbreak diabetes .

	N	%
Complications		
Retinal complications	24	12
Hyperglycemia	44	22
Foot complications	24	12
Cardiovascular complications	30	15
Hypoglycemia	44	22
Renal complications	46	23
Dental complications	30	15
Hospitalization		
Absent	132	66
Present	68	34
Surgery		
Undergone surgery for complication	52	26
Did not undergo any surgery	148	74
Rang of HbA1c, glycated hemoglobin		
4 – 5.6% (20 – 38 mmol/mol)	70	35
values between 5.7% and 6.4% (39 – 46 mmol/mol)	56	28
Over 6.5% (47 mmol/mol)	74	37
Impact of patients in after > 3 months of follow-up of Smartphone App to Deliver Virtual and the costs of treatment for the Smartphone		
Had a mean reduction in their HbA1c level	72	36
Had a mean increased in their HbA1c level	44	22
No differences in their HbA1c level	84	42
The costs of treatment for the Telemedicine		
less than cost of the traditional care model	116	58
More than cost of the traditional care model	84	42

Table (2) show regarding the complications the majority of participant heave renal complications were(23.0%), while hyperglycemia were (22.0%) , regarding the Hypoglycemia were (22.0%) but regarding the Hospitalization the majority of participant absent were(66.0%), followed by present

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were (34.0%), while regarding the surgery the most of participant did not undergo any surgery were (74.0%), followed by undergone surgery for complication were (26.0%), regarding the Rang of HbA1c, glycated hemoglobin the majority of participant over 6.5% (47 mmol/mol)were (37.0%) followed by 4 – 5.6% (20 – 38 mmol/mol)were (35.0%), while values between 5.7% and 6.4% (39 – 46 mmol/mol) were(28.0%), regarding the Impact of patients in after > 3 months of follow-up of Smartphone App to Deliver Virtual and the costs of treatment for the Smartphone the majority of participant No differences in their HbA1c levelwere (42.0%) followed by Had a mean reduction in their HbA1c level were (36.0%), regarding The costs of treatment for the Telemedicine most of participants less than cost of the traditional care modelwere (58.0%), followed by more than cost of the traditional care model were(42.0%) .

Table 3 Satisfaction of the rapid implementation of a Diabetes Telemedicine Clinic during the Coronavirus Disease 2019 Outbreak Our

Statement of the Satisfaction		Satisfaction			% Of Satisfaction	Chi-square	
		Strongly agree/ Agree	Neutral	Disagree /Strongly disagree		X^2	P-value
1. It was easy to run and work in the Diabetes Telemedicine Clinic.	N	90	70	40	75.00	19.000	<0.001*
	%	45	35	20			
2. I was confident and felt at ease when I worked in the Diabetes Telemedicine Clinic.	N	132	56	12	86.67	110.560	<0.001*
	%	66	28	6			
3. The images and audios during the Telemedicine encounter were clear.	N	58	36	106	58.67	38.440	<0.001*
	%	29	18	53			
4. The Diabetes Telemedicine Clinic almost always met its patient care treatment goals.	N	118	64	18	83.33	75.160	<0.001*
	%	59	32	9			
5. I believe the Diabetes Telemedicine Clinic was essential in maintaining a good glucose control for our patients during theCOVID-19 pandemic**.**	N	138	56	6	88.67	133.240	<0.001*
	%	69	28	3			
6. The quality of care	N	164	26	10	92.33	215.080	<0.001*

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provided in the Diabetes Telemedicine Clinicwas excellent.	%	82	13	5			
7. The time spent with patients when working in the DiabetesTelemedicine Clinic was sufficient.	N	70	90	40	71.67	19.000	<0.001*
	%	35	45	20			
8. In the Diabetes Telemedicine Clinic, the number of patients that I can see virtually in one clinic is more than the number that I can see in the standard "in-person" clinic.	N	174	24	2	95.33	262.840	<0.001*
	%	87	12	1			
9. In the Diabetes Telemedicine Clinic, there is less No-Shows rates among the patients with CONFIRMED appointments compared to that in the standard in-person clinic.	N	26	48	126	50.00	82.840	<0.001*
	%	13	24	63			
10. The Diabetes Telemedicine Clinic protocol is simple enough that it does not require technical knowledge or skills, and HCPs do not need to attend a dedicated orientation session prior to Working there.	N	84	48	68	69.33	9.760	0.008*
	%	42	24	34			
11. My experience in the Diabetes Telemedicine Clinic would have been more satisfying if I had an orientation session on how to conduct a Telemedicine visit.	N	116	38	46	78.33	55.240	<0.001*
	%	58	19	23			
12. For the most, I am satisfied with my experience with the Diabetes Telemedicine Clinic.	N	148	38	14	89.00	153.160	<0.001*
	%	74	19	7			
13. Some of our	N	162	32	6	92.67	209.560	<0.001*

