MARSHALL JOURNAL OF MEDICINE
Expanding Knowledge to Improve Rural Health.

Volume 7 | Issue 2 Article 8

2021

Mr. Watson, come here-I want to see you: One rural residency program's rapid pivot to telemedicine during the pandemic

William J. Crump, Diana M. Nims, and Douglas J. Hatler

Recommended Citation

Crump, William J.; Nims, Diana M.; and Hatler, Douglas J. (2021) "Mr. Watson, come here-I want to see you: One rural residency program's rapid pivot to telemedicine during the pandemic," *Marshall Journal of Medicine*: Vol. 7: Iss. 2, Article 8.

DOI: 10.33470/2379-9536.1314

Available at: https://mds.marshall.edu/mjm/vol7/iss2/8

DOI: 10.33470/2379-9536.1314

Author Footnote: We acknowledge the detailed visit report summaries provided by Stephanie Crick, Practice Manager and Sheri Martin, PCMH Coordinator, data analysis by Steve Fricker, ULTC Director of Student Affairs, and Kendall Denny, ULTC Pathways Coordinator, as well as the effort our residents put into the patient surveys

"Mr. Watson, come here. I want to see you": One rural residency program's rapid pivot to telemedicine during the pandemic

Abstract

Telemedicine has been used for over a generation, but application has been limited in rural areas due to lack of payment, licensure issues, cumbersome video equipment, and challenges with digital communications. Early in the COVID-19 pandemic, our rural family medicine residency made a rapid shift to all telemedicine services for our patients.

We collected data over a four-week period in April 2020 as we transitioned to 100% telemedicine consultations. We compare that to a four-week period prior to mid-March when COVID-related shutdowns began. We collected detailed visit summaries, patient feedback, and physician feedback to compare these two periods.

Early in the pandemic, telemedicine visits increased for those with chronic respiratory and cardiovascular issues, anxiety, and depression. Patient and physician feedback was positive, and time required averaged 12 to 18 minutes.

The cost savings from the 15% of telemedicine patients who would have otherwise sought urgent or emergency care is significant, and almost 45% would have still made an appointment later, further risking exposure and increasing outpatient volume. In this sense, telemedicine could be considered to have "flattened the curve" for potentially overwhelmed outpatient facilities just as mitigation interventions were implemented to do the same for acute inpatient beds.

We share our experience for consideration by those who will implement a similar transition and those who choose to advocate for continuing payment and platform flexibility. We also hope that residency training requirements can adapt to consider a telemedicine visit comparable to one completed in-person.

Keywords

Access to care, Family medicine, Utilization of health services

Introduction

The use of electronic and digital devices to provide remote medical care has been with us for a long time. The need for provision of medical care during spaceflight spurred an increase in telemedicine development almost 25 years ago.[1] Use in other remote locations became more routine, including on the U.S. space shuttle and international space station.[2] Although the advantages of providing primary and specialty care to remote populations on Earth were reported widely into the new millennium, widespread use in US rural areas was significantly limited by lack of insurance payment, licensure issues, and unwieldiness of video equipment.[3-5] These obstacles, as well as high-speed digital rural connections, had begun to improve in the few years before March 2020.[6]

As medical care systems adapted to the COVID-19 pandemic in the spring of 2020, there were new reasons to provide patients the care they needed in their homes. In a remarkable turnaround reversing 25 years of inertia, federal health insurance, followed soon by state Medicaid and private insurance, quickly began to cover telehealth consultations. Regulations also rapidly changed, allowing the suspension of burdensome security requirements for devices and platforms, allowing for personal cell phone use by both provider and patient. Practices in large and small towns quickly adapted and for the first time were reimbursed for managing their patients by the most convenient method available to both parties. This could include audio-only (telephone), eVisit, or video.

