Patients' Attendance to The Virtual Compared to The In-person Complimentary Outpatient Clinics at a Tertiary Care Hospital in Western Saudi Arabia: A Comparative Cross-sectional Study

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Abstract

Background: During the COVID-19 pandemic, outpatient clinics in National Guard-Health Affairs Hospitals, Saudi Arabia, have shifted their health-care services towards virtual clinics to keep up with patient appointments while maintaining infection control precautions. This study aimed to determine if patient attendance compliance has changed by implementing virtual "phone call" appointments compared to the conventional physical appointments in outpatient clinics.

Methods: This comparative cross-sectional study was conducted by comparing patients' demographic information, and compliance to virtual calls and physician recommendations during 2020 with the regular physical attendance clinics in 2019. Patient data was collected from the electronic medical records after randomly selecting the sample for each year from 6 main outpatient clinics.

Results: During the 4-month period of 2020 (March-June), in which virtual clinics were implemented, there was a significant decrease in the attendance compliance when compared to the same period in 2019 conventional clinics. Data were analyzed for 404 and 407 patients' medical records from each year, respectively. The drop in the clinic attendance compliance was the highest in the pediatric oncology clinic. Moreover, physician orders of investigations and medications were significantly reduced.

Conclusion: COVID-19 pandemic had a significant negative impact on patient care. Although that impact was seen greatest among those with chronic conditions and oncology patients, it was an essential step towards infection control during this difficult period. However, the pandemic is an opportunity to establish a comprehensive virtual care system that will ensure easy access and continuity of patient care.

Key words: virtual clinic; patient attendance; telemedicine; telehealth

Introduction

Living in the post digital era virtual healthcare has played a huge role in modern day medicine, especially during the event of COVID-19. A virtual clinic (VC) is a scheduled appointment where the healthcare professional contacts their patients via phone/ video call, to offer the clinical consultation, treatment planning, and advice (ISD Scotland 2020) (1). It may also be defined as an integrated web- based technology that combines self-management, data sharing and communication between patients and professionals (2).

The services that can be provided virtually differ according to the clinic or the virtual system. They could be a simple consultation and plan as mentioned in the definition and they could be more extensive. A prospective evaluation of a virtual urology clinic states that they were able to review imaging, lab results, deal with patient doctor query, refer to imaging or an intervention, and discharge from their clinic all within the VC appointments (3). Virtual healthcare services have been implemented all over the world, and are also known as telemedicine, telehealth, remote medicine, and e-health. After the emergence of the COVID-19 pandemic, National Guard Health Affairs (NGHA) in Saudi Arabia has activated the virtual clinics initiative since April 2020 in their outpatient clinics, in which patient- doctor contact occurs through telephone call (4).

Many other countries have also used virtual clinic appointments but have faced poor attendance. The rate of attendance can be applied to virtual clinics just as it has for conventional clinics. Ellis et al. led a large-scale data analysis on patient medical appointment attendance and stated that the rate of missed appointments at UK hospitals was ~12% until 2012 (5). Although this study is on a smaller scale, it would be interesting to see if the rate of missed appointments is similar to that of other countries. In light of COVID-19, virtual clinics are being implemented more worldwide, and to study their applicability attendance needs to be taken into account. A surgery outpatient clinic considering VOC as an alternative to actual clinics for patient follow-ups found that 91.6% complied with the virtual clinic compared to 81.4% of the actual outpatient clinic. Moreover, a study in Ireland compared the VOC to the conventional OPC patient attendance and satisfaction which found that patients attending the VOC were more pleased with their visit in comparison to patients attending the OPC (6).

Virtual Medicine has its advantages and disadvantages. A local study done in Taif, KSA, reports that physicians believe it could improve the effectiveness of therapeutic interventions in addition to serving stable patients living in remote areas, but for newly undiagnosed patients, the inability to perform physical examination was a setback to reach the correct diagnosis (7). In Saudi Arabia, the COVID-19 outbreak urged the precautionary measures of converting the outpatient clinics to virtual clinics which are somewhat a new technology, not applied prior to the pandemic, and attendance to these clinics is not yet studied.