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patients will still benefit from offering the Diabetes Telemedicine Clinic after the COVID-19 pandemic is over.	%	81	16	3			
14. I will use the Diabetes Telemedicine Clinic for some of my patients in the future if this is made as an available option in our clinics.	N	152	40	8	90.67	171.520	<0.001*
	%	76	20	4			

Table (3) shows the satisfaction level it was easy to run and work in the Diabetes Telemedicine Clinic our study the majority of participant Strongly agree were (45.2%) while Strongly disagree were(20.0%) while % Of agreement(75.00%) were significantly associated were P< 0.001 and X^2 (19.000). Regarding the I was confident and felt at ease when I worked in the Diabetes Telemedicine Clinic the majority of our participant Strongly agree were (66.0%) while Strongly disagree were(6.8%)were a significantly associated were P< 0.001 and X^2 (110.560), while % of satisfaction were(86.67%), regarding The images and audios during the Telemedicine encounter were clear majority of our participant Strongly disagree were (53.0%) while Strongly agree were(29.0%)were a significantly associated were P< 0.001 and X^2 (38.440), while % of satisfaction were(58.67%) . Regarding The Diabetes Telemedicine Clinic almost always met its patient care treatment goals majority of participant Strongly agree were (59.0%) while Strongly disagree were(9.0%)were a significantly associated were P< 0.001 and X^2 (75.160), while % of satisfaction were(83.33%). Regarding the I believe the Diabetes Telemedicine Clinic was essential in maintaining a good glucose control for our patients during the COVID-19 pandemic majority of our participant Strongly agree were (69.0%) while Strongly disagree were(3.0%)were a significantly associated were P< 0.001 and X^2 (133.240), while % of satisfaction were(88.67%). Regarding The quality of care provided in the Diabetes Telemedicine Clinicwas excellent the majority of our participant Strongly agree were (82.0%) while Strongly disagree were(5.0%)were a significantly associated were P< 0.001 and X^2 (215.080), while % of satisfaction were(92.33%), regarding The time spent with patients when working in the DiabetesTelemedicine Clinic was sufficient the majority of our participant **Neutral** were (45.0%) while strongly agree were(35.0%)were a significantly associated were P< 0.001 and X^2 (19.000), while % of satisfaction were(71.67%) . Regarding the Diabetes Telemedicine Clinic, the number of patients that I can see virtually in one clinic is more than the number that I can see in the standard "in-person" clinic the majority of our

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participant Strongly agree were (87.0%) while Strongly disagree were(1.0%)were a significantly associated were P< 0.001 and X^2 (262.840), while % of satisfaction were(95.33%), regarding the Diabetes Telemedicine Clinic, there is less No-Shows rates among the patients with CONFIRMED appointments compared to that in the standard in-person clinic majority of our participant Strongly disagree were (63.0%) while Neutral were(24.0%)were a significantly associated were P< 0.001 and X^2 (82.840), while % of satisfaction were(50.00%) . Regarding The Diabetes Telemedicine Clinic protocol is simple enough that it does not require technical knowledge or skills, and HCPs do not need to attend a dedicated orientation session prior to Working there majority of participant Strongly agree were (42.0%) while Strongly disagree were(34.0%)were a significantly associated were P< 0.001 and X^2 (9.760), while % of satisfaction were(69.33%). Regarding my experience in the Diabetes Telemedicine Clinic would have been more satisfying if I had an orientation session on how to conduct a Telemedicine visit majority of our participant Strongly agree were (58.0%) while Strongly disagree were(23.0%)were a significantly associated were P< 0.001 and X^2 (55.240), while % of satisfaction were(78.33%). Regarding For the most, I am satisfied with my experience with the Diabetes Telemedicine Clinic the majority of our participant Strongly agree were (74.0%) while Strongly disagree were(7.0%)were a significantly associated were P< 0.001 and X^2 (153.160), while % of satisfaction were(89.00%), regarding Some of our patients will still benefit from offering the Diabetes Telemedicine Clinic after the COVID-19 pandemic is over the majority of our participant Strongly agree were (81.0%) while neutral were(16.0%)were a significantly associated were P< 0.001 and X^2 (209.560), while % of satisfaction were(92.67%), regarding will use the Diabetes Telemedicine Clinic for some of my patients in the future if this is made as an available option in our clinics the majority of our participant Strongly agree were (75.0%) while neutral were(20.0%)were a significantly associated were P< 0.001 and X^2 (171.520), while % of satisfaction were(90.67%) .

