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Patient Characteristics and Telehealth Visits in a Hepatology Clinic

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Abstract

BACKGROUND: In an attempt to decrease significant no-show rates amongst telehealth patients in a Hepatology outpatient clinic, a clinic-specific intervention was executed, which was efficient in decreasing no-show rates, however could not continue to be financially supported.

PURPOSE: The purpose of this study was to evaluate correlations between demographic data and social determinants of health with patients who showed and did not show for their telehealth appointments, with an overall goal of determining if there is a need for targeted support for telehealth appointments to decrease no-show rates**.**

METHODS: Electronic health records of telehealth patients were reviewed in an outpatient Hepatology clinic from August 2021 to November 2022 for demographic data, co-morbidities, and if the patient showed or did not show for their telehealth appointment. Charts were reviewed before, during, and after the pilot intervention in this descriptive, correlational study.

RESULTS: 250 charts were reviewed. A statistically-significant correlation was found between no-show rates and new patients, and those who were under 45 years old, unemployed, and had a medical history of HCV, cirrhosis, and IVDU. There was no significant correlation between gender, race, insurance status, incarceration history, area of residence, and the diagnoses of HBV, HAV, NASH, alcohol abuse, OUD/SUD, depression/anxiety, and BPD with no-show appointment status.

CONCLUSION: These results suggest the need for targeted intervention amongst new, younger, and unemployed telehealth patients with a history of IVDU, Hepatitis C, and cirrhosis, to assist them to access and receive care in the Hepatology clinic.

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Background and Significance

Telehealth is a growing form of healthcare and is constantly evolving and improving. When used appropriately, telehealth is convenient and can be very beneficial to patients. Telehealth is efficient in increasing access to healthcare and access to healthcare specialists (Health Resources & Services Administration, 2022). There is an apparent need to increase specialty healthcare access and treatment to Hepatology and Hepatitis C (HCV) patients in high-risk, low-resource areas. Research shows that telehealth is a resource that can be effective in improving access to HCV treatment, specifically to patients in rural settings, by reducing the travel burdens and financial costs associated with accessing treatment, and by providing access to necessary specialists in areas where there are limited resources (Shaw et al., 2023).

Hepatitis C (HCV) infection is growing in prevalence within rural regions of the United States, specifically in rural Kentucky. Between 2006 and 2012, the prevalence of HCV amongst people under the age of 30 grew 364% in Central Appalachia (Cloud et al., 2019). According to a study published in 2020, Kentucky includes 54 of the 220 counties in the United States at high risk for HCV outbreaks and high prevalence of persons living with HCV infection (Cave et al., 2020). There are associations between HCV risk factors and rural areas, including poverty rates, socioeconomic inequities, unaddressed mental health problems, and most importantly, barriers to healthcare access (Cloud et al., 2019).

Treatment for HCV has improved significantly with the use of direct-acting antiviral (DAA) medications, which have been shown to be well-tolerated and highly successful. However, adequate healthcare access is needed for patients to be able to receive this treatment. Many barriers have been shown to affect healthcare access and continuity of care for this specific

patient population, including housing availability, geographic inaccessibility, availability of compassionate healthcare, and social stigma (Shaw et al., 2023).

One academic health center in the Bluegrass region of Kentucky has a telehealth Hepatology and HCV clinic whose sole provider is an Advanced Practice Registered Nurse (APRN). There is currently an ongoing significant problem with high no-show rates amongst patients using telehealth within this outpatient Gastroenterology (GI) clinic. Specifically, the overall no-show rate from August 2021 to November 2022 was 42% (W. Sims, personal communication, January 4, 2023). A recent pilot study in this clinic addressed this issue. For the pilot study, a current employee was supported to call all patients scheduled for a telehealth appointment before their appointment and walk them through the telehealth check-in process of their appointment. This intervention resulted in significant improvement with no-show rates and patient satisfaction (A. Hensley, personal communication, 2022). However, the intervention could not be supported financially and was stopped.

This Hepatology clinic provides increased access to HCV care and treatment for patients throughout the state of Kentucky and beyond. However, the current high no-show rates must be addressed to be able to continue this care sufficiently. Although the pilot study conducted in the clinic was effective and resulted in decreased no-show rates, the intervention could not be continued due to lack of financial support and resources. Therefore, the goal of this project was to assess characteristics, similarities, and differences between all Hepatology clinic telehealth patients, including those who show and those who do not show for their telehealth appointments before, during, and after the pilot intervention, to assess the need for a more-targeted support to decrease no-show rates. An intervention that addresses only those who need it most may be more financially cost-effective for the clinic while providing needed care.