Previous telemedicine studies have shown little difference in outcomes from in-person care and telephone consultations, except that telephone consultations took an average of 1.5 minutes less than in-person visits.[7-12]. A 2018 review reported the common obstacles to effective adoption of telemedicine, including technically challenged staff (11%), resistance to change (8%), cost (8%), knowledge of billing constraints (5%), age of patient (5%), and level of education of patient (5%).[9] We found one report from a residency in family medicine that, after transition to a Patient Centered Medical Home (PCMH), allowed that 250 of the annual resident visits be conducted electronically. [13]

We report here a very rapid transition by a rural residency program to meet the needs of our patient population as COVID-19 infections became widespread. We were interested in tracking the adjustments made by the residents and faculty and hearing from our patients what their experience was like during this accelerated transition. To paraphrase the chief information officer of the statewide health system that hosts our residency, we implemented a very carefully planned six-month telemedicine training schedule in a period of two weeks.

Table 1 shows the timeline of the pandemic in relation to our project.

Table 1: Countdown to telemedicine

December 31, 2019: World Health Organization (WHO) reports mysterious pneumonia in China
January 11, 2020: China reports first COVID-19 death
February 26, 2020: Centers for Disease Control and Prevention (CDC) confirms the first U.S. case without a history of travel to an outbreak area, proving community spread
March 13-15, 2020: Most U. S. schools closed
March 15, 2020: CDC warns against large gatherings
March 16, 2020: U.S. President Donald Trump announces the first of a series of social distancing recommendations, including avoiding gatherings of 10 or more people
March 17, 2020: Baptist Health (BH) promotes video and eVisits to established patients, urging virtual care when possible
March 17, 2020: Medicare eases telehealth restrictions, allowing payment for care provided on many devices and platforms with minimal or zero co-payments
March 17, 2020: BH providers trained in eVisits
March 20, 2020 Kentucky Gov. Andy Beshear orders all day care centers to close

https://mds.marshall.edu/mjm/vol7/iss2/8
DOI: 10.33470/2379-9536.1314

March 23, 2020: Kentucky Gov. Beshear orders all nonessential retail business closed and all medical elective procedures to cease
March 24, 2020: BH providers trained in video visits
March 25, 2020: Baptist Health Madisonville has its first inpatient case
March 25, 2020: Kentucky Gov. Behsear eases telehealth restrictions for Medicaid
March 25, 2020: Kentucky Gov. Beshear issues stay-at-home order
March 27, 2020: BH Family Medicine offices begin calling patients to suggest changing scheduled visits to virtual, essentially stopping all in-person visits
April 4, 2020: Kentucky Gov. Beshear urges wearing masks in public, following new CDC recommendations
April 13, 2020: Some BH clinic staff furloughed
April 30, 2020: Centers for Medicare & Medicaid Services (CMS) increases audio-only telehealth payment to the same as usual in-office codes, up from an average of $28/call to $78/call
May 11, 2020: BH staff returns in phases, clinic in-person appointment maximum limited to 50%
May 25, 2020: BH clinic in-person maximum raised to 75%
June 1, 2020: BH clinic in-person maximum returns to 100%

Methods

Our family medicine residency is based in a town of 20,000 within a medical center where ours is the only residency that serves six very rural counties. The program is known for producing small town physicians for our region for more than 50 years.[14] The program became a National Committee for Quality Assurance (NCQA) patient-centered medical home in 2016 and was behavioral health certified in 2020. It is staffed by 18 residents, four full-time faculty, four part-time faculty, one clinical psychologist, one licensed clinical social worker, and one ambulatory pharmacist. The physical facility has 20 exam rooms, staffed with 10 medical assistants and four front desk staff, and has used the EPIC® electronic medical record since 2016.

Prior to the pandemic, the typical residency clinic session saw 50 patients per day with common chronic and acute illnesses as shown in the following tables. There were no recorded telemedicine visits prior to the "washout" weeks of March 23 through April 5. The pre-telemedicine study period was February 24 through March 20, and the post-telemedicine study was April 6 through April 30. There were no in-person visits during the post-telemedicine period, as those with acute concerns or those unable to have their needs met by telemedicine were directed to our health system urgent care facility about two miles away.

Residents and faculty completed a survey near the end of the study period reporting their opinions on each visit type as well as the time required for each, including completing the EMR note. Approximately two weeks after the visit, a resident who did not provide the patient's care called each patient for feedback.

