Winter 12-16-2022

An Enhanced Enrollment Process to Impact Appointment Compliance in the HF-Optimize Clinic

Carolyn Coons
University of Nebraska Medical Center

Teri Diederich
University of Nebraska Medical Center

Kyana Holder
University of Nebraska Medical Center

Final

University of Nebraska Medical Center

College of Nursing

DOCTOR OF NURSING PRACTICE (DNP)

FINAL DNP PROJECT

An enhanced enrollment process to impact appointment compliance in the HF-Optimize clinic

by

Cari Coons, Teri Diederich, and Kyana Holder

The final DNP project presented to the

Faculty of the University of Nebraska Medical Center College of Nursing

In Partial Fulfillment of the Requirements for the Degree

DOCTOR OF NURSING PRACTICE

December 2022

Bunny Pozehl, PhD, APRN-NP, FAHA, FHFSA, FAAN and

Windy Alonso, PhD, RN, FHFSA

Abstract

Background

The HF-Optimize clinic showed improved utilization of guideline-directed medical therapy (GDMT) along with improved clinical outcomes from 2018 to 2020. Appointment compliance was poor with only 44% of patients completing all HF-Optimize visits. Missed appointments led to worse health outcomes, fragmented care, and provider inefficiencies. Interventions to improve appointment compliance are vital to improving heart failure outcomes.

Objective

The purpose of this quality improvement project is to evaluate the impact that an enhanced enrollment process has on appointment compliance in a culturally diverse, adult population referred to the HF-Optimize clinic at Nebraska Medicine.

Methods

This prospective quality improvement project evaluated an enhanced enrollment process for patients scheduled for their first visit to the HF-Optimize clinic between March 1, 2022, and August 31, 2022. The enhanced enrollment process included tracking reasons for missed appointments, deployment of an educational video, and instructing patients to enroll in MyChart. Evaluation of the enhanced enrollment process included a survey assessing if the patient watched the video, if they found the video helpful, and if it contributed to them coming to their first appointment. Demographics and MyChart enrollment were collected.

Results

A total of 138 patients were referred to the HF-Optimize clinic between March 1, 2022 and August 31, 2022. Patients were a mean age of 60.9 +/- 3.5 years, 42% female, and 33% non-

white. Of those referred, 98 patients came to their first appointment (71%). There were 59 video surveys completed. There were 50 patients that reported signing up for MyChart (85%). There were 15 patients that reported watching the HF-Optimize video. The majority of patients (59%) rated the video between 8 to 10 for helpfulness.

Conclusions

Appointment compliance improved during the project period. Patients completing the video survey found it to be helpful in describing the HF-Optimize clinic. Due to the small number of completed surveys, a relationship between video viewing and appointment compliance could not be determined. Future studies should utilize electronic applications that track individual use.

Keywords: Heart Failure, Optimize, appointment compliance

Introduction

Heart failure (HF) is a leading cause of morbidity and mortality in the United States. Currently over 6 million Americans are diagnosed with HF, and this is expected to increase to over 8 million by 2030, affecting 3% of the population (Virani et al., 2021). In 2018, heart failure was listed on 379,800 death certificates (Virani et al., 2020). There are significant costs in caring for patients with heart failure. In 2012, heart failure care cost in the United States was an estimated $30.7 billion dollars (Benjamin et al., 2019). This estimate includes costs of health care services, medications to treat heart failure, and missed days of work. Utilization of guideline-directed medical therapy (GDMT) has been shown to decrease morbidity and mortality for patients with heart failure with reduced ejection fraction (HFrEF) (Virani et al., 2021 and Yancy et al., 2017). Despite established treatment guidelines, only a small proportion of patients are treated on GDMT (Yancy et al., 2017). The Champ-HF registry showed that only 1% of eligible patients were on triple therapy as recommended for GDMT with ACEi/ARB/ARNI, BB, and MRA (Green et al., 2018).

Heart failure clinics aiming to improve GDMT utilization while decreasing HF hospitalizations and mortality have been described in the literature. Utilizing advanced practice providers (APPs), pharmacists, and HF-trained nurses in GDMT clinics is imperative to increase appropriate use of GDMT for heart failure patients (Berei, et al., 2021). Clinics led by APPs, pharmacists, and HF-trained nurses have shown increases in GDMT titration as well as higher proportion of patients on target doses of GDMT (Balakumaran et al, 2019 and Driscoll, et al., 2016). Patients seen in GDMT clinics also had improvements in ejection fraction along with fewer hospitalizations (Balakumaran et al, 2019 and Driscoll, et al., 2016). Additionally, patients

had improved quality of life scores when followed closely in a GDMT clinic (Schulz et al., 2019).

Problem Statement

The problems being addressed are appointment compliance and utilization of GDMT for HF patients. Literature shows that between 23% and 34% of outpatient appointments are missed annually (Crutchfield & Kistler, 2017 and Dantas et al., 2018). Dantas et al., found the no-show rate in cardiology clinics to be 30% (2018). Missed appointments lead to patients not receiving necessary care for their medical conditions. Patients not receiving outpatient follow-up for their medical conditions have fragmented care with worse health outcomes (Crutchfield & Kistler, 2017 and Shah et al., 2016). Patients not receiving care for chronic medical conditions are also at risk of rehospitalization. Patients with HF not on optimal GDMT are at higher risk for rehospitalization than those that are (Yancy et al., 2017). Clinic follow-up is an opportune time to assess GDMT uptake and optimize these therapies.

