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A Public Health Critical Race Praxis Informed Congestive Heart Failure Quality Improvement Initiative on Inpatient General Medicine

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BACKGROUND: Prior evaluation at our hospital demonstrated that, compared to White patients, Black and Latinx patients with congestive heart failure (CHF) were less likely to be admitted to the cardiology service rather than the general medicine service (GMS). Patients admitted to GMS (compared to cardiology) had inferior rates of cardiology follow-up and 30-day readmission.

OBJECTIVE: To develop and test the feasibility and impacts of using quality improvement (QI) methods, in combination with the Public Health Critical Race Praxis (PHCRP) framework, to engage stakeholders in developing an intervention for ensuring guideline-concordant inpatient CHF care across all patient groups.

METHODS: We compared measures for all patients admitted with CHF to GMS between September 2019 and March 2020 (intervention group) to CHF patients admitted to GMS in the previous year (pre-intervention group) and those admitted to cardiology during the pre-intervention and intervention periods (cardiology group). Our primary measures were 30-day readmissions and 14- and 30-day post-discharge cardiology follow-up.

RESULTS: There were 79 patients admitted with CHF to GMS during the intervention period, all of whom received the intervention. There were similar rates of Black and Latinx patients across the three groups. Compared to pre-intervention, intervention patients had a significantly lower 30-day readmission rate (18.9% vs. 24.8%; p=0.024), though the cardiology group also had a decrease in 30-day readmissions from the pre-intervention to intervention period. Compared to pre-intervention, intervention patients had significantly higher 14-day and 30-day post-discharge follow-up visits scheduled with cardiology (36.7% vs. 24.8%, p=0.005; 55.7% vs. 42.3%, p=0.0029), but no improvement in appointment attendance.

CONCLUSION: This study provides a first test of applying the PHCRP framework within a stakeholder-engaged QI initiative for improving CHF care across races and ethnicities. Our study design cannot evaluate causation. However, the improvements in 30-day readmission, as well as in processes of care that may affect it, provide optimism that inclusion of a racism-conscious framework in QI initiatives is feasible and may enhance QI measures.

KEY WORDS: health disparities; social determinants of health; congestive heart failure; quality improvement; hospital medicine

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INTRODUCTION

In the landmark report *Crossing the Quality Chasm*, the Institute of Medicine included "equity" as one of the 6 pillars of quality, with equitable care defined as "care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location and socioeconomic status."[1] However, quality improvement (QI) interventions in healthcare delivery settings have been slow to adopt an equity focus. Lack of attention to specific barriers and needs of racially or ethnically defined subpopulations can unintentionally exacerbate existing inequities[2–4]. Yet there is limited literature on how to best apply health equity frameworks to existing QI methods[2,3,5].

There remain persistent racial and ethnic inequities in congestive heart failure (CHF) care, with Black and Latinx patients disproportionately experiencing higher hospitalization rates, excess hospital readmissions, and greater

mortality compared to White patients[6–13]. A retrospective cohort analysis at our major academic medical center (AMC) revealed that Black and Latinx patients with CHF exacerbations who presented to the emergency department were significantly less likely than White patients to be admitted to the cardiology service[14]. Further, when compared to CHF patients admitted to the cardiology service, those admitted to the general medicine service (GMS) had a higher 30-day readmission rate and a lower rate of post-discharge outpatient cardiology follow-up[14]. These findings were consistent with earlier studies demonstrating worse outcomes for patients with CHF on non-cardiology services, including increased rates of hospital readmission[15–18]. Given the observed inequities in the triaging of CHF patient on admission, we postulated other aspects of guideline-concordant CHF care, including timely post-discharge follow-up with cardiology and engagement with a multidisciplinary care team comprised of specialized nurses and nutritionists, were disproportionately unavailable to Black and Latinx patients.