The aim of the study was to determine if patient attendance has improved using virtual clinics, which could possibly be applicable in the future after the pandemic. The primary objective was to estimate the percentage of patients who were committed to (attend) their virtual appointments during 2020 in comparison to the conventional outpatient physical attendance during 2019 at King Abdulaziz Medical City, Jeddah, in western Saudi Arabia.

Methods

Study Design, Area, and settings

This comparative cross-sectional study was conducted at King Abdulaziz Medical City, Jeddah. This hospital is a tertiary care hospital with 750 beds that serve the national guard employees and their dependents. Patients' medical records numbers (MRNs) were identified through the Health Information Management department. Other patients' data were collected from the Electronic Medical Record (BestCare®).

Identification of study participants and sample details

The patients included in this study were those with appointments at virtual clinics during (March -June) 2020 or conventional in-person outpatient clinic during (March-June) 2019. Exclusion criteria were patients with missing records, or if they were already admitted on the same day of the outpatient appointment.

The sample size was determined by assuming the percentage of attendance of the virtual clinic is 90%, then at 3% margin of error, 95% confidence interval and 80% study power, the estimated sample size was 384. This number was applied to patients in 2020 and 2019 (total sample size was 768). For the sake of simplifying the data collection, the total sample size was increased to 800 (400 from each year). The 400 participants were entered as followed: 100 from internal medicine specialties clinics, 100 from surgical specialties clinics, 50 from obstetrics and gynecology clinics, 50 from pediatric clinics, 50 from adult oncology clinic, and 50 from pediatric oncology clinics.

A systematic sampling technique was applied to select the study sample among patients with appointments since start of the virtual clinic throughout the end of the four-month period in 2020, compared to patients with conventional appointments during the same period in 2019.

Data Collection Process

With the help of medical records, an audit of all patient files with an appointment at a virtual clinic were labeled as show or no show during the 4-month period (during COVID pandemic 2020) - from March to June. The control group were all patients with appointments at the same clinics being evaluated during the same 4-month period, the year before (2019). The percentage of patients who showed in the virtual clinics was compared to the percentage of those who showed to the in-person clinic. The patients were considered as "show" as long as there was a check-in, or a physician note up to 2 weeks after the appointment date for that specific clinic.

Study variables also collected from BESTCare® included patient age, gender, eligibility, main diagnosis, specialty clinic, intervention (medication, investigation). The medication was reported as prescribed or not, and the ordered investigations, if any, were reported to be labs and/or imaging followed by a record if they were done (completed) or not.

Approval of the IRB office of King Abdullah International Medical Research Center (KAIMRC) was obtained (RJ20/180/J). Patient's information was preserved, and no names or sensitive information were taken. All study data collection forms were secured under the responsibility of the study principal investigator.

Data Analysis

Data was analyzed using IBM SPSS version 26. Descriptive statistics (mean, standard deviation, median, interquartile range, frequency, percentage) were applied. Chi square test or Fisher's Exact test, as appropriate was used to compare categorical variables. Student's t test and Analysis of variance (ANOVA) was used to compare means of two or more than two groups, respectively. Level of significance was determined at p value < 0.05.

Results

Attendance and Demographics

Retrospective data from the 2020 sample (N=407) showed a total attendance of 186 patients (45.7%). Demographic data from 2020 virtual clinic sample showed a mean age of 39 years (IQR 14-58), and the appointments were distributed as follows: female (n=251, 61.7%) and male (n=156, 38.3%).

In comparison, data from the 2019 sample (N=404) showed a total attendance of 283 (70.0%). Demographic data from that years' sample showed a mean age of 41 years (IQR 13-60), and the appointments were almost distributed evenly among the subjects where (n=218, 54.5%) were female and (n=182, 45.5%) were male.

Eligibility and Diagnosing Clinic

Military dependents in both the physical and virtual clinic had the most compliance.