Purpose and Objectives

The purpose of this study was to evaluate correlations between demographic data and social determinants of health with patients who showed and did not show for their telehealth appointments in the UK Hepatology GI Clinic. The specific aims of this study include:

- Determine no-show rates before, during, and after the pilot study.
- Determine if there is a correlation between demographic data and now-show rates for telehealth appointments.
- Determine if there is a correlation between social determinants of health/comorbidities and no-show rates for telehealth appointments.
- Provide guidance about options to decrease no-show rates in one specialty clinic.

The project objective was to provide information that could be beneficial in moving forward with an intervention to decrease patient no-show rates. The overall goal of this study was to determine if there is a need for targeted support for telehealth appointments to decrease no-show rates**.** A significant correlation being found amongst a specific patient population who do not show for their telehealth appointments could aid in the modification of the previously successful in-person walk through. The intervention would become more sufficient by being targeted to only those individuals who need it most, leading to the possibility of a more permanent and supported solution. Patient-centered care would be enhanced while judiciously using available resources.

Theoretical Framework

This project was guided by the Health Belief Model (The Health Belief Model, 2022). This framework is based on a theory that a person's willingness to change their health behaviors comes from six main components that can affect a person's health perception. These

components include perceived severity, perceived susceptibility, perceived benefits, perceived barriers, cues to action, and self-efficacy. These are important factors that can affect if a person will adapt to the behavior (The Health Belief Model, 2022). The patient population of this study were inconsistent in their compliance to the health behavior of attending their telehealth appointment. This was resulting in increased no-show rates.

With the guidance of the Health Belief Model, it can be determined that the willingness of patients to be compliant with attending their telehealth appointments depends on their perceptions of both the benefits and barriers related to the health behavior. The purpose of this project was guided by important factors of the Health Belief Model: cue to action and self-efficacy (The Health Belief Model, 2022).

It was observed that the perceived barriers amongst the telehealth patients in this clinic needed to be further evaluated, to assist with determining what specific barriers need to be addressed in order to overcome them in the future. It was determined that this information can help the clinic provide these patients with a cue to action, to help aid in the acceptance of the recommended health action of attending their telehealth appointment. This could also help improve patients' self-efficacy, by assisting them in successfully performing the behavior and also increasing their confidence in their ability to do so. Considering the constructs of the Health Belief Model, the information collected in this study can be beneficial in suggesting strategies for change to overcome barriers and provide support for patients to become more compliant with their health behaviors.

Review of Literature

A review of literature was completed to support the need for the project. A comprehensive review was conducted focusing on benefits of telehealth, barriers to telehealth,

telehealth no-show rates, the negative effect no-show rates have on healthcare financially, access to healthcare barriers for underserved communities, and ways to overcome telehealth barriers. CINHAL and PubMed databases were used for systematic research. Keywords and search terms used in various combinations included: *telehealth*, *no-show rates, patient support, barriers*, *rural*, and *access to health*. Inclusion criteria included scholarly articles, studies published within the past 5 years, studies published in English, and studies that included free full-text availability. Exclusion criteria included studies from greater than 5 years old, studies that were published in languages other than English, and non-scholarly articles. Three major studies were used for reference, including a case study, a descriptive analysis of questionnaires, and a prospective survey analysis, which were conducted in New York City, the Middle East/North Africa Region, and Australia. The *Centers for Disease Control and Prevention* (CDC) was referenced for current telehealth use percentages in the United States, and the *Health Resources & Services Administration* (HRSA) was also referenced for current telehealth research in the United States.

Synthesis of Evidence

Telemedicine is a developing and growing form of healthcare. During the COVID-19 pandemic, telemedicine health care services significantly expanded. According to the *Centers for Disease Control and Prevention* (CDC), in 2021 there was a total of 37% of adults in the United States who had used telehealth within the previous 12-month period (CDC, 2022).

Studies show there are many benefits to telehealth in today's healthcare. One benefit to telehealth is limited physical contact with others (Health Resources & Services Administration, 2022), especially for those with compromised immune systems and those at-risk for poor health outcomes if exposed to a contagious illness from others. Other benefits of telehealth include

convenience of access to healthcare from a patient's location (Health Resources & Services Administration, 2022), decreased travel time (Health Resources & Services Administration, 2022), decreased time off work or childcare (Health Resources & Services Administration, 2022), shortened wait times for appointments (Health Resources & Services Administration, 2022), and increased access to specialists who might be located far distances from where patients reside (Health Resources & Services Administration, 2022).