A prior phase of our work evaluated the root causes for the disparities in initial admission triage of CHF patients[19]. In the study reported here, we aimed to use the Public Health Critical Race Praxis (PHCRP) framework to engage our QI teams, in collaboration with key stakeholders, in designing a QI initiative that addressed the barriers and needs of racial and ethnic subpopulations within an overall effort to improve outcomes for patients triaged to GMS. In doing so, we tested an approach to integrating such a framework into routine QI methods.

METHODS

Study Setting

We conducted the intervention at our 793-bed AMC in Boston, MA. The AMC has approximately 400 hospital admissions for CHF exacerbation via the emergency department annually; of these, approximately one-third are cared for on GMS and two-thirds are cared for on the cardiology service. Both services include residents and/or physician assistants (PAs) in the role of responding clinician; however, attending physicians on the GMS service are typically generalists, whereas those on the cardiology service are board-certified cardiologists.

Ethical Considerations

The Mass General Brigham Institutional Review Board deemed the study to be QI, and thus exempt from further review.

Interventions

Project Planning Overview (Appendix Figure 1). We formed a CHF subcommittee within the Department of Medicine Health Equity Committee comprised of a senior cardiologist specializing in advanced heart failure; the Medical Director of Quality and Safety for the Department of Medicine; medicine residents and PAs from both GMS and cardiology services; nurses; social workers; and a data analyst. The Health Equity Committee and CHF subcommittee included a racially and ethnically diverse coalition of stakeholders, including community-based social workers with expertise in advancing racial justice[20].

Public Health Critical Race Praxis (PHCRP, Fig. 1) is a framework for facilitating the use of Critical Race Theory in public health and racial equity research[21–23] (Fig. 1). We employed it to focus QI participants and stakeholders on addressing the needs of racial and ethnic subpopulations in the context of overall CHF care improvements. The framework focuses on supporting "race consciousness" and helping participants recognize the "ordinariness of racism" and its consequences[21]. We applied PHCRP within the Evidence-Based Quality Improvement (EBQI)[24] principles that quality and safety officers at our hospital typically use for QI efforts. We named our QI initiative the Longitudinal Equity Action Plan (LEAP).

LEAP Intervention

Intervention Planning using QI methods, PHCRP and Stakeholder Engagement. In applying PHCRP (see Fig. 1, Focus 4: Action) we identified receipt of equitable high-quality CHF care for Black and Latinx patients between GMS and cardiology services as a QI target. Further, by leaning on the expertise of subcommittee members with knowledge in this area, we identified gaps in the social determinants of health (SDOH) of CHF patients on GMS compared to those on cardiology (Table 1) as potential contributors to the observed worse GMS outcomes. For example, based on data from the foundational study, we recognized that patients on GMS were more likely to reside in areas with lower scores on socioeconomic indicators and less likely to receive guideline-concordant post-discharge cardiology follow-up[14]. Throughout the intervention period, the LEAP team met regularly to make changes to processes as needed through an iterative plan-do-study-act process.

Key Intervention Features (Table 1). The central features of LEAP were Clinical Decision Support (CDS) tools that were available to clinicians caring for CHF patients. Teams were made aware of the CDS tools by clinical champions and posters in workrooms, and encouraged to use them by a LEAP program manager. CDS tools included an electronic medical record (EMR) order set that prompted teams to order for all CHF patients (a) social work consultation with a standardized screening tool and provision of ride-share vouchers for patients to attend their first post-discharge appointment and a scale for self-weight at home for those who screened positive for limited financial means; (b) enhanced nursing education; (c) nutrition consultation; and (d) electronic referral for scheduling of post-discharge follow-up with a

