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Research Article

Patient Satisfaction with Virtual Care Compared to Clinic Visit among Diabetic Patients in Primary Care

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Abstract

Objective: This study evaluated the level of patient satisfaction with virtual care compared to clinic visits among diabetic patients in primary care. **Materials and methods:** A cross-sectional study was conducted in a primary health care center under the family and community department of Prince Sultan Military Medical City (PSMMC), Riyadh, Saudi Arabia. A questionnaire with 23 multiple-choice questions was developed for assessing patient satisfaction with virtual care compared to clinic visits. The Cronbach's alpha for the questionnaire of patient satisfaction with virtual care was 0.856, which reflects good reliability. **Results:** A total of 128 diabetic patients participated in the study, more than half (54.7%) of them were males. the highest percentages of "strongly agree" were "Virtual care enables me to save money and time (65.38%). On the other hand, the point on which the highest percentage (21.26%) of the participants "strongly disagree" was "I was satisfied with the quality of the picture (video) during the virtual care". the majority (85.83%) of the patients "always" take their medication (insulin or tablets) during virtual care, while almost half (46.03%, and 47.24%) "Sometimes" do regular exercise and eat healthy food during virtual care, respectively. **Conclusions:** The patients with diabetic who participated in this study showed a general high satisfaction level with virtual care, particularly among females. In addition, a good level of adherence to the diabetes medications was reported during the virtual care. Future large-scale, multicenter studies are required.

Keywords: Patient satisfaction; Virtual care; Diabetic patients; Primary care; Clinic visit

Introduction

Access to primary care remains a major issue in many parts of the United States, particularly in rural areas. Rural residents have higher rates of mortality from preventable chronic diseases such as diabetes, cardiovascular disease, and stroke than their urban counterparts [1]. Furthermore, these same communities face disproportionate difficulties in recruiting and retaining physicians and other healthcare professionals to manage these patients [2].

Healthcare has begun transitioning to more technological-delivered services, making it possible to receive healthcare services from the patient homes and outside of designated rural areas. Telemedicine is defined broadly by the World Health Organization as the delivery of health care services, where distance is a critical factor using electronic means for "the diagnosis, treatment, and prevention of disease and injuries, research and assessment, and for the continuing education of health care providers, all in the interests of improving the health and satisfaction of individuals and their communities [3]. In 2015, a Cochrane systematic review found that using telemedicine strategies was associated with increased access to care and improved clinical outcomes in single chronic diseases [4]. In several large randomized controlled trials, telemedicine interventions for diabetes care have been shown to be effective in lowering hemoglobin A1C levels [5-7].

Diabetes is a chronic disease that necessitates ongoing and comprehensive health care, such as education, monitoring, and

evaluation for microvascular and macrovascular complications to maintain target glycaemia. Due to a lack of transportation, travel costs, and lost time, the vast majority of diabetes patients do not receive care or delay receiving care [8]. In addition, for people with diabetes, avoiding non-essential contact with others during the ongoing COVID-19 pandemic, including their healthcare team, is even more important given the higher risk of severe outcomes from COVID-19 infection in this population [9]. For routine, ongoing care, the pandemic has necessitated a greater reliance on virtual modes of clinical care, ranging from phone calls to videoconferences. According to emerging evidence, patients with diabetes can quickly adapt to this new virtual clinical visit paradigm [10].

Satisfaction is an important indicator of the quality of healthcare services [11]. Several definitions of satisfaction have been proposed, but no agreement has been reached [12]. Although some authors have developed complex psychological models and linked them to human cognition, most studies regard satisfaction as a match between a patient's expectations and the services that he or she receives [13]. Researchers in the field of telemedicine have emphasized that the acceptance and satisfaction of both healthcare consumers and service providers is critical to the successful implementation and adoption of telemedicine services [14]. Despite numerous publications on patient satisfaction with telemedicine, it has been determined that this aspect of telemedicine requires additional research [15-17]. This study aimed to evaluate patient satisfaction with virtual care compared to clinic visits among diabetic patients in primary care.

Methods

This was a cross-sectional study that was conducted in a primary health care center under the family and community department of Prince Sultan Military Medical City (PSMMC), Riyadh, Saudi Arabia. The study population was all diabetic patients at any age who were having well-controlled glucose levels and receiving treatment in the study setting. Diabetic patients with poor glycemic control were excluded.

