

Transition to Home-Based Treatment Plans for Center-Based Cardiac, Pulmonary, and Vascular Rehabilitation during COVID-19

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ABSTRACT

BACKGROUND: Traditional rehabilitation services, whether they are cardiac, pulmonary, or vascular, consist of 6-36 center-based, supervised sessions; however, due to COVID-19, in-person visits were suspended. This study sought to implement a transitional home-based treatment plan (HBTP) to patients.

METHOD: Patients enrolled in a rehabilitation service at the Miriam Hospital during the time of temporary closure were provided with a HBTP that was individualized to their needs and multi-disciplinary in nature. Patients were called weekly for continual guidance and support.

RESULTS: Of the 129 patients that received a HBTP, 115 (89%) participated in follow-up correspondence (63±12 years, 83% white, 66% male, 81% enrolled in cardiac rehab). Nearly 70% of patients continued to participate in regular exercise and upon re-opening, 69 (60%) of patients returned to center-based care. Psychosocial factors appeared to inhibit treatment adherence.

CONCLUSIONS: Patients are receptive to an HBTP and subsequent follow-up throughout temporary closure of rehabilitation services.

KEYWORDS: home-based cardiac rehabilitation, pulmonary rehab, vascular rehab, COVID-19

INTRODUCTION

Cardiac (CR), pulmonary (PR), and vascular (VR) rehabilitation are evidence-based, secondary prevention programs comprised of behavior modification and health education. The following rehabilitation services provide patients with a continuum of care following the diagnosis of heart disease, lung disease, and peripheral vascular disease, in order to reduce rates of morbidity and mortality.¹

Standard cardiac rehabilitation services in the US include 6 to 36 in-person sessions to be completed over the course of 18 to 36 weeks depending on program involvement and payer coverage. Programs are usually center-based and do not traditionally involve home-based delivery of care; however, due to COVID-19 and consequent stay-at-home orders, many rehabilitation programs were temporarily suspended. As a result, we described the implementation of a quality

improvement (QI) initiative in the setting of COVID-19 based on the Plan-Do-Study-Act (PDSA) cycle.² The QI initiative was two-fold: (1) preparation and distribution of individualized, home-based treatment plans, and (2) weekly follow-up support and interventions provided by a clinical staff person. The primary purpose of the present QI intervention was to ensure the health and safety of the patient population during temporary closure, while continuing to provide secondary prevention guidance and support to maintain a healthy lifestyle.

METHODS

This is a retrospective report of a QI intervention based on the Deming's PDSA cycle to implement home-based treatment plans for patients enrolled in center-based rehabilitation services at a city site in Rhode Island during a temporary closure between April 6, 2020 and May 27, 2020.

An enrolled patient was defined as a patient that participated in 1 to 11 week(s) of cardiac, pulmonary, or vascular rehabilitation. As of March 31, 2020, center-based rehabilitation services were temporarily suspended due to COVID-19 guidelines and restrictions. At this time, enrolled patients met with their assigned case manager, in person or on the phone, to discuss a temporary home-based treatment plan. A personalized treatment plan was designed for each interested patient and then provided to the patient via mail or e-mail. Upon receiving the treatment plan, patients were called weekly by a staff exercise physiologist for follow-up care.

Home-Based Treatment Plan (HBTP)

A treatment plan was developed for all patients enrolled in a rehabilitation service and was tailored specifically to their needs based upon their referring diagnosis, whether it be cardiac, pulmonary, or vascular, as well as their comorbidities, fitness level, access to home exercise equipment or community resources and their goals. Regardless of diagnosis, each treatment plan consisted of three main domains: exercise, nutrition and psychosocial recommendations.

Within the exercise domain, patients were provided with specific exercise recommendations based upon their entry graded exercise test if applicable, the Frequency, Intensity, Time and Type (FITT) principle, instructions on how to gauge exercise intensity using rating of perceived exertion

(RPE) and heart rate, online exercise resources, and printed resources, including an exercise tracker. Online exercise resources included: “Staying Active during the Coronavirus Pandemic” from the American College of Sports Medicine (ACSM) and videos pre-recorded by the center that were published to the rehabilitation center’s private YouTube® channel (www.youtube.com/channel/UCGsVnz92NlzpwrMTLgww). Printed resources included staff-created handouts regarding safe home exercise. The exercise tracker, on paper, provided patients with an opportunity to record their exercise activity, workload, duration, RPE, heart rate, pain level, and additional notes regarding specific dates. Mobile phone applications used to track exercise were encouraged on an individual basis during follow-up phone calls if a patient was interested and capable.