The reason for visit data was recorded by the medical assistants as they placed the patients in their exam room or transferred the call to the physician. If multiple reasons were listed, we presumed the first was the priority. Any complaint of acute or chronic pain at any site except

headache or chest pain was included under the pain label. We extracted chronic medical conditions from the list maintained by the primary physician.

This study was found to be exempt by the Baptist Health Madisonville Institutional Review Board.

Results

During the period of April 9 through April 30, there were 658 telemedicine visits distributed across eVisit, telephone, and video visits. Table 2 shows the most frequent reasons for visit pre- and post-telemedicine capability.

Table 2: Patients' reasons for visit, pre- and post- implementation of telemedicine.

Reason for Visit	Pre		Post		*P* value
	N = 833		N = 658		
	#	%	#	%	
ADHD	121	13.7%	94	14.3%	0.744
Pain	115	13.0%	107	16.3%	0.073
Diabetes	81	9.2%	40	6.1%	0.026
Hypertension	75	8.5%	71	10.8%	0.128
Anxiety	57	6.5%	51	7.8%	0.324
New Patient	50	5.7%	7	1.1%	0.000
Annual Exam	21	2.4%	1	0.2%	0.000
Chest Pain	18	2.0%	13	2.0%	0.928
Cough	16	1.8%	8	1.2%	0.350
Upper Respiratory Infection	16	1.8%	14	2.1%	0.657
Headache	15	1.7%	10	1.5%	0.783
Rash	15	1.7%	4	0.6%	0.055
Well Child	13	1.5%	0	0.0%	0.002
Urinary Tract Infection	10	1.1%	10	1.5%	0.506
Fatigue	10	1.1%	6	0.9%	0.673
Shortness of Breath	9	1.0%	8	1.2%	0.715
Medication Refill	9	1.0%	2	0.3%	0.130[a]
COPD	8	0.9%	7	1.1%	0.755
Vomit/Nausea	6	0.7%	5	0.8%	1.000[a]
Dizziness	6	0.7%	2	0.3%	0.479[a]
Fever	3	0.3%	1	0.2%	0.640[a]

[a]Fisher's exact test. All others are chi-square.

Table 3 shows the most frequent chronic conditions of the patients seen by the residency during the four week pre-telemedicine period and those frequencies during the post- period. The conditions listed are typical of most outpatient primary care practices.

Table 3: Most prevalent chronic issues of patients, pre- and post- implementation of telemedicine

https://mds.marshall.edu/mjm/vol7/iss2/8
DOI: 10.33470/2379-9536.1314

Medical History	Pre		Post		*P* value
	N = 883		N = 658		
	#	%	#	%	
Hypertension	375	42.5%	323	49.1%	0.010
Hyperlipidemia	246	27.9%	210	31.9%	0.085
Depression	242	27.4%	215	32.7%	0.025
Anxiety	209	23.7%	211	32.1%	0.000
Diabetes	183	20.7%	157	23.9%	0.142
Asthma	131	14.8%	137	20.8%	0.002
ADHD	109	12.3%	110	16.7%	0.015
COPD	107	12.1%	106	16.1%	0.025
Pain	56	6.3%	73	11.1%	0.001
Congestive Heart Failure	51	5.8%	28	4.3%	0.181
Coronary Artery Disease	51	5.8%	72	10.9%	0.000

Table 4 shows the patient reported experience with the telemedicine visits. Of the 658 visits, 313 patients could be reached after three phone attempts

Table 4: Patients reported experience as "agree" or "strongly agree".

Question	Visit Type		
	e-Visit Agree[a] (N= 9)	Telephone Agree[a] (N= 281)	Video Agree[a] (N= 23)
The doctor was able to help me with what was bothering me during this internet, video, or phone visit.	9 (100%)	270 (96%)	20 (87%)
Overall, I was satisfied with this internet, video, or phone visit.	9 (100%)	267 (95%)	19 (83%)

[a]Responses were on a five-point scale of strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree, and the number shown is the tally of the agree or strongly agree categories.