Missed health care appointments are a burden to the patient and health care system (Dantas et al., 2018). Missed appointments decrease provider efficiency, limit other patients' access to outpatient services, and increase health care costs (Crutchfield & Kistler, 2017, Dantas et al., 2018, and Shah et al., 2016). When patients do not attend their scheduled appointment, this decreases access for another patient to be seen. Provider efficiency is also decreased due to time spent preparing for a patient that is not seen.

Determining reasons for missed appointments and interventions to improve outpatient follow up are essential to providing quality patient care. Most common causes for missed appointments include patients forgetting, lack of transportation, distance from residence, work

schedules, and medical coverage (Crutchfield & Kistler, 2017, Dantas et al., 2018, and Shah et al., 2016). Patients with chronic medical conditions and uninsured/self-pay patients are also more likely to no-show an appointment (Shaw et al., 2016). Patients referred by another health care provider are less likely to no-show an appointment (Dantas et al., 2018).

Heart failure patients not on GDMT have worse health outcomes with higher mortality (Virani et al., 2021). It is estimated that between 20-50% of heart failure patients are not compliant with their medications, leading to heart failure decompensation and hospitalization (Maddox, et al., 2021). Heart failure hospitalizations are an opportune time to initiate GDMT that will be continued in the outpatient setting (Maddox, et al., 2021). Patients with heart failure require support when transitioning from acute care to outpatient care (Whitaker-Brown, et al., 2017) and should be regularly seen in clinic to assess heart failure symptoms and medication compliance (Maddox, et al., 2021). Systems are necessary to support patients and clinicians in getting patients appropriate medical therapy (Cutler, er al., 2010). Integrating APPs, pharmacists, and nurses into collaborative practice can help to optimize GDMT for patients with heart failure (Maddox, et al., 2021).

The advanced heart failure team at Nebraska Medicine developed the Heart Failure Optimize (HF-Optimize) clinic in 2018 to focus on optimizing GDMT in clinical practice for HF patients. This multidisciplinary clinic is led by Advanced Practice Providers (APPs), and includes a team of pharmacists, nutritionists, and nurses. The clinic targeted patients with a new HF diagnosis, 30-day HF readmission, or ≥ 2 HF-related hospitalizations in the prior 12 months to titrate GDMT, provide heart failure education, and evaluate the impact on functional markers and quality of life. Patients are referred to the HF-Optimize clinic by their inpatient provider team or by their outpatient providers. A referral is placed in the electronic health record (EHR) to

the HF-Optimize clinic and referrals are screened by the heart failure nurses. Inpatient heart failure nurse disease case managers help to identify candidates for the HF-Optimize clinic and work with the admitting team for referral. All patients are contacted by the heart failure scheduling team to make appointments. Patients are enrolled in the HF-Optimize clinic either during a hospital encounter or from an outpatient visit. Once they have completed the 6 visits over 12 weeks, they are then referred back to the referring provider with medication recommendations. Patients are referred to a heart failure physician if heart failure symptoms persist.

Between October 2018 and December 2020, the HF-Optimize clinic received 253 referrals for HFrEF patients. During this period 110 patients completed the 12-week HF-Optimize clinic program. Results from the clinic showed significant increases in GDMT along with improvements in 6-minute walk distance, LVEF, and QOL scores. There were 143 referred patients that did not complete the HF-Optimize program (Diederich et al., 2022). Documented reasons for not completing the program included the patient did not present to the appointment (no-show) (71%), APP in HF-Optimize clinic did not enroll after first visit (10.5%), patient did not enroll after first visit (10.5%), the patient was deceased (4%), or other (4%). The APP did not enroll patients in the HF-Optimize clinic if they were already on optimal GDMT or could not be optimized further due to dialysis or symptomatic hypotension. Of the 143 patients that did not complete HF-Optimize, 101 patients did not present to the clinic for their scheduled appointment (no-show).

Interventions to decrease missed appointment rates and improve transition of care have been described in the literature. Patients identified that appointment reminders through telephone calls, text messages, and emails are beneficial (Breathett, et al., 2017, Crutchfield & Kistler,

2017, Dantas et al., 2018, and Shah et al., 2016). Patients with HF were also interested in using mobile applications that can provide appointment reminders while tracking activity and providing symptom management tips (Sohn et al., 2019). Utilization of a patient portal has also been shown to improve patient clinic attendance (Zhong, et al., 2018). Transitioning patient care from time of referral to the first HF-Optimize visit is a crucial time to impact clinic appointment attendance.

Purpose Statement

The purpose of this quality improvement project is to evaluate the impact that an enhanced referral process has on appointment compliance in a culturally diverse, adult population referred to the HF-Optimize clinic at Nebraska Medicine. Specific goals of the project are to enroll patients in MyChart and Care Companions, develop educational material describing the HF-Optimize clinic, and encouraging patient attendance.

Specific Aims

The aims of this study are to:

1. Evaluate the impact of an enhanced enrollment process on appointment attendance in adults referred to the HF-Optimize clinic.
2. Identify reasons why patients did not present to scheduled appointments and appointment barriers
3. Evaluate enrollment and use of MyChart and Care Companions
4. Develop a HF-Optimize clinic educational video delivered through Care Companions to disseminate to referred patients with HF and survey patient responses on whether video affected their decision to attend clinic appointment

Clinical Question

Using a prospective, quality improvement project, the clinical research question for this study is: (P) In an adult population referred to the HF-Optimize clinic at Nebraska Medicine, (I) does an enhanced enrollment process, (C) compared to patients referred to the HF-Optimize clinic prior to implementation of enhanced enrollment process, (o) improve appointment attendance, (T) between March 2022 and August 2022.