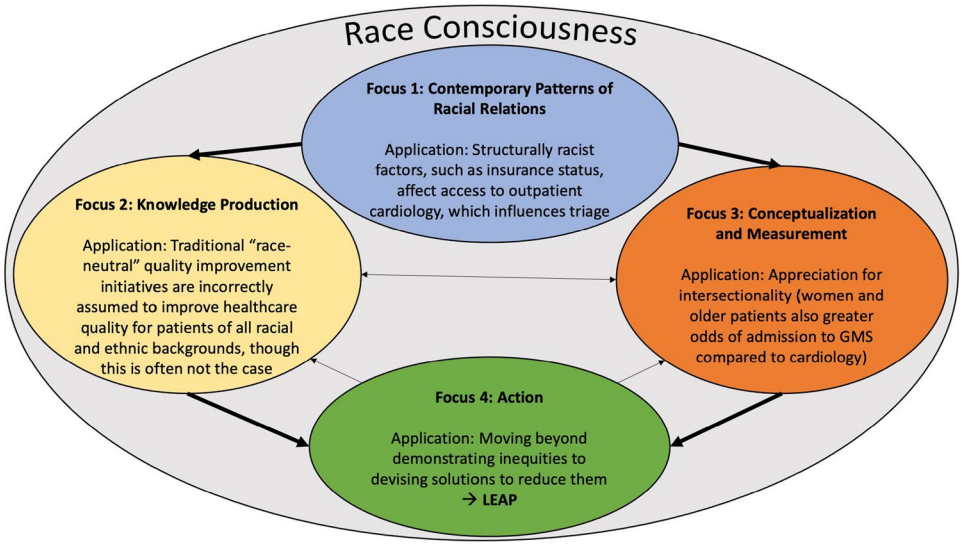

Figure 1 Adoption of Public Health Critical Race Praxis framework[16] employed by the Department of Medicine Health Equity Committee to understand inequities in CHF triage and example applications under framework foci. The original framework includes the four foci demonstrated here and the following 10 principles, which are affiliated with one or more foci: race consciousness, primacy of racialization, race as social construct, ordinariness of racism, structural determinism, social construct of knowledge, critical approaches, intersectionality, disciplinary self-critique, and voice.

Table 1 Components of the Longitudinal Equity Action Plan (LEAP) to Improve CHF Care on a General Medicine Service

Care Domain	Intervention	Components
Admission	*Clinical decision support tools and dot phrases**	Criteria for cardiology consultation Indications for guideline-directed medical therapy Prompts to order social work, nutrition consultation, and nursing communication for "CHF education"
	Social work consultation	Templated social determinants of health screening tool in realms of (1) food security; (2) medication access; (3) transportation; (4) formal/informal support; (5) health literacy Provision of ride-share vouchers for first post-discharge appointment Provision of home scale for self-weight if needed
	Enhanced nursing education	Minimum 30 min of education via face-to-face coaching or videos[†]
	Nutrition consultation	Face-to-face nutrition consultation for CHF diet education
Discharge planning	*Clinical decision support tools and dot phrases**	Suggested criteria for discharge readiness, including ensuring patient near dry weight, stable serum chemistries, stable weight for 24 h on oral maintenance diuretic Prompts to schedule post-discharge follow-up via EMR-embedded e-referral system
	Electronic referral system	Scheduling of timely follow-up (i.e., <14 days) with ambulatory cardiology, to establish care either as new patient or as return patient
	Discharge documentation	Templated hospital course for discharge summaries including estimated dry weight, medication change with diuretic dosage at discharge, results of echocardiography if performed Templated patient instructions (English and Spanish) including discharge weight, medication dosages, diuretic rescue instructions, and follow-up appointments if scheduled in advance
Post-discharge	*Clinical pharmacist phone calls*	Ensure outpatient medications obtained and taken correctly Assess for potential medication adverse effects Contact discharging or ambulatory provider if significant safety concerns

*Dot phrase is an auto-generated note template with decision trees, links, and/or drop-down menu options that can be added to progress notes. See Appendix Figure 3 for example

[†]Video content includes information about pathophysiology, signs and symptoms of CHF, medications prescribed, how to monitor symptoms, nutrition, and other key aspects of heart failure management

Abbreviations: *CHF*, congestive heart failure; *EMR*, electronic medical record

new or established cardiologist. CDS tools also included templates for progress notes including criteria for cardiology consultation, indications for guideline-directed medical therapy (Appendix Figure 3) and guideline-concordant discharge documentation. Additionally, patients received a post-discharge phone call from a clinical pharmacist to screen for any medication-related safety concerns.