Table 5 shows what the patients would have likely done if the telemedicine visit was not available to them. The other category included calling the physician or pharmacy without a time specified.

Table 5: Patients reported alternative if they had not communicated with their physician

	If you could not have communicated with your doctor via the internet, video, or phone visit about your problem, you would have:			
Strategy if no visit today	e-Visit N= 9	Telephone N= 281	Video N=23	Total N= 313

	#	%	#	%	#	%	#	%
Driven to see a doctor the same day	0	0.0%	62	22.1%	7	30.4%	69	22.0%
Made an appointment to see the doctor later	2	22.2%	129	45.9%	9	39.1%	140	44.7%
Not gone to see any doctor	3	33.3%	43	15.3%	4	17.4%	50	16.0%
Gone to an urgent care facility	4	44.4%	20	7.1%	1	4.3%	25	8.0%
Gone to the emergency department	0	0.0%	18	6.4%	2	8.7%	20	6.4%
Other	0	0.0%	10	3.6%	0	0.0%	10	3.2%

The residents and faculty responses are shown in Table 6.

https://mds.marshall.edu/mjm/vol7/iss2/8
DOI: 10.33470/2379-9536.1314

Table 6: Physician responses by type of visit

	Physician Type	e-Visit Agree[a]	Telephone Agree[a]	Video Agree[a]
I could obtain all the information I needed to make a precise diagnosis.	Residents	0/2 (0%)	13/15 (87%)	8/10 (80%)
	Faculty	1/2 (50%)	4/4 (100%)	3/3 (100%)
I could obtain enough information to make a working diagnosis.	Residents	1/2 (50%)	13/15 (87%)	10/10 (100%)
	Faculty	1/2 (50%)	4/4 (100%)	3/3 (100%)
I think I was able to provide advice that helped the patient.	Residents	1/2 (50%)	14/15 (93%)	10/10 (100%)
	Faculty	2/2 (100%)	4/4 (100%)	3/3 (100%)
A live audio-only (phone call) visit would have been just as effective.	Residents	2/2 (100%)	-	4/10 (40%)
	Faculty	2/2 (100%)	-	0/3 (0%)
An e-visit (internet, text only, not live) would have been just as effective.	Residents	-	-	2/9 (22%)
	Faculty	-	-	0/3 (0%)
A live video connection, such as FaceTime, Skype, or other service would have helped significantly.	Residents	0/2 (0%)	7/15 (47%)	-
	Faculty	2/2 (100%)	2/4 (50%)	-
Having a telemedicine stethoscope to hear heart and lung sounds would have helped significantly.	Residents	0/2 (0%)	9/15 (60%)	4/9 (44%)
	Faculty	1/2 (50%)	2/4 (50%)	2/3 (67%)

[a]Responses were on a five-point scale of strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree, and the number shown is the tally of the agree or strongly agree categories.

The times required to complete the visit, including EMR documentation, are shown in Table 7.

Table 7: Time physician spent on visit, by visit type

	Mean (Range) N[a]		
Provider Type:	e-Visit	Telephone	Video
PGY 1	0 N= 0	27 min (25-30) N= 4	25 min (25-25) N=2
PGY 2	0 N= 0	14 min (11-17) N= 5	17 min (10-28) N= 4
PGY 3	12 min (9-15) N= 2	12 min (8-20) N= 6	12 min (6-15) N=4
Faculty	10 min (10) N= 1	13 min (7-20) N=4	18 min (10-30) N=3

[a]N= number of physicians reporting that type of visit

Some representative comments are included in Table 8.