Review of the Literature

Information on heart failure education and specific strategies to achieve GDMT and goal directed cares are limited in the literature. The literature search was guided by the reference librarian at UNMC. The search was started by looking for articles that discussed the use of different forms of educational tools to help improve heart failure therapy compliance and improve appointment completion rates in heart failure patients. The search terms used were appointment compliance, appointment adherence, heart failure, patient education, and guideline-directed medical therapy which were then identified in the search through CINAHL, Embase, Cochrane and PubMed databases. The studies reviewed for this project had inclusion criteria for patients with heart failure of NYHA II-IV. The study participants were recruited from both inpatient and outpatient settings. The exclusion criteria of the reviewed articles consisted of patients who were under the age of 18; congenital heart disease; waiting for heart surgery, LVAD or transplant; less than 1 year of life expectancy, hospice/comfort care status; and patients on hemodialysis.

The total number of studies reviewed for the project was 691 (Appendix B). A hand search was completed from ancestry articles previously reviewed by the author and co-authors and yielded four more articles for review. The studies reviewed that fit the appropriate criteria

included: 2 quality improvement studies, 5 randomized control trials, 4 medical record review studies, 5 observational studies, 5 cohort studies, 1 cross-sectional study, 1 evidence of opinion article, and 6 literature reviews. The articles included in the review involved patients diagnosed and/or hospitalized with heart failure who were evaluated for level of knowledge, compliance with medications, compliance with appointment, and use of educational tools and resources to improve patient outcomes.

Results from each database that met inclusion and exclusion criteria included: 52 from the CINAHL database; 8 from the PubMed database; 629 from Embase; and 2 from the Cochrane database. A search for scholarly articles was also completed in Google Scholar which found another 27 articles. Once the duplicates were removed there were a total of 582 articles that remained. The remaining articles were screened to determine if they were applicable to our topic of increasing heart failure education to improve compliance with medications and appointments in patients referred to the HF-Optimize clinic. As the literature review continued there were 136 articles that were eligible and that had access to full text. The studies that were included in the systematic review were 22 qualitative synthesis papers with 17 articles that were quantitative or meta-analysis studies (See PRISMA diagram in Appendix B). There were 72 full text articles excluded as they did not pertain to improving appointment compliance.

Secondly, due to the limited number of articles that were able to be applied to this topic, many Level IV articles were accepted that were moderate to low quality. There were 4 Level I articles with an additional 4 articles that were Level II. The articles used questionnaires and surveys to obtain compliance information from the patients. The biases that were identified included selection bias of already hospitalized patients and those already included in other heart failure studies as well as response bias due to people receiving heart failure education in the

hospital prior to completing the questionnaires. All the studies were published prior to the review of the articles. Due to the limited number of studies available for review, articles that were applicable for heart failure patients, disease process education, and therapy compliance were retained. Excluded studies did not relate to appointment compliance or managing chronic disease states.

The smallest study consisted of 84 participants with the largest study of 115,245 participants. The search was not limited to any geographical area, and studies from multiple sites around the world were reviewed. The follow-up periods ranged from time of hospitalization to 5-year studies. Many interventions focused on improving education about the need for different heart failure interventions (daily weights, sodium, and fluid restriction) and medication as a method to improve compliance and quality of life while decreasing hospital readmissions (DeVore et al, 2021; Gilotra et al, 2017; Gupta et al, 2018; Marti et al, 2012; van der Wal et al, 2005). Studies comparing the use of goal directed medical therapy for heart failure and the number of patients who had met target doses were also included (Allen et al, 2021, Balakumaran et al, 2019; Driscoll et al, 2015; Green et al, 2018). The outcomes measured by the studies included 30-day readmission rates, appointment compliance, medication compliance, and diet/fluid management (Gupta et al, 2018). Additionally, studies discussing appointment compliance and the factors associated with missed appointments were included (Breathett et al, 2017; Chen, Bowers & Smallheer, 2018; Distelhorst et al, 2018; Gilotra et al, 2017; Giunta et al, 2020; Magadzire, Mathole & Ward, 2017). Two articles that were reviewed discussed the transition of care process and how to improve the key factors such as provider to provider communication, medication delivery prior to discharge, and a follow-up phone call 2-3 days post discharge (Devore et al, 2021; Mansukhani et al, 2015).

Conceptual/Theoretical Framework

The conceptual framework that was used for the foundation of this project is Naylor's Transitional Care Model. This model focuses on the transition phase from hospital to other settings in order to decrease rehospitalizations and improve outcomes (Hirschman et al., 2015). This model applies to this project as it targets patients prior to discharge in order to increase compliance with appointments which then leads to improved outcomes. The HF-Optimize clinic has shown improved measures related to heart failure in those who complete the program. The biggest issue at this time is the large percentage of patients who are referred to the clinic that do not attend. There are multiple components of the Transitional Care Model; the components that directly apply to this project include fostering collaboration, screening, engaging patients and care givers, educating and promoting self-management, collaborating, and promoting continuity (Hirschman et al., 2015). This project consisted of implementation of an enhanced enrollment process which includes screening patients for appropriate referrals as well as providing patients with tools prior to their appointments to increase attendance. As mentioned previously, the HF-Optimize clinic is a collaboration of multiple disciplines to best support the patient and provide them with the education they need to succeed in caring for themselves. By providing the education and tools patients need to succeed on their own, this engages them in their own care.

Methodology

Study Design

The study design was a prospective quality improvement process examining the impact of an enhanced enrollment process for the HF-Optimize clinic. Patients referred to the HF-Optimize clinic between March 1, 2022, and August 31, 2022, were enrolled prospectively in the study.

Subjects

Patients referred to the HF-Optimize clinic for heart failure medication titration between March 2022 and August 2022 were included.

Setting

The referrals were from the inpatient unit at the Nebraska Medicine Campus, primary care offices, and other cardiology clinics.