The questionnaire for the current study was a validated self-administrated questionnaire that was adopted from a previous similar study [18] after taking the authors' permission to answer the study objectives. The questionnaire consists of three main sections with a total of 23 items. The first section was about the socio-demographic variables (age, gender, level of education, income). The second section was about patients' satisfaction with virtual care (assessed by 16-item exploring four dimensions: equipment/technical issues; communication and rapport; clinical assessment; and program evaluation). While the third section assessed the adherence of diabetic patients to medication, diet, and exercise. The questionnaire was translated into the Arabic language. The participants were personally contacted. They were briefed about the purpose of the research and the questionnaire used in the study. After seeking the consent of the patient and assuring them that their responses would be kept confidential and would be used for research and academic purpose only, necessary instructions and guidelines were provided to them for properly filling the questionnaire. After this, the questionnaire was provided to them and they were requested to fill up the questionnaire as per the instructions given, and after completion of the questionnaire they were asked to it back and they were thanked for their participation and cooperation. The Cronbach's alpha for the questionnaire of patient satisfaction with virtual care was 0.856 which reflects good reliability.

Statistical analysis

Data were analyzed by using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as mean ± standard deviation and categorical variables were expressed as percentages. t-test and one-way ANOVA were used for continuous variables. The Cronbach's alpha was used to assess the reliability of the questionnaire of patient satisfaction with virtual care. A p-value <0.05 was considered statistically significant.

Results

A total of 128 diabetic patients participated in the current study, more than half (54.7%) of them were males, the highest percentages (46.9%, 28.3%) were in the age group of 46-65 years old, and have a secondary school educational level, respectively. Data is shown in table 1.

		Number	%
Gender	Male	70	54.7
	Female	58	45.3
Age	less than15	1	.8
	age 15-45	32	24.6
	age 46-65	61	46.9
	more than 65	36	27.7
Education level	illiterate	23	18.1
	Primary	23	18.1
	intermediate	16	12.6
	Secondary	36	28.3
	University	29	22.8

Table 1: Demographic characteristics of the participants.

Patients' responses about the questionnaire of the Patient satisfaction with virtual care are shown in table 2. The results revealed that points scored the highest percentages of "strongly agree" were " Virtual care enables me to save money and time" and " I was satisfied with the quality of the sound (audio) during the virtual care" by 65.38% and 60.77% of the participants, respectively. On the other hand, the point on which the highest percentage (21.26%) of the participants "strongly disagree" was "I was satisfied with the quality of the picture (video) during the virtual care". When participants were asked if they would like to use telehealth again in the future, the highest percentage (30.77%) of them responded as "agree". Overall, it was noticed that almost half of the participants "strongly agree" on most of the addressed points.

	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Number	%	Number	%	Number	%	Number	%	Number	%
I was satisfied with the quality of the sound (audio) during the virtual care	2	1.54	5	3.85	3	2.31	41	31.54	79	60.77
I was satisfied with the quality of the picture (video) during the virtual care	27	21.26	5	3.94	22	17.32	39	30.71	34	26.77
I experienced NO technical difficulties during the virtual care	7	5.43	5	3.88	8	6.20	35	27.13	74	57.36
The virtual care did not make me feel nervous and uncomfortable	9	6.92	3	2.31	8	6.15	43	33.08	67	51.54
I could easily explain my medical problems to the doctor in the virtual care	4	3.10	5	3.88	7	5.43	41	31.78	72	55.81
I took my doctor's advice given by virtual care seriously	6	4.65	1	0.78	9	6.98	46	35.66	67	51.94
I was confident that the clinician could assess my condition via virtual care as if I was there	14	10.77	6	4.62	17	13.08	35	26.92	58	44.62
I believe the doctor understood my blood sugar situation during the virtual care	6	4.62	6	4.62	8	6.15	43	33.08	67	51.54
I was confident that the doctor could evaluate my medication requirements (insulin or tablets) via virtual visit	3	2.31	10	7.69	16	12.31	37	28.46	64	49.23
The lack of physical contact in a virtual visit is NOT a problem for managing diabetes	24	18.46	9	6.92	21	16.15	29	22.31	47	36.15
Virtual care enables me to save money and time	1	0.77			10	7.69	34	26.15	85	65.38
Virtual care improves my access to specialist care	7	5.43	9	6.98	18	13.95	31	24.03	64	49.61
I would like to use telehealth again in the future	23	17.69	12	9.23	21	16.15	40	30.77	34	26.15
I believe that a virtual visit is good for achieving good control of my diabetes	18	13.85	8	6.15	25	19.23	36	27.69	43	33.08
I prefer to have my next consultation via virtual visit	24	18.60	13	10.08	20	15.50	33	25.58	39	30.23

Table 2: Patients' responses about the questionnaire of the Patient satisfaction with virtual care.