Table 8: Representative comments from provider survey

Resident Comments:

- "The telephone visits, for the vast majority of my patients, provide the best balance of appropriate information gathering with efficiency."
- "Telephone visits have significantly increased the efficiency of my clinic."
- "First time doing a video visit and it could not have gone better! Telephone/video visits should be used more!"
- "I do not like the video visits for most of my encounters as I feel I can get most of the information I need to assess the patient via telephone encounter. If I need more info, like a PE, I would rather have them here in office to examine."
- "Of the visits I have had so far, most have been to discuss refills of medications for chronic, stable problems. Only about five have been for acute concerns and I did not feel a physical exam would have been helpful."
- "Phone visits overall have been good. Feel they are most beneficial for established patients presenting for regular follow-up or medication checks."
- "I truly enjoy the telephone visits. I do not feel that they adversely affect my ability to care for the patient. I feel that my patients are satisfied with their care, and visits are timelier through the telephone encounter.
- "Most of my telephone visits feature chief complaints that do not require a physical exam for diagnosis, treatment, or further management. Phone visits are also relatively quick and I find I can provide the same or better education via phone as I can in person in the vast majority of cases."

https://mds.marshall.edu/mjm/vol7/iss2/8
DOI: 10.33470/2379-9536.1314

- "I truly do enjoy the telephone visits. I hope this is something the residency continues post-COVID-19 pandemic, not only for the convenience of our patients, but also for the providers."
- "Acute visits are more difficult than chronic follow-up."
- "I prefer the telephone visits for the vast majority of my patient encounters. I feel like the video visits would only add benefits to certain MSK or derm complaints, and in most cases I would like to physically see a patient in the case of a MSK complaint because most of my physical exam can't be done over the phone or via video."

Faculty Comments:

- "Prefer video visits, much easier to be able to visualize patient concerns. Patients feel connected. One patient today kept commenting how she just wished she could see me because she is alone at home."
- "Routine visits easily completed by phone."
- "Several patients today commented they felt like they were here and received the same care and compassion. Felt better about having visit too."
- "The two visits/phone encounters were originally scheduled as office encounters but both patients had comorbidities and mental health issues. They both benefitted from the encounters. I tried to convince them to do video encounters; however, they were not willing to do video."
- "Patient was in her car making the video difficult to understand."
- "Easy to use. Great visit."
- "This was initially to be an e-visit that was initiated by the patient; however, with the patient's permission, it was converted to a video visit. I felt that the issues were beyond the means of an e-visit."
- "Using the app worked smoothly. Patients were mainly chronic, stable problems that just needed routine care. Only one visit with acute knee pain which would have benefitted from in-person visit for exam."
- "These were routine visits and worked great by video."
- "This is a long-term care visit in a patient with multiple admissions to the hospital with CHF. Hopefully these video visits can be performed more frequently and we will be able to keep her out of the hospital."
- "So far, both e-visits had to be converted to phone visits. This was so that I could get more specific information."
- "Limited diagnosis available for use with e-visit. Information provided by patient often is not as specific as I would obtain from asking the patient, i.e., laterality."

Discussion

Our results provide a snapshot of the first four weeks of a rapid transition to telemedicine in a rural family medicine program. Most patients during the telemedicine period stayed at home and many delayed any care they could, including many who decided to wait rather than learn the telemedicine process. The significant decrease in new patients, annual exams, and well child visits supports the validity of our patient counts, as these were largely curtailed during the telemedicine period.

The listing of chronic conditions in Table 3 reflects the need for those with chronic pain and ADHD to maintain regular visits with us. In addition, more of those with chronic cardiovascular and respiratory conditions chose to use the telemedicine process to maintain their connection with us, and significantly more of our visits were dedicated to addressing the physical and emotional needs of these patients early in the pandemic. The significant increase in visits for patients with depression and anxiety may be a reflection of the pandemic, including exacerbated symptoms and more of those patients choosing to communicate with us without any delay. It is important that those patients, we reached later by telephone survey, expressed that their needs were met. The generally positive patient feedback shown in Table 4 is comparable to previous publications.

It is also important to note in Table 5 that more than a third of our patients who were served by the telemedicine option would have otherwise sought care in-person somewhere that day. The virtual option thus kept a significant number of concerned patients safely at home when all outpatient options were already overburdened by more severely ill patients. Also, the cost savings to insurers, including Medicare and Medicaid, from the 15% who would have sought urgent or emergency care is significant. Almost 45% would have still made an appointment later, further risking exposure and increasing outpatient volume. In this sense, telemedicine could be considered to have "flattened the curve" for potentially overwhelmed outpatient facilities much in the way that mitigation interventions were implemented to do the same for acute inpatient beds.