Proposed Intervention

The enhanced enrollment process included use of the EHR with additional education on the clinic, a video description of what the HF-Optimize clinic is, why attendance will benefit their health, and services offered through the clinic.

Tools & Measures

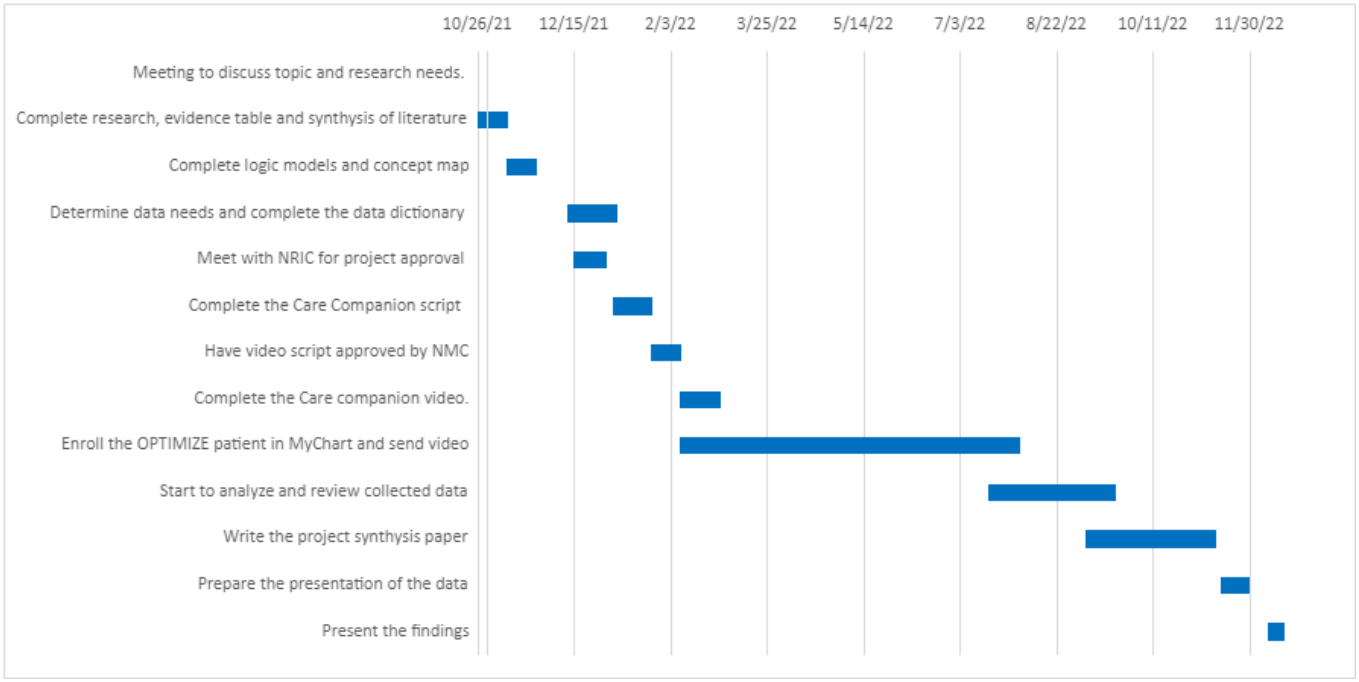
The EHR system MyChart/EPIC was utilized as the platform for delivery of the enhanced enrollment process. The adjunct Care Companions program was unable to be utilized at the time of this study as it was not operational. A survey (Appendix A) was developed to assess if the patient was able to sign up for MyChart; if not able to, why that was; if the patient was able to watch the video; on a scale of 0 to 10 how helpful the video was; if the video helped to decide to come; if yes, how so; and what the most helpful information was in the video. Data was input into a secured, cloud-based database, Research electronic Data Capture (REDCap). REDCap is a secure web application for building and managing online surveys and databases. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies. REDCap at UNMC is supported by Research IT Office funded by

Vice Chancellor for Research (VCR). This publication's contents are the sole responsibility of the authors and do not necessarily represent the official views of the VCR and NIH.

Procedure

An educational video was developed to educate the patients referred to the HF-Optimize clinic to increase their knowledge and awareness of the clinic. The educational video described the HF-Optimize clinic schedule, testing that would happen during their first visit, and provided information to the patient about heart failure. The patient was also encouraged to enroll in the EHR MyChart system, connecting them to the providers via the EPIC EHR system. The heart failure nurses and schedulers were educated on the new process of enrolling patients in MyChart. They then assisted patients to enroll in the MyChart application and assigned the HF-Optimize clinic video to the patients to review. At the first visit, engagement with the video and MyChart was assessed with the survey described above. Demographic data and surveys collection from the educational video were stored in REDCap.

Timeline



Analysis

As mentioned above, this study focused on four aims. The first aim was to evaluate the impact of an enhanced enrollment process on appointment attendance in adults referred to the HF-Optimize clinic. As noted in Diederich, et al. (2022), the HF-Optimize clinic improved heart failure outcomes, GDMT initiation and titration, and heart failure symptoms. Also noted was a problem with appointment compliance. There was a 56% non-completion rate of those referred to the HF-Optimize clinic during the first 27 months of operation. Once the enhanced enrollment process went into effect, this study assessed the number of patients that showed up for their first appointment as compared to the time from the start of HF-Optimize to the time of initiation of the enhanced enrollment process.

The second aim was to identify the causes of missed appointments and the associated barriers. An excel spreadsheet was given to the schedulers to document reasons given for patients not presenting to their appointment. Unfortunately, due to staff turnover in the

scheduling department, a full log was not kept. The only causes and/or barriers collected were those that were reached to reschedule.