Patients' responses about the questionnaire of adherence of diabetic patients to medication are shsown in Figure 1. The results showed that the majority (85.83%) of the patients "always" take their medication (insulin or tablets) during virtual care, while almost half (46.03%, and 47.24%) "Sometimes" do regular exercise and eat healthy food during virtual care, respectively.

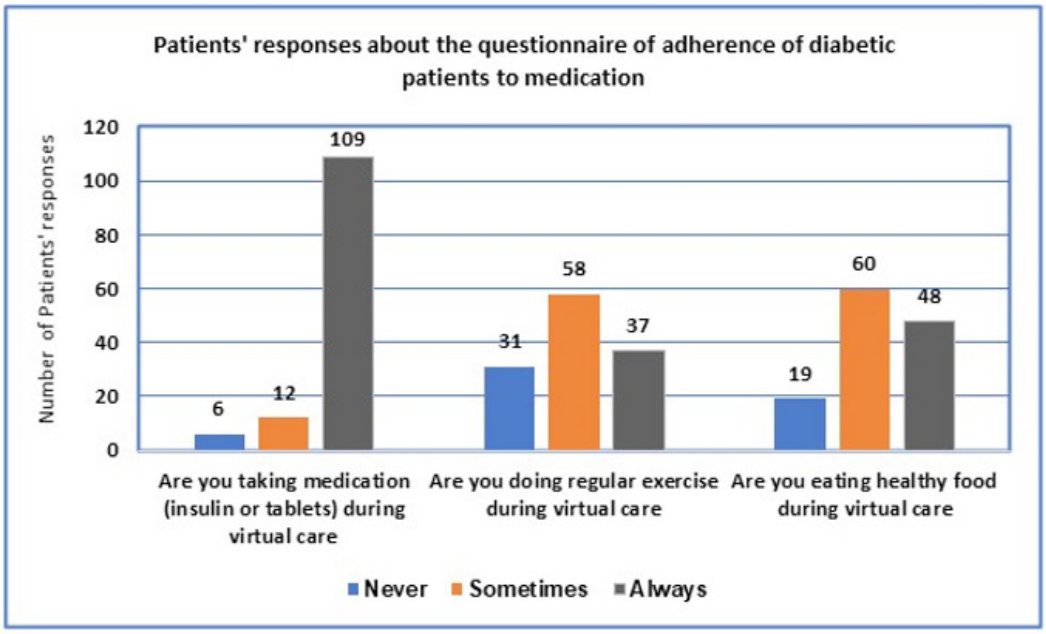

Figure 1: Patients' responses about the questionnaire of adherence of diabetic patients to medication.

Table 3 shows the mean total score for the patient satisfaction with the virtual care questionnaire and adherence of diabetic patients to the medication questionnaire. It was found that diabetic patients were highly satisfied with the equipment technical issues, and communication and rapport, with mean (±SD) scores of 12(±2.4) and 12.76(±2.39) out of 15, respectively. For the clinical assessment, the mean score was 15.78(±3.8) out of 20, indicating a good satisfaction level. The mean score for the program evaluation was 18.92(±4.84) out of 25, indicating a general good evaluation. For the overall satisfaction score, it was 59.46 (±10.24) out of 75 and this refers to a high satisfaction level.

For the adherence of diabetic patients to medication, it was generally good with a total mean score of 7.07(±1.30) out of 9.

	Minimum	Maximum	Mean	SD
Patient satisfaction with virtual care questionnaire				
Equipment technical issues (out of 15)	3.00	15.00	12.00	2.40
Communication and rapport(out of 15)	3.00	15.00	12.76	2.39
Clinical assessment(out of 20)	6.00	20.00	15.78	3.81
Program evaluation(out of 25)	5.00	25.00	18.92	4.84
overall satisfaction(out of 75)	34.00	75.00	59.46	10.24
Adherence of diabetic patients to medication questionnaire				
Adherence(out of 9)	5.00	9.00	7.07	1.30

*For Patient satisfaction with virtual care questionnaire we used Likert scale with 5 points (Strongly disagree=1, Disagree=2, Neutral=3, Agree=4, Strongly agree=5) high score indicates to high satisfaction and low score indicates to low satisfaction; **For Adherence of diabetic patients to medication questionnaire we used Likert scale with 3 points (Never=1, Sometimes=2, Always=3) high score indicates to high adherence and low score indicates to low adherence).