Intervention and Medication

Distribution of the sample among the clinics was generally equal among the two groups. However, number of investigations ordered differed between the virtual and physical clinics. The 2019 clinic demonstrated that 184 (65%) of the patients who attended the clinic had investigations ordered for them. Among them, 149 (81.0%) completed the recommended investigations at the hospital while the remaining 35 (19.0%) didn't go for their investigations. The 2020 clinic showed that 83 (44.6%) patients that attended the virtual appointment had investigations ordered, where 67 (80.7%) had completed their investigations at the hospital and 16(19.3%) did not go for their ordered investigations. As for the medication for those who attended, 168 out of 283 (59.4%) of the physical clinic patients were prescriped medication, compared to the virtual clinic patients where only 84 out of 186 (45.2%) of them were prescribed medication.

Virtual appointments had significantly lower attendance compared to conventional appointments (P value 0.001), as demonstrated in Table1. When looking at total appointments, females had more virtual appointments, and males had more physical appointments, but there was no significant difference in the attendance between the genders in the physical clinics (P value 0.71) and a slight significance in the virtual clinics as males had better attendance (P value 0.047).

Fisher exact analysis showed no relation between eligibility and type of clinic, physical and virtual, (P value 0.209), nor did the chi squared analysis for the 6 main departments or clinics (P value 0.998). When looking more closely into the virtual clinic, attendance in the surgery and pediatric clinics were significantly better, while least responses to the calls were from patients with appointments at the pediatric oncology clinic (P value 0.006).

Regarding the variables (investigations and medication) there was a noticeable statistically significant decrease in ordering investigations in the virtual clinic. The "labs/imaging" together was the most ordered in the physical clinic, in contrast, for the 2020 virtual clinic the labs and imaging together were least needed (P value 0.001), and in fact the majority did not have investigations ordered at all. Analysis showed no difference between virtual clinic compared to the in-person clinic (p-value 0.961) when it comes to completing the ordered investigations. As for medication, results display significant decrease in prescriptions in the virtual clinic compared to the physical clinic (p value 0.003).

Discussion

This study demonstrated that the attendance compliance was significantly reduced in the new 2020 virtual clinics, which was different than results of a similar study in the UK done in an otolaryngology outpatient clinic, where the investigators reported a decrease in the "no show" rate in virtual appointments compared to face- to-face visits (8). However, the current study's low attendance was when the outpatient clinics were only operative virtually in 2020 and only operative physically in 2019, and the results could have been different if the virtual clinic was incorporated into the physical clinic , so that both would be running at the same time. McKirdy and Imbuldeniya published a study where they incorporated virtual clinics into the physical clinic when following up with patients, and they reported significant (75%) reductions in the "non attendee" rate (9). Unfortunately, due to the unexpected shift in the method of delivering healthcare during the COVID-19, a telehealth system in the national guard-health affairs prior to this pandemic was not well-established. Thus, the attendance rate has decreased since many of the patients were unfamiliar with virtual appointments and telemedicine, seen especially in the elderly population. Schulz et al. stated that telehealth would be successful during the pandemic only