The third aim was to evaluate enrollment in MyChart and Care Companions. Due to Care Companions not being available at the time of data collection the aim was shifted to only assess the ability to enroll in MyChart.

Finally, the fourth aim was to make and distribute an educational video about the HF-Optimize clinic that was accessible through Care Companions. However, as mentioned, due to the inability to utilize Care Companions, a video was made, and the link was sent to the patient either via email or MyChart. A one-page survey was provided to the patients at the time of their initial appointment in HF-Optimize. The survey assessed if the patient was able to sign up for MyChart, sign up for Care Companions, and if they watched the HF-Optimize video. If they watched the video, they were asked if it played a factor in them coming to their first appointment. Patients also completed a scale to score the helpfulness of the video and to identify what portions of the video they felt were the most helpful.

Findings

Between March 1, 2022, and August 31, 2022, the HF-Optimize clinic received 138 referrals. Of those, 98 patients presented to the clinic for their first appointment whereas 40 did not. The resulting non-completion rate was 29%. The demographics, including race (see Table 1) and gender (see Table 2), were evaluated in both groups. Our sample was majority Caucasian and male with a mean age of 60.9 years.

Table 1. Appointment compliance by race

Race	Presented to clinic Count (percent of total)	Did not present to clinic Count (percent of total)	Totals Count
Caucasian	72 (77.4%)	21 (22.6%)	93
Black	17 (54.8%)	14 (45.2%)	31
Hispanic	6 (66.7%)	3 (33.3%)	9
Asian	0 (0%)	1 (100%)	1
Other	3 (75%)	1 (25%)	4
Totals	98 (71%)	40 (29%)	138

Table 2. Appointment compliance by gender

Gender	Presented to clinic Count (Percent of total)	Did not present to clinic Count (percent of total)	Totals
Male	55 (68.8%)	25 (31.2%)	80
Female	43 (74.1%)	15 (25.9%)	58
Totals	98 (71.0%)	40 (29.0%)	138

There were 59 surveys completed for evaluation. There were 50 (85%) participants that reported signing up for MyChart and 9 that did not. Of the 9 unable to sign up for MyChart, 3 provided text to explain their responses. These answers included: they did not like the program, they did not have access, and they did not have internet on their phone. There were 15 patients that reportedly watched the HF-Optimize video and 44 that did not. Of those that reported viewing the video, a majority (59%) rated it between 8 and 10 for helpfulness. In addition to surveys, charts were accessed to note the number of patients enrolled in MyChart. There were 88 patients (64%) that were enrolled, 48 were not, and 2 were deceased therefore status was unknown.

Discussion

We developed an enhanced enrollment process to improve appointment compliance at the HF-Optimize clinic. As stated in Diederich, et al. (2022), the Optimize-HF clinic experienced a high number of missed appointments. A significant improvement in GDMT, EF, and QOL was seen in those that completed the clinic. There have been many other studies that have looked at appointment compliance and the effect it has on efficiency and patient outcomes (Crutchfield & Kistler, 2017, Dantas et al., 2018, and Shah et al., 2016). This project aimed to improve appointment compliance and thereby improve patient outcomes. The initial study design utilized Care Companions; a web-based application available through MyChart in EPIC. Care Companions was chosen as the digital assistant due to its availability within the organization's EHR. Literature shows improved appointment compliance with utilization of digital applications to engage patients in their healthcare and remind them of clinic visits (Zhong et a., 2018). While the initial timeline was approved by IT for development of the Care Companions heart failure cascade for patients, development took longer than expected and could not be utilized during the study period.

Development of an informational video for all patients referred to the HF-Optimize clinic was completed. Patients were given the website to view the video and encouraged to do so. Patients that viewed the video and completed the survey found it informative and helpful to understand the HF-Optimize clinic. There was no ability to track if each participant viewed the video and numbers could not be tracked. While all participant surveys had positive evaluations, a causal effect could not be determined based on small sample size.

Data collection was difficult and incomplete in the study. Staffing turnover led to data not being collected by patients missing initial appointments, such as reasons for missed appointments and barriers they experienced. Crutchfield & Kistler (2017). Dantas et al., (2018).,

and Shah et al., (2016) all found that when barriers were addressed, appointment attendance improved. Determining reasons for missed appointments can guide interventions for further studies. As Care Companions could not be utilized for surveys, patients were given paper packets to complete at initial and final visits. Packets were developed and printed by the team and staff were educated on which packets patients needed at each visit. Despite this, many patients did not receive a packet or received the incorrect packet. Survey packets were also returned without completed surveys. In the future, interventions to ensure complete data collection are necessary.

Appointment compliance did improve during the study period. Our findings are consistent with studies by Zhong et al., (2018) and Salinero et al., (2018), showing improved compliance with use of appointment reminders and education regarding visit reasons. Over 70% of patients in this cohort presented to the clinic for their initial appointment. This is a marked improvement from the 41% reported by Diederich et al., 2022. Data on video viewing and survey completion was incomplete so the impact of the enhanced enrollment process could not be determined. The data showed that 88 of the 138 (64%) referred patients were enrolled in MyChart.

Limitations

A key limitation to this study was the inability to utilize Care Companions to deliver the HF-Optimize video and appointment reminders. There also was no ability to track video viewing so these results were based on self-report. All data was collected in packets given to patients at their first visit and then entered into REDCap and not all patients completed packet surveys. Survey completion was insufficient to have sufficient data to analyze beyond descriptive statistics. Staff turnover during the study period also prohibited collection of reasons

appointments were missed. This study was performed at a single center and may not be generalizable to all heart failure clinics.