Within the nutrition domain, the staff dietician provided “quick quarantine nutrition tips,” various pre-recorded nutrition lectures posted to the center’s private YouTube® channel, an abundance of online nutrition resources, a weight tracker, and a food log. Online nutrition resources included: My Fitness Pal®, Calorie King®, Healthy Dining Finder®, Diabetes Food Hub®, nutrition information from the American Diabetes Association, recipes from the American Heart Association, The Garden Grazer® recipes, Minimalist Baker® recipes, Nutrition News® and 2020 Dietary Guidelines.³ The weight tracker provided was a paper log used to describe the patient’s weight on a day-to-day basis and track weight fluctuations. The food log provided patients with a way to record on paper the foods they consumed on each day of the week. Patients were asked to provide specific brand names, sizes, amounts, among other details. Patients were encouraged to follow the template during closure for review by the staff registered dietitian upon rehabilitation re-opening for in-person participation.

Lastly, within the psychosocial category, patients were provided with “Stress Coping Plan for the COVID-19 Pandemic” written by Joel Hughes, PhD, FAACVP, as well as “Keys to Embarking on a Path Toward Reduced Stress and Improved Well-Being” by Mindy, Caplan, ACSM-EP.^{4,5} Online resources, such as Gentle Chair Yoga for Beginners & Seniors® were included, along with phone applications and online resources for guided relaxation (Headspace®, Calm, Mindful.org, Mindbodygreen.com). Instructions on how to start meditation were provided, as well as a paper log that could be used to record the type of relaxation/meditation practiced, and the time spent practicing.

Additional information regarding COVID19 guidelines as it applies to execution of the rehabilitation recommendations, medication compliance, symptom management, self-management tips of diabetes, heart failure and hypertension; energy conservation strategies on activities of daily living, oxygen use and tobacco use, were provided on an individualized basis where applicable. Lastly, the HBTP was provided in conjunction with an education book titled,

Living Well with Heart Disease or Living Well with Chronic Lung Disease, depending on the patient’s diagnosis.^{6,7}

Follow-up Care

Follow-up contact was provided primarily via telephone; however, email was also used if preferred. Patients were contacted at least one time per week. If contact could not be established within the first three attempts, no further attempt to reach the patient was made.

When a patient was contacted, they were first asked, “What are some of the challenges that you are facing being home every day?” In addition, patients were asked to report their exercise participation, nutrition choices, weight, mental health, and patient-specific goals, such as the management of symptoms, diabetes, heart failure, blood pressure, tobacco use, where applicable, similar to the themes covered during exercise and education sessions by the patient’s case manager during the in-person rehabilitation sessions.⁸ Additional support and resources were provided to the patient, as needed, and a summary of each call was transcribed into the patient’s medical record. Clinical changes were tracked and documented per patient self-report.

Management supervision

Each week, the management of the rehabilitation services facilitated a conference call with the clinical staff to discuss how to improve follow-up care based upon patient progress and barriers. As a result, a list of resources was compiled and distributed to the staff to aid in patient phone calls for subsequent weeks.

RESULTS

Of the 129 patients that were mailed a HBTP package, 120 (93%) responded to follow-up care on at least 1 occasion. Of those 120 patients, 5 (3%) deferred weekly follow-up care, resulting in 115 patients (89%) that were called or contacted by email weekly throughout the closure period. Reasons for deferring follow-up included: lack of interest (2), confidence in ability to progress independently (2), and disinterest in CR services due to copay for center-based program (1) despite these sessions being free to the patient. As a group, the 115 patients were 63 years old (\pm 11.8), 66% male (n = 76), and 83% white (n = 96), with 93 (81%) enrolled in CR. On average, each patient communicated with a clinical staff person 4 to 5 times (4.56) over the 7-week closure.

Assessment of treatment plan adherence

Of the 115 patients, 80 (70%) reported participating in regular, weekly, home-based exercise. Home-based exercise varied from patient to patient depending upon individual exercise capacity and access to exercise equipment; however, exercise ranged from 2–7 days of participation per week. In addition, 78 patients (68%) tracked one or more

of the following metrics: weight, diet, blood pressure, blood glucose, heart rate, and/or oxygen saturation, with weight being the most commonly tracked variable (69 patients, 60%). Additional resources were provided to patients based upon their personal interests, goals, and reported barriers. Most commonly, patients were provided with additional exercise resources, such as home-exercise handouts, online videos, mobile phone applications, among the most common ones (34 patients, 30%) to overcome the barrier of limited exercise capabilities at home. Furthermore, 25 patients (22%) received additional educational materials, via email or the center's YouTube® channel, beyond what was provided in their HBTP to provide additional support related to patient-specific goals and/or barriers.

For individuals who expressed concern with their weight (8 patients, 9% of CR patients), an online weight loss research study particular to CR patients was offered. Of those 8 patients, 6 gained weight and 2 lost weight, which resulted in an average weight gain of 1.3lbs. For patients that were recent or current tobacco users (18, 16%), tobacco treatment or relapse prevention counseling was provided by a tobacco treatment counselor. As a result, 3/18 patients received smoking cessation pharmacotherapy (1: varenicline, 1: bupropion, 1: nicotine replacement).