These factors are especially important for rural patients, as telehealth aids in the expansion of healthcare access and quality of care improvement for rural areas. Specifically when utilized in rural areas, telehealth has shown to increase care coordination and continuity of care, reduce costs, and result in savings in time, decreased travel, and increased productivity (DeHart et al., 2022). Telehealth is a beneficial tool that can aid in the health improvement of individuals in underserved communities throughout the Appalachian region (DeHart et al., 2022).

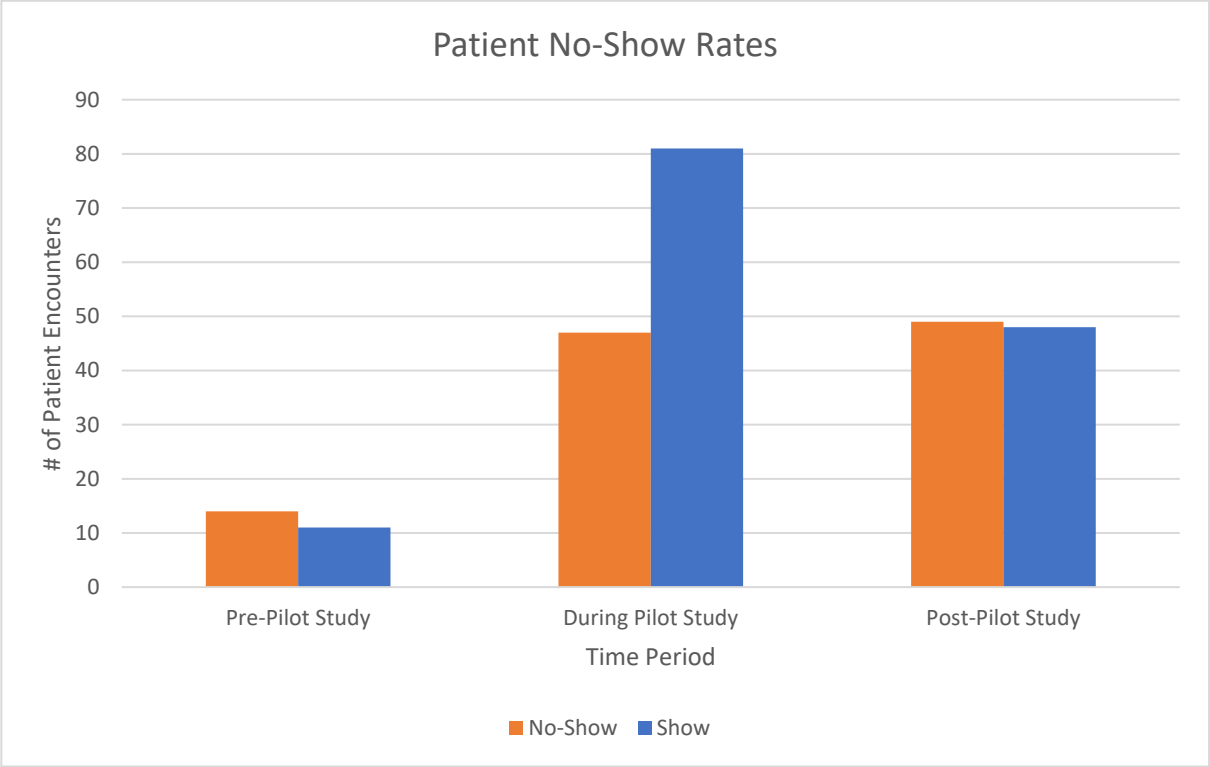
Although there are many positive aspects to telehealth, there are some downfalls as well. One downfall to consider is operational incompetence, examples including limited WiFi/internet access/cellular service, problems with technology setup and operation, and limited technology skills, especially in the elderly and less-educated populations. Other barriers include insurance coverage and reimbursement, patient and provider comfort, privacy/legal concerns, and missing interpersonal communication and assessment that occurs during in-person appointments (DeHart et al., 2022).

Because of these obstacles, some patients remain unsatisfied with telehealth and medical technology, which sometimes results in increased no-show rates amongst telehealth patients (Muppavarapu et al., 2022). According to a study published in 2023, the global average no-show

rate is 23% (Oikonomidi et al., 2023). Marbough et al., (2020) discussed in a recent published case study how detrimental high no-show rates can be for healthcare facilities, as no-shows negatively affect available time slots available for other patients, available resources, and can even negatively affect patients' health conditions due to delay in diagnosis and treatment (Marbough et al., 2020). Furthermore, it was estimated that 67,000 no-shows can cost a healthcare system approximately $7 million. It was also demonstrated that reducing the no-show rate in a clinic to 5% annually could result in an increase in revenue by $51,769.00 (Marbough et al., 2020).