Table 1: Profile of Study Participants and Healthcare Provided

	Attending Clinic				Total	p-value
	Physically 2019		Virtually 2020			
	n	%	n	%		
Attend clinic or respond to call						<0.001*
Yes	283	60.3	186	39.7	469	
No	121	35.4	221	64.6	342	
Total	404	49.8	407	50.2	811	
Gender						0.039*
Female	218	46.5	251	53.5	469	
Male	182	53.8	156	46.2	338	
Total	400	49.6	407	50.4	807	
Eligibility						0.209**
Military dependents	143	45.7	170	54.3	313	
Letter of Exception	60	48.4	64	51.6	124	
Exception Disease (onc)	54	45.0	66	55.0	120	
Military	37	51.4	35	48.6	72	
HCW dependents	27	58.7	19	41.3	46	
Healthcare worker (HCW)	10	31.3	22	68.8	32	
Business	4	80.0	1	20.0	5	
NGH Non-dependent	2	25.0	6	75.0	8	
Emergency Non-Saudi	1	100.0	0	0.0	1	
Students (College)	1	50.0	1	50.0	2	
Organ Donors	1	100.0	0	0.0	1	
Total	340	47.0	384	53.0	724	
Dx Clinic (sub-specialty)						0.021**
Adult medical oncology	50	50.0	50	50.0	100	
Oncology-pediatrics	46	46.9	52	53.1	98	
Obstetrics and gynecology	45	48.9	47	51.1	92	
Orthopedics	24	49.0	25	51.0	49	
Ophthalmology	22	51.2	21	48.8	43	
Nephrology	13	35.1	24	64.9	37	
Endocrinology & metabolism	23	69.7	10	30.3	33	
Urology surgery	13	40.6	19	59.4	32	
Gastroenterology	18	58.1	13	41.9	31	
Internal medicine	19	65.5	10	34.5	29	
Adult pulmonary	13	46.4	15	53.6	28	
ENT	13	56.5	10	43.5	23	
General pediatric	13	56.5	10	43.5	23	
General surgery	9	45.0	11	55.0	20	
Pediatric diabetic	5	25.0	15	75.0	20	
Pediatric neurology	8	44.4	10	55.6	18	
Neurology	0	0.0	17	100.0	17	
Rheumatology	9	56.3	7	43.8	16	
Neurosurgery	8	53.3	7	46.7	15	
Pediatric neonatology	5	50.0	5	50.0	10	
Vascular surgery	6	60.0	4	40.0	10	
GYN and oncology	5	62.5	3	37.5	8	
Infectious disease	5	71.4	2	28.6	7	

Table 1: Profile of Study Participants and Healthcare Provided (continued)

Pediatric endocrinology	7	100.0	0	0.0	7	
Pediatric gastroenterology	4	57.1	3	42.9	7	
Pediatric oncology	4	66.7	2	33.3	6	
Pediatric pulmonary	1	16.7	5	83.3	6	
Plastic surgery	5	83.3	1	16.7	6	
Pediatric nephrology	2	66.7	1	33.3	3	
Pediatric rheumatology	2	66.7	1	33.3	3	
Pediatric surgery	2	66.7	1	33.3	3	
Pediatric metabolic	1	50.0	1	50.0	2	
Pulmonology	1	50.0	1	50.0	2	
Respiratory	1	50.0	1	50.0	2	
Thoracic surgery	1	50.0	1	50.0	2	
General OB and Gyn	0	0.0	1	100.0	1	
Pediatric asthma	1	100.0	0	0.0	1	
Ped-development	0	0.0	1	100.0	1	
Total	404	49.8	407	50.2	811	
Clinic						0.998*
Surgery	103	50.7	100	49.3	203	
Internal medicine	102	50.5	100	49.5	202	
Peds oncology	50	48.1	54	51.9	104	
Pediatric	49	48.5	52	51.5	101	
OBGYN	50	49.5	51	50.5	101	
Adult oncology	50	50.0	50	50.0	100	
Total	404	49.8	407	50.2	811	
Investigation						**<0.001***
None	99	49.0	103	51.0	202	
Labs	115	61.0	74	40.0	189	
Labs/Imaging	39	90.7	4	9.3	43	
Imaging	30	85.7	5	14.3	35	
Total	283	60.3	186	39.7	469	
Investigation completed						**0.961***
Done	149	69.0	67	31.0	216	
Not done	35	68.6	16	31.4	51	
Total	184	69.0	83	31.1	267	
Medication						**0.003***
Prescribed	168	66.7	84	33.3	252	
Not prescribed	115	53.0	102	47.0	217	
Total	283	60.3	186	39.7	469	

*chi-square test **fisher exact test

if the program was previously established since it would take months to years to have a fully running online health delivery system (10). The implementation of this online outpatient clinic in Australia that started in 2017 resulted in significant reduction in the failure-to-attend rate during the 2020 pandemic (10). Whatever may be the cause of low attendance, justifications are not simply explained by logistics, rather complex psychosocial factor as described in a study conducted to assess non-attendance at diabetic outpatient clinics (11).