Timing of and Participants in the LEAP Intervention. We first piloted the intervention on a subset of CHF patients admitted to GMS teams from July to August 2019 (not included in the evaluation). The intervention expanded to include all CHF patients meeting our criteria for a principal diagnosis of CHF (Appendix Figure 2) admitted to any GMS team between September 2019 and March 2020. Only patients admitted through the emergency department were included. The intervention had initially been planned to continue through June 2020, but we ceased enrollment in March 2020 due to the COVID-19 pandemic.

LEAP Evaluation

Measures and Covariates. We tracked demographic and clinical data for enrolled patients, including age, gender, race, ethnicity (race and ethnicity are typically self-reported at time of patient registration), English proficiency (as determined by a "needs interpreter" flag in the EMR), highest education level attained, primary insurance, discharge disposition, number of admissions in the preceding year, cardiac comorbidities, whether a patient had heart failure with reduced ejection fraction (HFrEF), and whether the patient had any outpatient cardiologist, a cardiologist at our institution, or a cardiologist specializing in heart failure at our institution.

We used EMR data reports generated by a data analyst to collect several process and outcomes measures based on the AHA's guidelines for CHF care[25]. Our primary measures of interest included 30-day readmission rate and rates of cardiology appointments scheduled and attended at or before 14 and 30 days of discharge. Secondary measures included rates of PCP and/or cardiology appointments scheduled or attended at or before 14 and 30 days of discharge, and rates of receipt of enhanced nursing education, social work consultation and nutrition consultation.

Analysis. We compared the above measures in the intervention group to a pre-intervention comparison group of patients admitted to GMS in the year prior to the intervention period from July 2018 to July 2019 (termed "pre-intervention group") and to a comparison group of patients admitted to the cardiology service via the emergency department over the course of the pre-intervention and intervention periods from July 2018 to March 2020 (termed "cardiology group") (see Appendix Figure 1). For the pre-intervention patients, we collected data on our measures retrospectively through chart review. Cardiology group patients were identified with the assistance of a senior quality program manager who tracked quality measures for CHF patients on the cardiology service. Patients on cardiology who were status-post orthotopic heart transplant, with ventricular assist devices, or on bridge or palliative inotropes were excluded. A project manager then performed chart review of these patients to track measures of interest.

We used chi-squared testing to compare categorical demographic and clinical covariates between the intervention, pre-intervention, and cardiology groups. We then performed a "pre-test/post-test with control" design to compare measures between groups. First, we compared measures on GMS alone between the intervention and pre-intervention groups. Next, we compared the GMS intervention group to the cardiology group during the intervention period. Lastly, we used an interaction term (pre-post*study group) to assess changes in the GMS groups from the pre-intervention to intervention period compared to the cardiology group. We used a generalized linear mixed model with a logit link function and a residual pseudo-likelihood estimation technique[26]. We were not powered adequately to demonstrate non-inferiority when comparing the GMS intervention group to the cardiology group during the intervention period. We used pre-post with control design rather than time-varying analysis (e.g., interrupted time series) for our primary analysis given the short time period and relatively small number of patients enrolled in the intervention. Due to relatively low anticipated sample size during the intervention and pre-intervention periods, we a priori did not plan to compare quality measures between racial and ethnic groups in the study groups.

We used a benchmark of an approximately 25% absolute difference in rates of 30-day post-discharge follow-up between patients admitted to GMS and cardiology in the initial CHF inequities study[14]. In this study, the rate of 30-day post-discharge follow-up was 25% for patients on GMS and 46% for patients on cardiology. With a predicted minimum number of 75 patients in the intervention and pre-intervention groups, we had 86% power to detect a 25% absolute difference in this measure with a two-sided alpha of 0.05. For those patients with outpatient providers outside of our system, we were unable to confirm if patients had attended follow-up appointments; thus, for these patients, measures including post-discharge appointment attendance were censored. Given the relatively small number of patients with HFrEF who were eligible for GDMT, we were underpowered to detect differences between groups for these measures (Appendix Table 1).