Table 4 Distribution of the Frequency of the participants in the rapid implementation of a Diabetes Telemedicine Clinic during the Coronavirus Disease 2019 among the Outbreak Our Protocol, Experience, and Satisfaction Reports .

Satisfaction			
		N	**%**
Satisfied		52	26
Not satisfied		148	74
Total		200	100
Chi-square	**X^2**	45.125	

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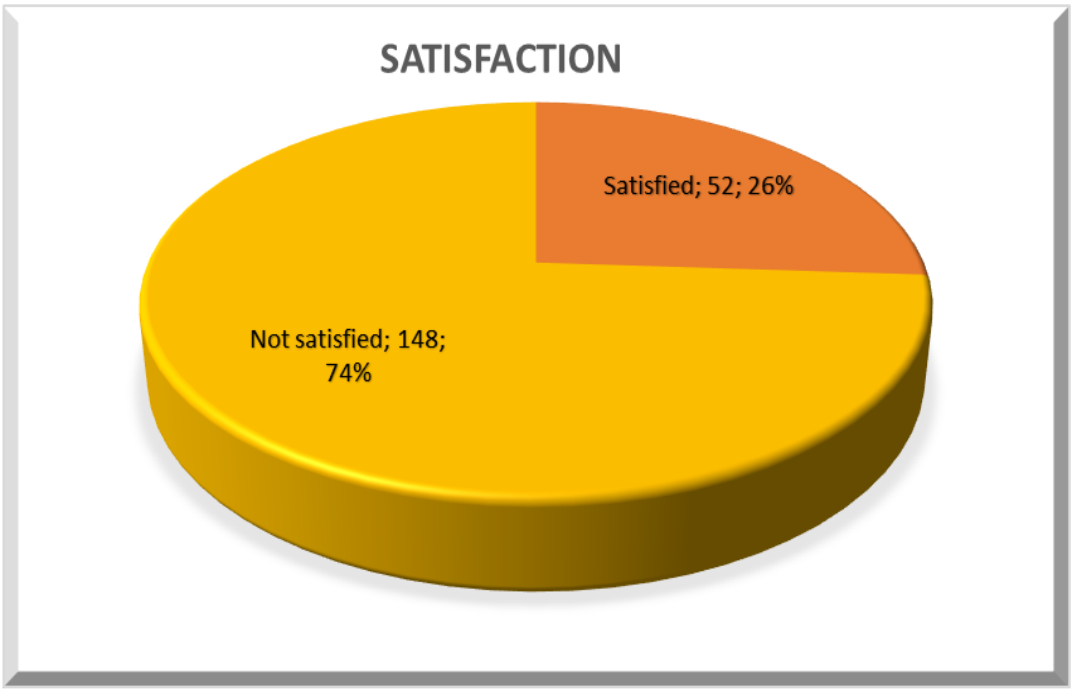
	P-value	<0.001*

Table 4 Regarding distribution of the participant with satisfaction and heave a significant relation between the satisfaction and frequency while P-value<0.001 and $X^2$45.125, participant toward Satisfaction study results show the majority of participant not Satisfied were(74.0%) while satisfied were(26.0 %)

Figure 1 Distribution of the Frequency of the participants in the rapid implementation of a Diabetes Telemedicine Clinic during the Coronavirus Disease 2019 among the Outbreak Our Protocol, Experience, and Satisfaction Reports .