The pilot study that was recently carried out in the clinic of this study involved having a current employee calling all patients scheduled for a telehealth appointment before their appointment time and walk them through the telehealth check-in process (A. Hensley, personal communication, 2022). Data reflected the positive effect this intervention had on no-show rates, showing that during the time period before the pilot study began, the no-show rate was 56%. During the time period of the intervention implementation, the no-show rate decreased to 37%. Once the pilot study ended, the no-show rate increased to 51% (W. Sims, personal communication, January 4, 2023). A graph was created to provide a visualization of these findings (Figure 1).

Figure 1. *Patient No-Show Rates Amongst Time Periods* (*N*= 250)



Kalicki et al., (2021) conducted a study to identify barriers to telehealth by assessing 16 primary care providers' perceptions of patient barriers to telehealth. The study showed that 82% of patients required assistance to complete the visit, either from a family member or caregiver. The authors also reported that providers were unaware of which patients were experiencing barriers to the telehealth technology. It was determined that, to assist providers in identifying the potentially modifiable telehealth barriers amongst their patients, better systemic data collection is needed to determine the need for targeted interventions to increase telehealth use.

Similarly, Philip et al., (2022) conducted a study amongst outpatient palliative care in Australia, where both providers and patients completed a prospective survey to assess for telehealth satisfaction and barriers. The study findings supported the importance of having targeted support involving coaching for patients to navigate the telehealth platform to provide successful telehealth delivery.

Summary of Evidence

The literature supports the benefits of telehealth. Specifically, it supports how telehealth can address the gaps in healthcare access, especially for those who reside in rural areas and underserved communities. However, literature also supports that there are also some negative aspects to telehealth that still need addressed. Multiple studies show that there continues to be barriers amongst patients using telehealth technology, sometimes resulting in increased rates of no-show appointments. Studies show how detrimental no-show rates can be on healthcare facilities financially. Targeted support can be utilized to improve telehealth delivery and increase telehealth use, leading to decreased no-show rates, but the modifiable patient barriers must be determined before creating a successful intervention.

Gaps in Knowledge

Although it is known there are areas of improvement still present in telehealth, and although it is known that there are current high no-show rates amongst telehealth patients, it is still unknown what specific factors can be contributing to problem. There are trials to access of healthcare to rural areas, specifically in the growing population of patients with HCV, that are still unknown. In this clinic, it is known that increased telehealth support can decrease no-show rates for their telehealth patients, but it is unknown how to modify this process to be more targeted and more patient-specific. It is unknown what specific modifiable barriers patients are experiencing, and what specific patients need targeted for telehealth support. This study addresses these factors and barriers, in an attempt to gather more information to give a better insight on what patient population can be targeted.

Methods

Study Design

This study is a descriptive correlational analysis of demographic data, social determinants of health, comorbidities, and patient no-show rates within the University of Kentucky Healthcare's outpatient Gastroenterology (GI) Hepatology clinic.

Setting

The study population included all adult Hepatology patients within the University of Kentucky's Digestive Health and Gastroenterology (GI) outpatient clinic who were scheduled for a telehealth appointment with an Advanced Practice Registered Nurse (APRN) between August 2021 and November 2022. This clinic provides specialty healthcare for patients diagnosed with gastroenterological and hepatologic diseases, specifically focusing on patients diagnosed with HCV. The APRN sees patients exclusively via telehealth appointments.

Congruence

UK HealthCare is dedicated to providing advanced and effective care to the state of Kentucky and beyond, while upholding high standards of care. Networks are important in this institution, providing access to care throughout the entire state. The institution is committed to creating a healthier Kentucky, and focuses on patient-centered care, while being committed to providing advanced specialty medical care. While telehealth is a large factor in providing access to specialty medical care throughout the region, it is important to identify and improve barriers with telehealth that arise. This helps to ensure the availability of patient-centered care for all.

Stakeholders

The stakeholders for this project include patients and clinic medical staff. Improving telehealth support can overcome barriers and improve continued patient care provided via

telehealth. Clinic support personnel are stakeholders as they will be responsible for providing targeted patient telehealth support. The institution is also a stakeholder, as decreasing telehealth no-show rates in this clinic can decrease the financial burden associated with increased no-show rates.

Site-Specific Facilitators and Barriers

Facilitators included the clinic provider and the clinic manager as they were motivated to identify barriers and patient-specific factors that could be contributing to increased telehealth no-show rates. Motivation to identify these barriers stemmed from the hopes of determining a more supported targeted intervention that can be used to address this ongoing issue.