We used a significance threshold of a 2-sided p-value of 0.05. For the measures of interest, missing data occurred at a rate of 5% or less; thus, missing values were excluded from the analysis. Data were managed using Microsoft Access and Excel (v16, Redmond, WA). Statistical analyses were performed using SAS (v9.4, Cary, NC).

RESULTS

Demographic and Clinical Variables

Overall, all 79 CHF patients meeting enrollment criteria received the LEAP intervention. As shown in Table 2, of the 79 patients, most were female and >50 years old. Five (6.3%) patients were Latinx, and 23 (29.1%) patients were Black. The majority had established cardiologists, with a slight majority having a cardiologist at our institution and far fewer having a cardiologist at our institution specializing in advanced heart failure.

There were 137 patients in the pre-intervention group and 338 patients in the cardiology group. In the cardiology group, 145 were during the post-intervention period and 193 were during the pre-intervention period. Notably, there were similar distributions of Black and Latinx patients across the three groups (Table 2). Patients admitted to the cardiology team had higher rates of having an outpatient cardiologist, a

Table 2 Demographic and Clinical Characteristics by Study Group

Characteristic, *n* (%)	GMS		Cardiology		*p*-value*
	Intervention (*n*=79)	Pre-intervention (*n*=137)	Intervention period (*n*=145)	Pre-intervention period (*n*=193)	
Female	42 (53.2)	62 (45.3)	64 (44.1)	97 (50.2)	0.53
Age (years)					0.35
<50	8 (10.1)	6 (4.4)	8 (5.5)	21 (10.9)	
50–75	41 (51.9)	70 (51.1)	76 (52.4)	96 (49.7)	
>75	30 (38.0)	61 (44.5)	61 (42.1)	72 (37.3)	
Limited English proficiency	5 (6.3)	18 (13.1)	13 (9.0)	19 (9.8)	0.31
Ethnicity					0.35
Non-Latinx	73 (92.4)	118 (86.1)	136 (93.8)	171 (88.6)	
Latinx	5 (6.3)	16 (12.0)	8 (5.5)	21 (10.8)	
Race					0.19
Black	23 (29.1)	28 (20.4)	23 (15.9)	42 (21.8)	
White	47 (59.5)	88 (64.2)	98 (67.6)	118 (61.1)	
Other	3 (3.8)	5 (3.6)	11 (7.6)	17 (8.8)	
Highest education level completed					0.20
Less than high school	13 (16.5)	23 (16.8)	18 (12.4)	32 (16.3)	
High school	45 (57.0)	63 (46.0)	66 (45.5)	83 (43.0)	
College or greater	18 (22.8)	45 (32.8)	54 (37.2)	68 (35.2)	
Insurance type					0.82
Commercial	24 (30.4)	48 (35.0)	64 (44.1)	54 (28.0)	
MassHealth/Medicaid	6 (7.6)	13 (9.5)	10 (6.9)	14 (7.3)	
Medicare	49 (62.0)	76 (55.5)	83 (57.2)	113 (58.5)	
Discharge disposition					0.57
Facility†	15 (19.0)	24 (17.5)	31 (21.4)	35 (17.9)	
Home	48 (60.8)	110 (80.3)	108 (74.5)	152 (78.8)	
AMA	4 (5.1)	3 (2.2)	1 (0.6)	2 (1.0)	
Deceased	1 (1.5)	0 (0.0)	5 (3.4)	4 (2.1)	
Number of past admissions in the past year					0.12
0	28 (35.4)	46 (33.6)	49 (33.8)	68 (35.2)	
1–2	24 (30.4)	62 (45.3)	57 (39.3)	75 (38.9)	
3–5	19 (24.1)	15 (10.9)	29 (20.0)	36 (18.7)	
>5	8 (10.1)	14 (10.2)	10 (6.9)	14 (7.3)	
HFrEF	25 (31.6)	26 (19.0)	75 (51.7)	105 (54.4)	0.01
Comorbidities					
Arrhythmia	44 (55.7)	70 (51.1)	88 (60.7)	135 (70.0)	0.01
Valvular disease	39 (49.4)	68 (49.6)	78 (51.0)	112 (58.0)	0.31
Diabetes	37 (46.8)	73 (53.3)	54 (37.2)	80 (41.5)	0.01
Hypertension	61 (77.2)	99 (72.3)	84 (57.9)	108 (56.0)	0.01
CAD/IHD	25 (31.6)	55 (40.1)	59 (40.7)	74 (38.3)	0.40
Outpatient cardiologist					
Any	59 (74.7)	104 (75.9)	131 (90.3)	157 (81.3)	0.02
Home institution	42 (53.2)	78 (56.9)	117 (80.7)	137 (71.0)	0.01
Home institution, heart failure specialist	14 (17.7)	23 (16.8)	37 (25.5)	65 (33.7)	0.02