Conclusions

An enhanced enrollment process to improve appointment compliance can be beneficial for patients. While the study design planned to use Care Companions, an electronic application to deliver information to all enrolled patients, IT development of the patient application build took longer than projected and could not be utilized for the project. Patients were sent a weblink to view the HF-Optimize video, but data could not be collected on the number of patients accessing the actual video. Patient surveys were given at initial visits but were not completed by many patients. Patient's review of the video was positive, stating the information was helpful and encouraged some to attend their first visit. During the study period an increase in appointment attendance was seen but due to the inability to track video viewing and small number of returned surveys, we could not determine the impact of our enhanced enrollment process.

Significance and/or Implications

The study showed that the enhanced enrollment process, particularly the appointment reminders, help decrease the number of missed and underutilized appointments as seen in other literature. We did not measure hospital readmissions in this study, but prior literature demonstrates that heart failure GDMT optimization programs that have an improved completion rate can also help to avoid hospital readmissions (Balakumaran et al, 2019 and Driscoll, et al., 2016). By utilizing the automated system, the reminder calls were set without risk of human error and did not require acquisition of a new position or increased personnel budget. There is a plan to continue evaluating the addition of the Care Companions portion to see if the missed appointment and appropriate referrals continue to improve.

For future studies, we recommend the use of electronic questionnaires sent via the EMR system or via an email PDF. As the study progressed, it was necessary to update the packets of information and questionnaires to give to patients at the time of the first appointment. There were multiple times that the previous packets were not removed from the outreach sites. The paper copies were often difficult to collect which made data collection inefficient and delayed into the REDCap system. The electronic system would enable updating of the packets in a more streamlined process.

Recommendations

Based on these findings, we recommend use of the automated systems available in the electronic medical record to facilitate appointment compliance. The use of automated appointment reminders proved useful to reduce the number of missed appointments and scheduled tests. We also recommend placement of necessary programs and personnel prior to implementing a new enrollment process with written training instructions for each role to help reduce the number of errors that can occur with position turnover. Not having the Care Companions program available made it more confusing for the patients to participate in the pre-appointment education. As an alternative to Care Companions, an educational video link was sent to each of the patients. Unfortunately, we were unable to track how many patients watched the video prior to the first appointment. Future studies should be initiated once electronic applications are available for better data tracking and the ability to provide all information to patients. By engaging patients through our educational video and enrollment in MyChart, we were able to increase appointment completion rate. Ultimately, we hope to continue the enhanced enrollment process with the refinements identified during this project.

References

Allen, L. A., Venechuk, G., McIlvennan, C. K., Page, R. L., Knoepke, C. E., Helmkamp, L. J., Khazanie, P., Peterson, P. N., Pierce, K., Harger, G., Thompson, J. S., Dow, T. J., Richards, L., Huang, J., Strader, J. R., Trinkley, K. E., Kao, D. P., Magid, D. J., Buttrick, P. M., & Matlock, D. D. (2021). An electronically delivered patient-activation tool for intensification of medications for chronic heart failure with reduced ejection fraction. *Circulation*, *143*(5), 427–437. https://doi.org/10.1161/circulationaha.120.051863

Balakumaran, K., Patil, A., Marsh, S., Ingrassia, J., Kuo, C.-L., Jacoby, D. L., Arora, S., & Soucier, R. (2019). Evaluation of a guideline directed medical therapy titration program in patients with heart failure with reduced ejection fraction. *IJC Heart & Vasculature*, *22*, 1–5. https://doi.org/10.1016/j.ijcha.2018.10.003

Benjamin, E. J., Carson, A. P., Callaway, C. W., Bittencourt, M. S., Alonso, A., & Muntner, P. (2020). Correction to: Heart disease and stroke statistics—2019 update: A report from the American Heart Association. *Circulation*, *141*(2). https://doi.org/10.1161/cir.0000000000000746

Breathett, K., D'Amico, R., Adesanya, T. M. A., Hatfield, S., Willis, S., Sturdivant, R. X., Foraker, R. E., Smith, S., Binkley, P., Abraham, W. T., & Peterson, P. N. (2017). Patient perceptions on facilitating follow-up after heart failure hospitalization. *Circulation: Heart Failure*, *10*(6). https://doi.org/10.1161/circheartfailure.117.004099

Charais, C., Bowers, M., Do, O. O., & Smallheer, B. (2020). Implementation of a disease management program in adult patients with heart failure. *Professional Case Management*, *25*(6), 312–323. https://doi.org/10.1097/ncm.0000000000000413

Chen, C., Li, X., Sun, L., Cao, S., Kang, Y., Hong, L., Liang, Y., You, G., & Zhang, Q. (2018). Post-discharge short message service improves short-term clinical outcome and self-care behavior in chronic heart failure. *ESC Heart Failure*, *6*(1), 164–173. https://doi.org/10.1002/ehf2.12380

Crutchfield, T. M., & Kistler, C. E. (2017). Getting patients in the door: Medical appointment reminder preferences. *Patient Preference and Adherence, Volume 11*, 141–150. https://doi.org/10.2147/ppa.s117396

Cutler, D. M., & Everett, W. (2010). Thinking outside the pillbox — medication adherence as a priority for health care reform. *New England Journal of Medicine*, *362*(17), 1553–1555. https://doi.org/10.1056/nejmp1002305

Dantas, L.A., Fleck, J.L., Cyrino Oliveria, F.L., & Hamacher, S. (2018). No-shows in appointment scheduling – a systematic literature review. *Health Policy*, 122, 412-421.https://doi.org/10.1016/j.healthpol.2018.02.002