Residents and faculty adapted quickly and reported positive opinions, almost evenly divided between telephone and video preferred as shown in Tables 6 and 7. The physician opinion on having equipment such as a digital stethoscope at the patient site was also evenly divided, and probably would depend on the patient condition. This could be an expensive option, although cost for basic vital sign capability is more modest. As we transitioned our student-directed chronic care free clinic to permanent telemedicine visits, we received funding from our local AHEC office to provide each patient an automatic blood pressure machine, scale, thermometer, and pulse oximeter for $90 per patient. The physicians in our residency found the cameras in most cell phones adequate for answering basic questions about skin conditions and determining the extent of pedal edema by instructing the patient to press on the edematous area, leaving an indentation. Some also became creative with guiding patients through limb movements to assess some musculoskeletal conditions. The phone cameras were not adequate for most ocular, oral, or ear concerns. Peripheral cameras for cell phones are inexpensive, but many require connections and switching that may challenge some users.

https://mds.marshall.edu/mjm/vol7/iss2/8
DOI: 10.33470/2379-9536.1314

Although there was a wide range of time reported to complete the telemedicine visits, the numbers were very similar to most in-person visits, depending on the level of experience of the resident. From the comments and informal focus groups, the physicians expressed that, just as with in-person visits, the time needed depended on the number of conditions managed in an individual visit. These results support the assertion that payment for virtual visits should mirror that for in-person visits when fee-for-service is still the routine. As various prospective payment options are implemented in outpatient settings, these time requirements can help guide resource allocation.

Initially it was felt that we could provide most services through eVisits using MyChart within our Epic® EMR. However, this overestimated the typical patient's ability to utilize this service. We ultimately converted most attempted eVisits to telephone visits as the patients were unable to access MyChart reliably or the e-text was not enough information for the physician to understand the patient's question. Patients were still encouraged to use MyChart for simple communications outside of telemedicine, although many still did not. With eVisits, the patients were expected, essentially, to go through the same process on their own that our front desk normally would. This was a big hurdle for many patients and many did not want to complete the process or were not able to navigate the multistep process.

We encountered the obstacles reported in previous studies, and solutions were worked out quickly among residents and faculty. Those with previous experience with digital communications taught those who were less experienced. Cost was not an issue because no new equipment was needed and the clinic manager provided simple coding and billing advice. The disruption of efficient services lasted about ten days as physicians and staff learned the details of these new communications. The most common problem was when patients had unreliable Wi-Fi and images would freeze, which required a callback.

Limitations and Strengths

We report the experience of one rural residency with a relatively small number of physicians and patients. Generalization can only be to similar environments. Additionally, our patients chose their method, which would be expected to have better satisfaction than if we had chosen it for them. However, this reflects what most practices would do. The complete capture of pre- and post- visits that would be typical of an outpatient primary care environment is a strength, but the precise number who were referred to our urgent care center or to the ED was not captured. An informal poll of front desk staff, residents, and faculty estimated that this was less than one per day, but some of our patients could have gone directly to urgent care or the ED without interacting with us.

The physician responses were subject to the recall of each individual. While their opinions are valid as based on recall, the actual time for visit completion could be subject to a form of recall bias. During the study period, we did not estimate the duration of in-person visits for comparison. The number of patients reached for feedback was low despite several calls. Possible explanations were that phone calls from non-family went unanswered during this stressful time and many of our patients did not have voicemail activated. This limits the generalizability of the responses from those reached.

Conclusion

By the end of the rapid transition to telemedicine described here, the process was working well for staff, physicians, and patients. Much of this was due to the ability to use existing personal digital devices and routine communications systems that were easily available to our patients, which was very different from the constraints described in previous telemedicine publications.