*p-value based on chi-square testing

†"facility" includes long-term care, skilled nursing facility, or acute rehabilitation

Frequencies may not add to 100% due to missing data

Abbreviations: *AMA*, against medical advice; *CAD*, coronary artery disease; *HFrEF*, heart failure with reduced ejection fraction; *IHD*, ischemic heart disease

cardiologist at our institution, or a cardiologist specializing in heart failure at our institution.

Pre-/Post-control Analysis

Primary Measures. There was a significant improvement in 30-day readmission comparing the pre-intervention to intervention groups with no significant difference comparing the intervention group to the cardiology group during the intervention period, nor when comparing the pre-post improvement in the GMS groups to improvement in the cardiology group (Table 3). There was a significant increase in the rate of 14-day post-discharge cardiology appointments scheduled on GMS comparing the intervention period to the pre-intervention period, but rates remained significantly lower on GMS compared to cardiology and there was no significant pre-post difference in the GMS groups compared to the cardiology group. There was no significant difference in rates of 14-day post-discharge cardiology appointment attendance between the intervention and pre-intervention periods and rates remained lower on GMS compared to cardiology during the intervention period. Similarly, when comparing the intervention to the pre-intervention period, there was a significant increase in the rate of scheduling but no significant difference in the attendance of 30-day post-discharge follow-up appointments; 30-day post-discharge appointment scheduling was significantly lower on GMS compared to cardiology during the intervention period.

Secondary Measures. Similar findings to the above were observed when comparing rates of 14-day and 30-day cardiology and/or PCP post-discharge follow-up appointments scheduled and attended, though generally PCP appointment scheduling was higher on GMS than on cardiology (Table 4). There was a significant improvement in rates of enhanced nursing education, social work consultation, and nutrition consultation; all three were significantly better than in the cardiology group in the post-intervention period and demonstrated significant pre-post improvement compared to the cardiology group.

DISCUSSION

The LEAP intervention tested the integration of a racism-conscious framework (PHCRP) within a QI initiative designed to improve CHF care for patients admitted to a general medical service. The intervention purposefully targeted potential gaps in guideline-concordant care experienced by patients with challenges due to social determinants of health. Our intervention was associated with pre-post improvements across all CHF patients admitted to GMS in rates of 30-day readmission and scheduling of 14- and 30-day post-discharge cardiology appointments. Additionally, rates of enhanced nursing education, social work, and nutrition consultation on GMS improved beyond benchmark rates. We did not, however, observe an anticipated improvement in post-discharge cardiology appointment attendance. While our findings show promise, our design used a concurrent sample of all CHF patients admitted to our cardiology service as a comparison group and we found that the comparison group showed similar improvements on our primary outcome measures, suggesting contemporaneous secular trends outside of our intervention may have driven the pre-post improvements we observed.