Barriers included the patient-population of this specific clinic, and appointment times. Knowing the majority of these patients have an overall poor health status and are considered a vulnerable population, reasons for appointment no-shows can be due to other factors that were not assessed in this study. Another barrier included that the only day these patients had appointments were on Thursdays.

Sample

The sample consisted of electronic medical records (EMRs) of patients scheduled at the Hepatology clinic between August 2021 and November 2022. Patients under the age of 18 were excluded. Other exclusion criteria included patients with in-person appointments and patients within the GI outpatient clinic other than hepatology. These patients are typically considered very sick with a poor health status, including liver health issues. Economically or educationally disadvantaged persons and other vulnerable populations were important to be included, to determine if other factors are affecting telehealth no-show rates amongst this specific population.

Procedures

Institutional Review Board Approval

Institutional Review Board (IRB) approval for this study was obtained December 14th, 2022.

Measures and Instruments

De-identified patient no-show rates between August 2021 and November 2022 were provided by the Patient Services Coordinator, Will Sims. One provider in the hepatology clinic, who exclusively sees patients via telehealth, was included as study personnel. This provider's patients were the subjects for the telehealth pilot study that included a person to assist patients with the check-in process. That pilot ended in June 2022. This study focused on this provider's patients who were scheduled to be seen before the pilot began, during the pilot study, and after the pilot ended.

The data collected included time-period of appointment (pre-, during, and post-pilot study), age, gender, race, insurance status (private, Medicaid, Medicare, and uninsured), employment status (employed, unemployed, and retired), socioeconomic factor (jail history), patient status (new patients and existing/established patients), area of residence (rural, urban, and out-of-state), and appointment status (show and no-show).

Comorbidities were also collected, which included 10 most-common diagnoses amongst this specific patient population, associated with Hepatology and Hepatitis C risk-factors. These diagnoses included: Hepatitis C (HCV), Hepatitis B (HBV), Hepatitis A (HAV), cirrhosis, non-alcoholic steatohepatitis (NASH), alcohol abuse disorder, intravenous drug use (IVDU), opioid use disorder/substance use disorder (OUD/SUD), depression/anxiety, and bipolar disorder (BPD). To measure the extent of the patients' medical history, the amount of diagnoses each

patient had from the 10 diagnoses listed above was also collected, which ranged from 1-9. No patient identifiers were included in the data that was collected.

Data Collection

The provider's patient schedule from August 2021 to November 2022 was accessed for data collection through EPIC EHR. The PI accessed and manually completed data collection from a private office in the GI department. An Excel spreadsheet was used to collate data and was stored on a password-protected computer that only the PI had access to.

Data Analysis

The data collected included only quantitative data. This data was synthesized and analyzed for differences between patients who kept the appointments and those who did not. This was accomplished by cross-analyzing demographic data, patient status, socioeconomic factors, and co-morbidities with appointment status. Multiple statistical tests were executed to obtain this data, including Kruskal-Wallis tests, chi-square tests, Mann-Whitney U tests, and Post-hoc chi-square tests. Data was analyzed using SPSS software.

Results

Demographics

250 patient charts were reviewed in total, including 10 from the pre-pilot time period, 140 from the time period during the pilot study, and 100 from the post-pilot time period. In total, there were slightly more males than females across all time points. The majority of the patients were Caucasian/white, unemployed, held Medicaid insurance, lived in an urban area, and were established patients. Ages ranged from 18-74 years old. Most patients had a diagnosis of HCV and cirrhosis, and many also had a history of IVDU and substance abuse (Table 1).

Table 1. *Analysis of Sample Population Variance* (*N*= 250)