DeVore, A. D., Granger, B. B., Fonarow, G. C., Al-Khalidi, H. R., Albert, N. M., Lewis, E. F., Butler, J., Piña, I. L., Allen, L. A., Yancy, C. W., Cooper, L. B., Felker, G. M., Kaltenbach, L. A., McRae, A. T., Lanfear, D. E., Harrison, R. W., Disch, M., Ariely, D., Miller, J. M., … Hernandez, A. F. (2021). Effect of a hospital and post discharge quality improvement intervention on clinical outcomes and quality of care for patients with heart failure with reduced ejection fraction. *JAMA*, *326*(4), 314. https://doi.org/10.1001/jama.2021.8844

Distelhorst, K., Claussen, R., Dion, K., Bena, J. F., Morrison, S. L., Walker, D., Tai, H.-L., & Albert, N. M. (2018). Factors associated with adherence to 14-day office appointments

after Heart Failure Discharge. *Journal of Cardiac Failure*, *24*(6), 407–411. https://doi.org/10.1016/j.cardfail.2018.04.006

Driscoll, A., Currey, J., Tonkin, A., & Krum, H. (2015). Nurse-led titration of angiotensin converting enzyme inhibitors, beta-adrenergic blocking agents, and angiotensin receptor blockers for people with heart failure with reduced ejection fraction. *Cochrane Database of Systematic Reviews*, *2016*(1). https://doi.org/10.1002/14651858.cd009889.pub2

Gilotra, N. A., Shpigel, A., Okwuosa, I. S., Tamrat, R., Flowers, D., & Russell, S. D. (2017). Patients commonly believe their heart failure hospitalizations are preventable and identify worsening heart failure, nonadherence, and a knowledge gap as reasons for admission. *Journal of Cardiac Failure*, *23*(3), 252–256. https://doi.org/10.1016/j.cardfail.2016.09.024

Giunta, D. H., & Alonso Serena, M. (2019). Nonattendance rates of scheduled outpatient appointments in a university General Hospital. *The International Journal of Health Planning and Management*, *34*(4), 1377–1385. https://doi.org/10.1002/hpm.2797

Giunta, D. H., Alonso Serena, M., Luna, D., Peroni, M. L., Sanchez Thomas, D., Binder, F., Blugerman, G. A., Fuentes, N., Elizondo, C. M., & Gonzalez Bernaldo de Quirós, F. (2020). Association between Non-attendance to outpatient clinics and emergency department consultations, hospitalizations and mortality in a health maintenance organization. *The International Journal of Health Planning and Management*, *35*(5), 1140–1156. https://doi.org/10.1002/hpm.3021

Greene, S. J., Butler, J., Albert, N. M., DeVore, A. D., Sharma, P. P., Duffy, C. I., Hill, C. L., McCague, K., Mi, X., Patterson, J. H., Spertus, J. A., Thomas, L., Williams, F. B.,

Hernandez, A. F., & Fonarow, G. C. (2018). Medical therapy for heart failure with reduced ejection fraction. *Journal of the American College of Cardiology*, *72*(4), 351–366. https://doi.org/10.1016/j.jacc.2018.04.070

Gupta, A., Allen, L. A., Bhatt, D. L., Cox, M., DeVore, A. D., Heidenreich, P. A., Hernandez, A. F., Peterson, E. D., Matsouaka, R. A., Yancy, C. W., & Fonarow, G. C. (2018). Association of the hospital readmissions reduction program implementation with readmission and mortality outcomes in heart failure. *JAMA Cardiology*, *3*(1), 44. https://doi.org/10.1001/jamacardio.2017.4265

Hefter, G. B., & Gerson, L. (2010). Increasing adherence to scheduled outpatient dobutamine stress echocardiograms. *The Journal for Nurse Practitioners*, *6*(10), 768–774. https://doi.org/10.1016/j.nurpra.2010.07.022

Hirschman, K., Shaid, E., McCauley, K., Pauly, M., & Naylor, M. (2015). Continuity of Care: The Transitional Care Model. *OJIN: The Online Journal of Issues in Nursing*, *20*(3). https://doi.org/10.3912/ojin.vol20no03man01

Maddox, T. M., Januzzi, J. L., Allen, L. A., Breathett, K., Butler, J., Davis, L. L., Fonarow, G. C., Ibrahim, N. E., Lindenfeld, J. A., Masoudi, F. A., Motiwala, S. R., Oliveros, E., Patterson, J. H., Walsh, M. N., Wasserman, A., Yancy, C. W., & Youmans, Q. R. (2021). 2021 update to the 2017 ACC expert consensus decision pathway for optimization of heart failure treatment: Answers to 10 pivotal issues about heart failure with reduced ejection fraction. *Journal of the American College of Cardiology*, *77*(6), 772–810. https://doi.org/10.1016/j.jacc.2020.11.022

Magadzire, B. P., Mathole, T., & Ward, K. (2017). Reasons for missed appointments linked to a public-sector intervention targeting patients with stable chronic conditions in South Africa: Results from in-depth interviews and a retrospective review of Medical Records. *BMC Family Practice*, *18*(1). https://doi.org/10.1186/s12875-017-0655-8

Mansukhani, R. P., Bridgeman, M. B., Candelario, D., & Eckert, L. J. (2015). Exploring Transitional Care: Evidence-Based Strategies for Improving Provider Communication and Reducing Readmissions. *P & T: A peer-reviewed journal for formulary management*, *40*(10), 690–694.