Barriers to treatment adherence

Psychosocial: after three weeks, in response to a common theme of patients having difficulty coping with stress, anxiety, depression and isolation surrounding COVID-19, a fee-for-service virtual group therapy intervention was established. As a result, 13 patients (11%) were referred to participate. There were 6 patients interested in participating; however, only 2 patients completed the 6-week program. Reasons for not participating included: insurance co-payment and lack of interest in group therapy. Patients (11, 9%) were also referred to a hospital-based therapy access line which provided patients access to an on-call fee-for-service 1:1 therapy session.

Physical: 11 patients reported various limitations/injuries (i.e. back pain, shoulder pain, leg pain/claudeication, tendon tear) that limited their participation in exercise.

Clinical Changes during closure period

By self-report, 6 patients (5%) were tested for COVID-19; however, no patients tested positive. Despite no hospitalizations due to COVID19, 5 (4%) patients were hospitalized for the following reasons: a mechanical fall (2), stomach pain, kidney stones, and chest pain, respectively. The patient who was hospitalized with chest pain underwent successful percutaneous coronary intervention with three drug-eluting stents, and one

patient that fell had to undergo a hip replacement. Of note, 2 additional patients reported chest pain, both were in contact with their physicians; however, one passed away at home due to cardiac arrest, and the other was medically managed.

Return to cardiac, pulmonary or vascular rehabilitation after re-opening

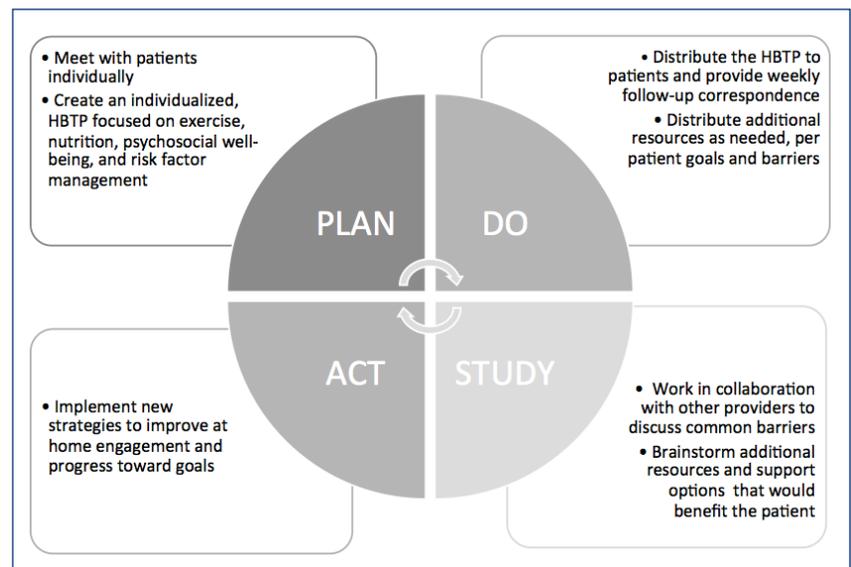
Overall, 60% (69) of patients returned to rehabilitation services: 56 (81%) CR, 16 (11%) PR and 2 (3%) VR when in-person care was reestablished. Comparison of patients who returned versus those who did not showed that there were no significant associations between gender ($p = 0.17$), race ($p = .41$), or specialty (CR, PR or VR) of rehabilitation service provided ($p = .92$) and return to center-based care upon reopening. However, the number of times in which a patient was contacted was significantly associated with a higher likelihood of a patient's return to rehabilitation services upon reopening ($p = < 0.001$).

DISCUSSION

The following QI initiative was based upon Deming's Plan, Do, Study, Act Cycle as shown in **Figure 1**. From this project, we learned that close to 90% of patients participating in cardiac, pulmonary, or vascular rehabilitation, are receptive to participating in home-based rehabilitation services in the setting of a temporary closure, such as COVID-19 stay-at-home orders. Approximately 70% of the patients were responsive to follow-up phone calls and were willing to track their individual progress in one or more areas. As a result, upon the re-opening of rehabilitation services, more than half of the patients returned to the center-based program.

In the setting of a pandemic recurrence, it appears that a home-based treatment plan is a feasible option to bridge

Figure 1.



the gap of a temporary suspension of center-based care. Follow-up contact should be consistent and frequent to ensure adherence and re-enrollment upon the reopening of in-person services. Similar to in-person visits, treatment plans should be individualized and include psychosocial interventions, such as individual or group support sessions.

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Disclosures

The authors declare no conflicts of interest.

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