	Pre-Pilot Study (*n* = 10) *n* (%)	During Pilot Study (*n* = 140) *n* (%)	After Pilot Study (*n* =100) *n* (%)	*p*
Age				.184
18-24	0 (0%)	3 (2.1%)	0 (0%)	
25-34	1 (10.0%)	21 (15.0%)	17 (17.0%)	
35-44	1 (10.0%)	42 (30.0%)	33 (33.0%)	
45-54	2 (20.0%)	23 (16.4%)	26 (26.0%)	
55-64	6 (60.0%)	37 (26.4%)	17 (17.0%)	
65-74	0 (0%)	14 (10.0%)	7 (7.0%)	
Gender				.80
Male	6 (60.0%)	76 (54.3%)	51 (51.0%)	
Female	4 (40.0%)	64 (45.7%)	49 (49.0%)	
Race				.201
White	9 (90.0%)	132 (94.3%)	234 (93.6%)	
Black	0 (0%)	4 (2.9%)	9 (3.6%)	
Hispanic	0 (0%)	3 (2.1%)	4 (1.6%)	
Asian	1 (10.0%)	1 (0.7%)	3 (1.2%)	
Insurance				.262
Private	0 (0%)	5 (3.6%)	4 (4.0%)	
Medicaid	6 (60.0%)	97 (69.3%)	79 (79.0%)	
Medicare	4 (40.0%)	31 (22.1%)	16 (16.0%)	
Uninsured	0 (0%)	7 (5.0%)	1 (1.0%)	
Employment Statu				.129
Employed	3 (33.3%)	31 (22.1%)	36 (36.0%)	
Unemployed	5 (55.6%)	100 (71.4%)	61 (61.0%)	
Retired	1 (11.1%)	9 (6.4%)	3 (3.0%)	

Socioeconomic Fa				.023
No jail hx	8 (80.0%)	109 (77.9%)	62 (62.0%)	
Jail hx	2 (20.0%)	31 (22.1%)	38 (38.0%)	
Patient Status				.665
New Patient	2 (20.0%)	42 (30.0%)	33 (33.0%)	
Existing Patient	8 (80.0%)	98 (70.0%)	67 (67.0%)	
Appointment Statu				.023
Show	7 (70.0%)	91 (65.0%)	48 (48.0%)	
No-show	3 (30.0%)	49 (35.0%)	52 (52.0%)	
Residence				.754
Rural	3 (30.0%)	54 (38.6%)	41 (41.0%)	
Urban	6 (60.0%)	82 (58.6%)	56 (56.0%)	
Out of state	1 (10.0%)	4 (2.9%)	3 (3.0%)	
Comorbidities				
HCV	6 (60.0%)	114 (81.4%)	87 (87.0%)	.079
HBV	1 (10.0%)	8 (5.7%)	9 (9.0%)	.587
HAV	0 (0.0%)	2 (1.4%)	1 (1.0%)	.897
Cirrhosis	3 (30.0%)	32 (22.9%)	17 (17.0%)	.417
NASH	1 (10.0%)	11 (7.9%)	3 (3.0%)	.255
Alcohol abuse	2 (20.0%)	44 (31.4%)	35 (35.0%)	.585
IVDU	2 (20.0%)	51 (36.4%)	53 (53.0%)	.013
OUD/SUD	4 (40.0%)	38 (27.1%)	29 (29.0%)	.674
Dep/Anxiety	2 (20.0%)	35 (25.0%)	26 (26.0%)	.914
BPD	0 (0.0%)	8 (5.7%)	7 (7.0%)	.658

Patients in this study had an average of 4 comorbidities. An analysis of variance reflected there was no statistically significant difference in the number of diagnoses between time periods (p= .19), as the average number of diagnoses in all 3 time periods was slightly above 4 (Table 2).

Table 2. *Analysis of Variance in Number of Diagnoses Across Time Periods* (*N*= 250)

	Pre-Pilot Study (*n* = 10)	During Pilot Study (*n* = 140)	After Pilot Study (*n* =100)	*p*
# of Diagnoses (1-9)				.193
Mean	4.50	4.73	4.34	
Std. Deviation	1.51	1.75	1.48	
Minimum	2	1	1	
Maximum	7	9	8	

Findings

Specific Aim 1

Regarding specific aim 1, a post-hoc chi-square test was used to determine any significant differences in no-show rates amongst the 3 times periods. Results revealed a statistically significant decrease in no-show rates during the period of the applied pilot intervention, and an increase in no-show rates once the intervention was stopped (p= .009).

Specific Aim 2

Regarding specific aim 2, Pearson chi-square and Mann-Whitney U tests were used to determine any significant correlation between patient demographics/socioeconomic factors and no-show appointments. This revealed a statistically significant correlation in no-show encounters amongst the unemployed patients (p= .034), new patients (p= <.001), and younger patients (p= .039) (Table 3). Over 50% of the patients who were no-shows were under the age of 45 years old. Amongst the patients within the age group of 25-34, 56% were no-shows. Amongst the patients within the age group of 55-64, only 30% were no-shows, meaning 70% of the patients within this age group attended their scheduled appointment.

Considering employment status, results showed that 74.8% of those who did not show for their appointment were unemployed. Out of all patients who had a scheduled appointment throughout the entire data collection period, the unemployed made up the majority at 66.7% of the total number of patients.