Marti, C. N., Georgiopoulou, V. V., Giamouzis, G., Cole, R. T., Deka, A., Tang, W. H., Dunbar, S. B., Smith, A. L., Kalogeropoulos, A. P., & Butler, J. (2012). Patient-reported selective adherence to heart failure self-care recommendations: A prospective cohort study: The Atlanta cardiomyopathy consortium. *Congestive Heart Failure*, *19*(1), 16–24. https://doi.org/10.1111/j.1751-7133.2012.00308.x

Oosterom-Calo, R., van Ballegooijen, A. J., Terwee, C. B., te Velde, S. J., Brouwer, I. A., Jaarsma, T., & Brug, J. (2012). Determinants of adherence to heart failure medication: A systematic literature review. *Heart Failure Reviews*, *18*(4), 409–427. https://doi.org/10.1007/s10741-012-9321-3

Oscalices, M. I., Okuno, M. F., Lopes, M. C., Campanharo, C. R., & Batista, R. E. (2019). Discharge guidance and telephone follow-up in the therapeutic adherence of heart failure: randomized clinical trial. *Revista Latino-Americana De Enfermagem*, *27*. https://doi.org/10.1590/1518-8345.2484.3159

Salinero, E. A., Ramirez, J., Cramm-Morgan, K., & Papa, L. (2018). Does receiving a text message reminder increase follow-up compliance after discharge from a pediatric emergency department? *Pediatric Emergency Care, Publish Ahead of Print*. https://doi.org/10.1097/pec.0000000000001675

Schulz, M., Griese-Mammen, N., Anker, S. D., Koehler, F., Ihle, P., Ruckes, C., Schumacher, P. M., Trenk, D., Böhm, M., Laufs, U., Botermann, L., Krueger, K., Krügerke, N., Mantzke, J., Parrau, N., Strauch, D., Wachter, A., Fikenzer, K., Schubert, I., … Wachter, R. (2019). Pharmacy-based interdisciplinary intervention for patients with chronic heart failure: Results of the pharm-chf randomized controlled trial. *European Journal of Heart Failure*, *21*(8), 1012–1021. https://doi.org/10.1002/ejhf.1503

Shah, S. J., Cronin, P., Hong, C. S., Hwang, A. S., Ashburner, J. M., Bearnot, B. I., Richardson, C. A., Fosburgh, B. W., & Kimball, A. B. (2016). Targeted reminder phone calls to patients at high risk of no-show for primary care appointment: A randomized trial. *Journal of General Internal Medicine*, *31*(12), 1460–1466. https://doi.org/10.1007/s11606-016-3813-0

Sohn, A., Speier, W., Lan, E., Aoki, K., Fonarow, G., Ong, M., & Arnold, C. (2019). Assessment of heart failure patients' interest in mobile health apps for self-care: Survey study. *JMIR Cardio*, *3*(2). https://doi.org/10.2196/14332

van der Wal, M. H. L., Jaarsma, T., & van Veldhuisen, D. J. (2005). Non-compliance in patients with heart failure; how can we manage it? *European Journal of Heart Failure*, *7*(1), 5–17. https://doi.org/10.1016/j.ejheart.2004.04.007

van der Wal, M. H. L., Jaarsma, T., Moser, D. K., Veeger, N. J. G. M., van Gilst, W. H., & van Veldhuisen, D. J. (2005). Compliance in heart failure patients: The importance of knowledge and beliefs. *European Heart Journal*, *27*(4), 434–440. https://doi.org/10.1093/eurheartj/ehi603

Virani, S. S., Alonso, A., Aparicio, H. J., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Cheng, S., Delling, F. N., Elkind, M. S. V., Evenson, K. R., Ferguson, J. F., Gupta, D. K., Khan, S. S., Kissela, B. M., Knutson, K. L., Lee, C. D., Lewis, T. T., … Tsao, C. W. (2021). Heart disease and stroke statistics—2021 update. *Circulation*, *143*(8). https://doi.org/10.1161/cir.0000000000000950

Virani, S. S., Alonso, A., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Chang, A. R., Cheng, S., Delling, F. N., Djousse, L., Elkind, M. S. V., Ferguson, J. F., Fornage, M., Khan, S. S., Kissela, B. M., Knutson, K. L., Kwan, T. W., Lackland, D. T., … Tsao, C. W. (2020). Heart disease and stroke statistics—2020 update: A report from the American Heart Association. *Circulation*, *141*(9). https://doi.org/10.1161/cir.0000000000000757

Whitaker-Brown, C. D., Woods, S. J., Cornelius, J. B., Southard, E., & Gulati, S. K. (2017). Improving quality of life and decreasing readmissions in heart failure patients in a multidisciplinary transition-to-care clinic. *Heart & Lung*, *46*(2), 79–84. https://doi.org/10.1016/j.hrtlng.2016.11.003

Zhong, X., Liang, M., Sanchez, R., Yu, M., Budd, P. R., Sprague, J. L., & Dewar, M. A. (2018). On the effect of electronic patient portal on Primary Care Utilization and appointment adherence. *BMC Medical Informatics and Decision Making*, *18*(1).

https://doi.org/10.1186/s12911-018-0669-8

Appendix A

Heart Failure Optimize/Care Companions Survey

1. Were you able to sign up for MyChart? Yes No

   If no, why not?

2. Were you able to sign up for Care Companions? Yes No

   If no, why not?

3. Did you watch the HF-Optimize video before your appointment? Yes No

4. On a scale of 0-10 with 0 being “Not at all helpful’ to 10 being “Very helpful”, how would you rate the information about the HF-Optimize clinic in the video?

1	2	3	4	5	6	7	8	9	10

   Not at all helpful Very helpful

5. Did the HF-Optimize video help you decide to come to your appointment today?

   Yes No

   If yes, how?

6. What was the most helpful information in the HF-Optimize video?

Appendix B

PRISMA Flow Diagram