Table 3: Mean for Total score for the Patient satisfaction with virtual care questionnaire and Adherence of diabetic patients to medication questionnaire.

The results of the current study showed that female diabetic patients have a significantly higher satisfaction level of clinical assessment via virtual care than male patients with mean scores of 16.74(±3.30) vs. 14.97(±4.04), with a P-value of 0.008. Similarly, the overall satisfaction with the virtual care was significantly (P 0.041) higher among females at 61.50 (±9.44) compared to males at 57.79 (±10.73). in contrast, there were no significant differences between the two genders in terms of satisfaction with technical issues, communications and rapport, program evaluation, and medication adherence, since all P values were >0.05, as shown in Table 4.

	Male		**Female**		**P value**
	Mean	**SD**	**Mean**	**SD**	
Patient satisfaction with virtual care questionnaire					
Equipment technical issues (out of 15)	11.81	2.72	12.22	1.97	0.340
Communication and rapport(out of 15)	12.61	2.63	12.86	2.08	0.562
Clinical assessment(out of 20)	14.97	4.04	16.74	3.30	0.008*
Program evaluation(out of 25)	18.39	4.84	19.67	4.82	0.136
overall satisfaction(out of 75)	57.79	10.73	61.50	9.44	0.041*
Adherence of diabetic patients to medication questionnaire					
Adherence(out of 9)	7.21	1.20	6.95	1.39	0.268

Table 4: Mean for Total score for the Patient satisfaction with virtual care questionnaire and Adherence of diabetic patients to medication questionnaire by gender.

The mean of the total score of patient satisfaction with virtual care questionnaire and adherence to medication questionnaire did not differ significantly by the age group, as all P values were >0.05. Though it was noticed that the highest scores were for the youngest age group (<46 years old), as shown in Table 5. Similar results were obtained when the satisfaction scores were calculated according to the educational level, and all the differences were statistically non-significant (P>0.05) as shown in Table 6.

	less than 46		age 46-65		more than 65		P value
	Mean	SD	Mean	SD	Mean	SD	
Patient satisfaction with virtual care questionnaire							
Equipment technical issues (out of 15)	12.76	2.05	11.82	2.33	11.61	2.69	0.100
Communication and rapport(out of 15)	13.27	2.07	12.67	2.39	12.44	2.66	0.331
Clinical assessment(out of 20)	16.52	3.38	15.16	3.87	16.14	4.02	0.209
Program evaluation(out of 25)	19.58	4.76	18.38	4.89	19.25	4.87	0.467
overall satisfaction(out of 75)	62.12	9.55	58.03	10.19	59.44	10.73	0.182
Adherence of diabetic patients to medication questionnaire							
Adherence(out of 9)	7.09	1.33	7.18	1.24	6.86	1.38	0.498

Table 5: Mean for Total score for the Patient satisfaction with virtual care questionnaire and Adherence of diabetic patients to medication questionnaire by age.

	Illiterate		Primary		Intermediate		Secondary		University		P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Patient satisfaction with virtual care questionnaire											
Equipment technical issues (out of 15)	11.65	2.90	12.43	1.80	11.81	2.20	11.86	2.39	12.21	2.58	0.801
Communication and rapport(out of 15)	12.83	2.79	12.22	2.58	12.38	1.93	12.64	1.91	13.31	2.71	0.534
Clinical assessment(out of 20)	15.83	4.06	15.57	4.55	15.50	3.67	15.67	3.51	16.03	3.78	0.990
Program evaluation(out of 25)	18.96	5.19	18.83	5.32	18.88	4.59	19.00	4.48	18.79	5.09	0.999
overall satisfaction(out of 75)	59.26	10.46	59.04	11.57	58.56	10.35	59.17	9.71	60.34	10.52	0.983
Adherence of diabetic patients to medication questionnaire											
Adherence(out of 9)	6.74	1.29	7.27	1.32	6.47	0.83	7.22	1.31	7.46	1.35	0.078

Table 6: Mean for Total score for the Patient satisfaction with virtual care questionnaire and Adherence of diabetic patients to medication questionnaire by Educational level.