Overall, there were a total of 77 new patients, 45 of which were considered no-shows, meaning 58.4% of new patients did not show for their appointment. Throughout the entire data collection period, 31% were new patient/new consult appointments, while 69% were follow-up appointments with established patients.

There was no statistically significant correlation between other demographic data/socioeconomic factors, including gender, race, insurance status, urban vs. rural address, or jail history, with no-show appointments. Surprisingly, amongst patients with a history of incarceration, 45% were no-shows, although there was no statistical significance when compared to those who had no incarceration history. In addition, although no statistical significance was found amongst areas of residence, there was a high rate of no-shows amongst those who lived in a rural area at 47%.

Specific Aim 3

Chi-square tests were used to assess for correlations between comorbidities and no-show appointments which addressed specific aim 3. The comorbidities that were analyzed included HCV, HBV, HAV, cirrhosis, NASH, alcohol abuse, IVDU, OUD/SUD, depression/anxiety, and BPD. This revealed a statistically significant correlation in no-show encounters and HCV (p= .007), cirrhosis (p= .006), and IVDU (p= .040). Considering the vast majority of the patients included in this study had been diagnosed with HCV, the no-show rate is still statistically significant, as 45% were no-shows. Amongst patients with cirrhosis, 25% were no-shows.

Remarkably, amongst patients with a history of IVDU, 49% did not show for their scheduled appointment. Overall, patients with IVDU made up 50% of the total of no-shows throughout the entire data collection period. There was no statistical significance amongst the other diagnoses included in the study in relation to no-show rates.

Table 3. *Associations with Demographic Data and Appointment Status* (*N*=250)

	Appointment status		*p*
	Complete (*n* = 146)	No-show (*n* = 104)	
Age			.039
18-24	3 (2.1%)	0 (0.0%)	
25-34	17 (11.6%)	22 (21.2%)	
35-44	42 (28.8%)	34 (32.7%)	
45-54	29 (19.9%)	22 (21.2%)	
55-64	42 (28.8%)	18 (17.3%)	
65-74	13 (8.9%)	8 (7.7%)	
Gender			.35
Male	74 (50.7%)	59 (56.7%)	
Female	72 (49.3%)	45 (43.3%)	
Race			.162
White	134 (91.8%)	100 (96.2%)	
Black	5 (3.4%)	4 (3.8%)	
Hispanic	4 (2.7%)	0 (0%)	
Asian	3 (2.1%)	0 (0%)	
Insurance			.418
Private	7 (4.8%)	2 (1.9%)	
Medicaid	102 (69.9%)	80 (76.9%)	
Medicare	31 (21.2%)	20 (19.2%)	
Uninsured	6 (4.1%)	2 (1.9%)	
Employment Status			.034
Employed	46 (31.5%)	24 (23.3%)	
Unemployed	89 (61.0%)	77 (74.8%)	
Retired	11 (7.5%)	2 (1.9%)	

Socioeconomic Fa No jail hx Jail hx	107 (73.3%) 39 (26.7%)	72 (69.2%) 32 (30.8%)	.483
Patient Status New Patient Existing Patient	32 (21.9%) 114 (78.1%)	45 (43.3%) 59 (56.7%)	<.001
Residence Rural Urban Out of state	52 (35.6%) 87 (59.6%) 7 (4.8%)	46 (44.2%) 57 (54.8%) 1 (1.0%)	.124
Comorbidities			
HCV	113 (77.4%)	94 (90.4%)	.007
HBV	10 (6.8%)	8 (7.7%)	.799
HAV	2 (1.4%)	1 (1.0%)	.770
Cirrhosis	39 (26.7%)	13 (12.5%)	.006
NASH	8 (5.5%)	7 (6.7%)	.681
Alcohol Abuse	53 (36.3%)	28 (26.9%)	.118
IVDU	54 (37.0%)	52 (50.0%)	.040
OUD/SUD	38 (26.0%)	33 (31.7%)	.324
Dep/Anxiety	34 (23.3%)	29 (27.9%)	.409
BPD	11 (7.5%)	4 (3.8%)	.226

Finally, a two-sample t-test was used to assess for a correlation between the extent of the patient medical history and no-show encounters (Table 4). This was completed by numbering the amount of diagnoses each patient had been diagnosed with out of the 10 diagnoses included in this study, which ranged from 1-9. There was no statistical significance in the comparison of these factors (p= .19). The average number of diagnoses amongst the patients who did not show

for their appointment was 4.40/10 diagnoses, while the average number amongst those who did show was 4.68/10 diagnoses.