Discussion

Our clinic was one of many clinics around the world that had no telemedicine infrastructure or prior experience with this model of care and found themselves navigating the process of transitioning to become fully virtual as the Coronavirus Disease 2019 outbreak situation evolved. Saudi Arabia was not far from putting telemedicine in practice during the Coronavirus Disease 2019 outbreak. The Ministry of Health in Saudi Arabia and the private sector had developed several telemedicine services before and during the the Coronavirus Disease 2019 outbreak as a part of the Saudi Vision (2030) that managed to invest in digital health and provide innovative digital solutions for the increasing need for healthcare(34) We undertook the current study to describe the rapid

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Received 08 November 2021; Accepted 15 December 2021.

implementation of a Diabetes Telemedicine Clinic During the Coronavirus Disease 2019 Outbreak Our Protocol, Experience, and Satisfaction Reports in Makkah Al-Mukarramah Saudi Arabia2022. shows there were 200 participants, shows that most of the participants (40.0%) were in the age group 55-64 years follow by the (29.0%) were the age group 35-44 years, the majority of them were female (65.0%) while male(35.0%), also regarding Nationality the majority of participant are Saudi were(88.0%) while Non- Saudi were(12.0%). regarding Educational levelthe majority of participant are University were(29.0%) while Primary school/below were(29.0%). Regarding the Job the majority of participant Private sector employee were (29.0%) while Not workingwere(29.0%) .(See Table 1)

In China, a study conducted on 161 tertiary hospitals representing 29 provinces showed that 93.8%of tertiary hospitals provided synchronous and asynchronous telemedicine services during the Coronavirus disease 2019 and 75.8% of hospitals had assigned telemedicine staff (34). Another study conducted on 48 public dental hospitals in China during the COVID-19 pandemic showed that 90% of hospitals changed their face-to-face consultations to web based and mobile-based consultations, and telemedicine triage to detect the cases that needed urgent intervention was carried out in 69% of the included hospitals (22)

Our current study results in a Health Care Providers' Satisfaction with the Diabetes Telemedicine Clinic during the Coronavirus Disease 2019 Outbreak are similar and further demonstrate the usefulness of the exclusive use of the Telemedicine to deliver follow-up care for participant with T2D.(27)

Satisfaction of the rapid implementation of a Diabetes Telemedicine Clinic during the Coronavirus Disease 2019 Outbreak Our regardin the Satisfaction of the rapid implementation of a Diabetes Telemedicine Clinic during the Coronavirus Disease 2019 Outbreak Our images and audios during the Telemedicine encounter were clear majority of our participant Strongly disagree were (53.0%) while Strongly agree were(29.0%) were a significantly associated were P< 0.001 and X2 (38.440), while % of satisfaction were(58.67%) . Regarding The Diabetes Telemedicine Clinic almost always met its patient care treatment goals majority of participant Strongly agree were (59.0%) while Strongly disagree were(9.0%) were a significantly associated were P< 0.001 and X2 (75.160), while % of satisfaction were(83.33%). (See Table 2,3)

Prior studies have shown similar high patients' satisfaction with telemedicine,34 and clinical outcomes of patients using telemedicine services were found to be comparable with those using traditional "in-person" clinic visits.(35) However, these studies were done in the United States, where telemedicine is better

established than it is in Saudi Arabia and many other countries around the world. Nonetheless, our results show that a simplified protocol of a Diabetes Telemedicine Clinic can serve the purpose and result in a similarly high patients' satisfaction when implemented in countries that lack the infrastructure of telemedicine. distribution of the participant with satisfaction and heave a significant relation between the satisfaction and frequency while P-value <0.001 and X2 45.125, participant toward Satisfaction study results show the majority of participant not Satisfied were(74.0%) while satisfied were(26.0 %)(See Table 4)

Conclusions

Telemedicine Clinic can offer a convenient way of expanding access to healthcare in Saudi Arabia accurately and cost-effectively while minimizing the risk of COVID-19 transmission. More efforts should be exerted to provide healthcare settings with technical equipment and training needed for telemedicine clinic in the healthcare. Regulations to implement telemedicine on a large scale in Saudi Arabia while protecting data privacy are also needed, as a result of adapting to the deliver healthcare for patients with Type 2 Diabetes during the COVID-19 Pandemic.

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