Discussion

We set out this cross-sectional survey study to assess diabetic patients' satisfaction with the virtual care, and their adherence to the diabetes medications they use. The results highlighted a general high satisfaction level with the virtual care, and a good level of adherence to the medications.

The results of the current study are in line with a previous similar study, which showed that diabetic patients who were seen remotely by endocrinologists via videoconferencing were generally satisfied with remote consultation [18]. Our survey showed that almost one-quarter of the diabetic patients were concerned with the lack of physical contact in the virtual visit. Those patients may be concerned about the long-term complications of diabetes for which physical examination is a must such as diabetic neuropathy and retinopathy. If this is the scenario, the treating physician would ask for a physical examination to be completed at the patient's next clinical visit. Such concern was also reported by almost the same percentage of patients in a previous study [18]. One of the most serious concerns in remote consultations is the inability to perform a physical examination and the decrease in nonverbal communication [19]. These characteristics may contribute to the dissatisfaction of patients. A recent comprehensive literature review, on the other hand, reveals that video conferencing has been used for remote consultation of patients in a variety of medical disciplines, including those that may rely more on physical examination, such as neurology [20].

However, evidence on cost savings has been varied, and it is largely reliant on whether the analyses are undertaken from a system viewpoint (i.e., payer) or from a societal perspective, which includes the patient perspective [21].

It was previously reported that patients can save vehicle costs or waste time in traffic with video consultations, this is in addition to that virtual care could save the cost of the health system's operations [22]. Although telemedicine is expensive in the beginning, healthcare systems should see a positive return on investment over time due to more patients and less staff [22]. According to a scoping review article, health services adopting telehealth should be motivated by benefits other than cost savings. According to the available research, while telehealth produces overwhelmingly positive patient benefits and boosts productivity for many services, it does not typically reduce the cost of care delivery for the health systems [23]. Most of the diabetic patients who participated in the current study strongly agree that virtual care enables saving money and time.

Improved access to care for patients who do not have family physicians or who reside in distant places without doctors is one potential benefit of the virtual care clinic approach. However, patients should not use these applications as their primary point of contact with the healthcare system if they do not already have a relationship with a family physician [24]. The implementation of virtual medical care in Canada has been accelerated by COVID-19. Virtual care can help people get better access to healthcare, especially if they live in distant areas or have health issues that make seeing a doctor in person difficult or dangerous [24]. Almost three-quarters of the diabetic patients who participated in the current study were either agree or strongly agree that virtual care improve the access to specialist care.

A recent systematic review of published articles on diabetes telehealth over the last two decades found that there was a significant improvement in A1C levels, a reduction in

diabetes complications, and a reduction in healthcare costs [25]. It demonstrated that technology can assist patients with diabetes in overcoming common challenges such as insufficient time spent with their healthcare providers, a lack of access to specialists and diabetes educators, and insufficient support for proper self-management [25].

In the current survey, there is a considerable number of respondents who weren't satisfied with the quality of the video during the consultation. A few numbers of the respondents indicated technical difficulty with the virtual care, which might reflect some problems in the infrastructure and networking available in the assigned virtual clinic. Better findings were previously reported [18]. Where all of the respondents were pleased with the video quality during the consultation, one respondent expressed dissatisfaction with the audio transmission, and none of the respondents reported any technical difficulties with the videoconferencing [18].

In line with the current study, differences in satisfaction between male and female participants were reported, where females were significantly more satisfied than males with offering virtual visits to connect with patients [26]. Another study showed that the female gender is one of the predictors of liking telehealth [27]. This might be because women are more likely than men to visit doctors and consume healthcare services in general; therefore, telehealth seems to be uniquely attractive to them. In addition, the time savings and convenience of virtual care are especially helpful for caregivers, a historically female role.

The current study has some limitations. The number of subjects participating in this study was small and taken from only one health institution; therefore, the results cannot be generalized to the whole kingdom. Diabetes was the only health condition investigated.

Conclusion

Diabetic patients who participated in the current study showed a general high satisfaction level with virtual care, particularly among females. In addition, a good level of adherence to the diabetes medications was reported during the virtual care. Future large-scale, multicenter studies are required.

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