Table 4. *Associations with Number of Diagnoses and Appointment Status* (*N*=250)

	Appointment status		*p*
	Complete (*n* = 146)	No-show (*n* = 104)	
# of Diagnoses (1-9) Mean	4.68	4.40	.193

Discussion

This study was able to show that there are patterns amongst patients that do not show for their appointments. This data specifically reflects that for this clinic, new patients are more likely to not show for their appointment when compared to already-established patients, and that patients who have a history of IVDU, HCV, and cirrhosis are more likely to not show when compared to those diagnosed with HBV, HAV, NASH, alcohol abuse, OUD/SUD, depression/anxiety, and BPD. Considering the statistically significant correlations between no-show rates and multiple factors reflected in the data, it can be determined that specific demographic data, comorbidities, and patient health status may contribute to a higher likelihood that a patient will not show for their scheduled telehealth appointment. Specifically, this study indicates that new patients, patients who are under 45 years old, patients who are unemployed, and patients with a history of HCV/cirrhosis, and IVDU are the most likely to be a no-show. This is similar to what Karimi et al., (2022) found in a study that assessed the national trends in telehealth use, which showed that telehealth use rates were significantly lower amongst patients who were uninsured and young adults ages 18-24, while remaining similar amongst other demographic subgroups. This information supports the need for a targeted intervention.

Overall, there is a significant problem with increased no-show rates amongst telehealth patients in this clinic. While it is unclear why no-show rates increased in the time period after the pilot study was completed, one possibility is that patients were lacking the telehealth support needed once the pre-appointment call was stopped. Based on the differences in no-show rates during the three time periods, it can be suggested that the pre-visit phone call intervention was successful in decreasing the amount of no-show appointments during the time period of implementation. Data reflects that patients who are within the age range of 25-44 are more likely to not show for their appointment when compared to the other age groups, and that patients who are unemployed are more likely to not show for their appointment when compared to those who are employed or retired. These results show that there is no significant correlation between gender, race, insurance status, incarceration history, and area of residence with no-show appointment status.

The results of this study can be used to determine the next step in creating an intervention to decrease no-show rates. These findings can help guide the clinic in defining what patients can be included in a more-targeted intervention. For example, a pre-appointment phone call can be made to patients who are considered high-risk for appointment no-show, to provide telehealth support with logging in and attending their scheduled appointment. This clinic can provide needed targeted pre-appointment telehealth support, thus resulting in decreased no-show rates.

Practice Recommendations

Considering the results of this study, a recommendation can be made that targeted telehealth assistance for new patients, patients under the age of 45, unemployed patients, and patients with a history of IVDU may help this group of patients to receive health care. Overall, this recommendation can also be applied to patients with a history of HCV and cirrhosis.

However, considering most of the patients seen in this clinic have been diagnosed with one or both of these diagnoses, including targeted support for those diagnosed with HCV or cirrhosis is not recommended for this clinic, as this would hardly differ from the previous implemented intervention that was not able to be continued or supported long-term.

Cost implications to be considered include the financial support of an employee to complete the targeted pre-appointment telehealth assistance. By targeting the assistance to only patients who are considered high-risk for no show, rather than every patient scheduled, it decreases the time and effort needed of this employee. Considering no-show appointments increase the overall cost and negatively affect relative value unites (RVUs), further leading to reimbursement issues, the cost benefit of this intervention goal would be accomplished by decreasing telehealth no-show rates within this clinic. A cost-benefit analysis could determine if the cost benefit of the intervention would outweigh the cost implications.

Limitations

Some limitations were noted in this study. One limitation was that patient records prior to the end of August 2021 were not available to be accessed for data collection, although raw no-show percentages showed that a no-show rate problem existed. Another limitation is the consideration that other factors could have contributed to patients not showing for their telehealth appointments that were not analyzed for this study.

Conclusion

Overall, this study was able to identify a significant problem with telehealth no-show rates within this clinic, identify a statistically significant decrease in no-show rates during the implementation of a pre-appointment telehealth support phone call, and most importantly, determine what factors were the most common amongst patients who did not show for their

appointment. This information is important in creating targeted pre-appointment support amongst telehealth patients who are more likely to not show for their appointment, in an effort to decrease overall no-show rates.

This study is valuable to healthcare and practice, as identifying patterns to determine future predictions for no-shows can be applied to telehealth appointments in other outpatient clinics that have high no-show rates. Decreasing no-show rates can positively impact a clinic financially. The results of this study determine that there can be barriers that a specific patient population is experiencing, and by determining the characteristics of patients more likely to not show for their appointment, a targeted intervention can be created to help support patients with these characteristics, and increase telehealth use overall.

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