Our practice continues with approximately half in-patient volume and half via telemedicine. Our patients increasingly prefer telephone to video or eVisit, and the process has become very smooth six months after the rapid transition. Patients who have mild upper respiratory or gastrointestinal symptoms who do not want to venture out will probably continue to prefer a virtual visit for months to come.

Telemedicine has become integrated into our workflow and our residents have adapted and will expect this to be a part of their future practice, much like EMR entered our training routines in years past. We hope residency training requirements will reflect this new workflow to allow telemedicine visits to count toward basic training requirements. We offer our experience for those still considering this transition as well as those who seek to advocate for continuing payment for simple telemedicine and flexibility for communication platforms to meet the needs of rural Americans.

https://mds.marshall.edu/mjm/vol7/iss2/8
DOI: 10.33470/2379-9536.1314

References

1. Crump WJ, Driscoll B. An application of telemedicine technology for otorhinolaryngology Diagnosis. Laryngoscope. 1996;106:595-598.
2. Crump WJ, Levy BJ, Billica RD. A field trial of the NASA telemedicine instrument pack in a family practice telemedicine testbed. Aviat Space Environ Med. 1996;67(11):1080-1085.
3. Crump WJ, Pfeil T. A telemedicine primer for the primary care physician: an introduction to the technology and an overview of the literature. Arch Fam Med. 1995;91(7):796-803. https://doi.org/10.1001/archfami.4.9.796.
4. Rogove HJ, Amoateng B, Binner J, Demaerschalk BM, Sanders RB. A survey and review of telemedicine license portability. Telmed J E Health. 2015 21(5):374-381. https://doi.org/10.1089/tmj.2014.0116.
5. Vo A, Shore J, Waugh M, Doarn CR, et al. Meaningful use: a national framework for integrated telemedicine. Telemed J E Health. 2015 21(5):355-63. https://doi.org/10.1089/tmj.2014.0142.
6. Crump WJ. Telemedicine: has the time really finally arrived? J Rural Health. 11 April 2020. https://doi.org/10.1111/jrh.12435 https://doi.org/10.1111/jrh.12435. Accessed on November 9, 2020.
7. Flodgren G, Rachas A, Farmer AJ, Inzitari M, Shepperd S. Interactive telemedicine: effects on professional practice and health care outcomes. Cochrane Database Syst Rev [Internet]. 2015 Sep [cited 2020 Nov 09];CD002098. Available from: https://doi.org/10.1002/14651858.cd002098.pub2.
8. Kruse CS, Krowski N, Rodriguez B, Tran L, et al. Telehealth and patient satisfaction: a systematic review and narrative analysis. BMJ Open. 2017 7(8):e016242. https://doi.org/10.1136/bmjopen-2017-016242.
9. Kruse CS, Karem P, Shifflett K, Vegi L, et al. Evaluating barriers to adopting telemedicine worldwide: A systematic review. J Telemed Telecare. 2018 24(1)4–12. https://doi.org/10.1177/1357633X16674087.
10. McKinstry B, Walker J, Campbell C, Heaney D and Wyke S. Telephone consultations to manage requests for same-day appointments: a randomised controlled trial in two practices. Br J Gen Pract. 2002 52(477):306-10.
11. Miller D, Loftus AM, O'Boyle PJ, et al. Impact of a telephone first system in general practice. Postgrad Med J. 2019 95:590–5. https://doi.org/10.1136/postgradmedj-2019-136557. Epub 2019 Jul 20.
12. Hammersley V, Donaghy E, Parker R, McNeilly H, at al. Comparing the content and quality of video, telephone, and face-to-face consultations: a non-randomized quasi-experimental exploratory study and UK primary care. Br J Gen Pract. 2019 69(686):e595-e604.: https://doi.org/10.3399/bjgp19X704573.
13. Kim JG, Morris CG, Ford P. Teaching today in the practice setting of the future: Implementing innovations in graduate medical education. Acad Med. 2017 92(5):662–5. https://doi.org/10.1097/ACM.0000000000001510.
14. Martin DA. A Short History of Trover Clinic. Kuttawa, KY: McClanahan Publishing House;1989.