In-person appointments can sometimes be inconvenient for the patient for a variety of reasons. Sabit et al. looked at the predictors of poor attendance to a pulmonary rehabilitation program and concluded that attendance was affected by frequent admissions, degree of symptoms, and the long journey time among other causes (12).

This study's findings also revealed that virtual clinics were associated with less investigation orders and less medication prescriptions. The impact of such reduction requires further investigation to assess its cost-effective value on hospital resources and finances. It is well known in any hospital that there is a number of unnecessary laboratory and imaging ordered, as Strockbine et al. applied a clinical decision support system in ordering their lab investigations, they reported significant reduction in required screening, labs, and annual costs (13). Relatedly, Mubaraki et al. report that 44% of physicians included in the study thought the quality of care was enhanced using telemedicine and even with the difficulties that came with it, it should still be a considered medical service for patients living in rural areas (7). Specific applications for telehealth in the commuting population can be used to screen for severe cases and monitor clinically stable patients as stated in a Brazilian study (14).

Telemedicine has been used in the U.S. military for years, and Hwang et al. evaluated the tele-dermatology program documenting that 98% of complaints were consulted within the same day including diagnoses and prescriptions, in addition to avoidable location evacuations (15). This study demonstrated the usefulness of virtual clinics in remote areas. Similarly, Karwowski et al. conducted a study on telemedicine in the Obstetrics and Gynecology field and reported that 10% of their study subjects were in another country at the time of their virtual consultation, demonstrating the convenience of telemedicine systems (16). That convenience is not limited to the patient but to the caregiver as well. An orthopedic clinic evaluated the proportion of patients with simple clavicle fractures that were discharged virtually and followed up with the patients a year later, to find the majority of those patients satisfied with their treatment and recovery. The authors concluded that the virtual appointments benefitted both patient by fewer clinic visits and physician by saving time for complex cases (17).

As for the limitations of this study, they were related to the general acceptance and familiarity of the public toward telehealth care, especially that the data were collected during the early months of the pandemic with first widespread use of the virtual clinics. This observation may have obscured the results towards less attendance when the "call appointments" were first introduced. Social culture in Saudi Arabia is shifting to accept this mode of healthcare delivery among the young to middle aged population, and since the mean age of this study's sample was 40 years, an improvement in the attendance is expected once online or phone appointments are more familiarized. An active way of improving attendance would be to make the online platform user friendly as Li et al. stated (18), and in this case, it would be to prepare the patient for the call and ensure they have access for assistance, especially the elderly. A recent published review emphasized on the importance of the infrastructure to provide a good quality virtual patient-physician confidential session (19).

Cultural familiarity was not the only limitation, as other factors including availability of good communication infrastructure, especially in the rural areas may have also played roles in the low attendance. Although telemedicine provided care for geriatric patients worldwide, a recent review found that these services were limited because of lack of outreach communication facilities, and in order to optimize health care delivery, there needs to be greater government investments to engage the elderly, their care givers and healthcare providers (20).

Conclusion

This study was conducted to determine if attendance was improved using the virtual clinics compared to the conventional physical clinics, however, the findings showed lower attendance compliance. Both male and female patients had almost similar attendance compliance when comparing virtual to physical clinics. Moreover, the association of specialty clinics to virtual attendance differs, for example the pediatric and surgery clinics showed good response, but the oncology and OBGYN clinics had low attendance. Another finding was that lab work up and imaging were ordered less, and prescriptions also decreased when the clinic converted virtually, which raises the question of needing them in the first place, but the rate of completing the investigations in the virtual appointments did not differ from the physical appointments. The low compliance to the virtual clinics may be attributed to poor awareness of patients and families about telehealth care and limitation of infrastructure. Given that virtual appointments are comparatively new to governmental hospitals in Saudi Arabia, they are expected to be used more in the near future and accepted as a mode of healthcare delivery for selected patients. The circumstances to which the virtual appointments system was applied may not have been ideal, and the low attendance rate proves that. But it provided an opportunity to explore how to improve telehealth and deliver care in the best method possible to the patients.

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