Table 3 Primary Measures for Intervention (GMS) and Comparison (Cardiology) Group Post- and Pre-intervention, with Results of Pre-test/Post-test with Comparison Group Testing

Primary measures, n(%)	GMS			Cardiology			Pre-test/post-test with comparison test *p*-values		
	Post (*n*=79)	Pre (*n*=137)	Pre-post delta (%)	Post (*n*=145)	Pre (*n*=193)	Pre-post delta (%)	GMS Pre v post	Intervention v cardiology (post period)	Pre/post x study group (entire period)
30-day readmit	15 (19.0)	34 (24.8)	−5.8	22 (15.2)	52 (26.9)	−11.7	0.024	0.52	0.40
Cardiology post-discharge follow-up									
Within 14 days									
Scheduled	29 (36.7)	34 (24.8)	+11.9	78 (53.8)	79 (40.9)	+12.9	0.005	0.032	0.86
*Attended**	16 (21.3)	25 (18.8)	+2.5	47 (33.1)	74 (38.7)	−5.6	0.78	0.083	0.36
Within 30 days									
Scheduled	44 (55.7)	58 (42.3)	+13.4	104 (71.2)	111 (57.5)	+13.7	0.0029	0.037	0.88
*Attended**	27 (36.4)	44 (32.8)	+3.6	71 (50.0)	113 (58.5)	−8.5	0.44	0.064	0.19

*Unknown attendance for 14-day cardiology post-discharge follow-up: 4 pts in GMS intervention group, 4 pts in GMS pre-intervention group, 3 patients in cardiology intervention period group, and 2 patients in cardiology pre-intervention group; for 30-day cardiology post-discharge follow-up: 5 pts in intervention group, 3 pts in pre-intervention group, and 3 patients in cardiology intervention period group and 3 patients in cardiology pre-intervention group; these pts were removed from the denominator

Abbreviations: *GMS*, general medicine service

Table 4 Secondary Measures for Intervention (GMS) and Comparison (Cardiology) Group Post- and Pre-intervention, with Results of Pre-test/Post-test with Comparison Testing

Secondary measures, *n* (%)	GMS			Cardiology			Pre-test/post-test with comparison test *p*-values		
	Post (*n*=79)	Pre (*n*=137)	Pre-post delta (%)	Post (*n*=145)	Pre (*n*=193)	Pre-post delta (%)	GMS Pre v post	Intervention v cardiology (post period)	Pre/postx study group (entire period)
PCP post-discharge follow-up									
Within 14 days									
Scheduled	41 (51.9)	60 (43.8)	+8.1	28 (19.3)	29 (15.0)	+4.3	0.15	<0.001	0.92
*Attended**	16 (23.5)	35 (28.4)	−4.9	19 (13.9)	38 (20.1)	−6.2	0.093	0.58	0.69
Within 30 days									
Scheduled	47 (59.5)	66 (48.2)	+11.2	45 (31.0)	47 (24.4)	+6.6	0.043	0.001	0.69
*Attended**	25 (38.4)	48 (37.5)	+0.9	35 (25.5)	52 (27.5)	−2.0	0.47	0.22	0.96
Cardiology and/or PCP post-discharge follow-up									
Within 14 days									
Scheduled	54 (68.4)	76 (55.5)	+12.9	88 (60.7)	97 (50.3)	+10.4	0.010	0.24	0.65
*Attended**	27 (34.2)	49 (35.8)	−1.6	54 (38.0)	92 (48.2)	−10.2	0.20	0.70	0.34
Within 30 days									
Scheduled	62 (78.5)	92 (67.2)	+11.3	110 (75.9)	130 (67.4)	+8.5	0.0187	0.57	0.58
*Attended**	40 (50.6)	70 (51.1)	−0.5	79 (55.6)	130 (68.1)	−12.5	0.15	0.69	0.14
Enhanced nursing education	55 (69.6)	71 (51.8)	+17.8	80 (55.2)	128 (66.3)	−11.1	0.037	0.047	0.018
Social work consultation/SDOH screen	56 (70.8)	42 (30.7)	+40.1	54 (37.2)	58 (30.5)	+6.7	<0.001	<0.001	0.001
Nutrition consultation	68 (86.1)	54 (39.4)	+46.7	61 (42.1)	83 (43.0)	−0.9	<0.001	<0.001	<0.001

*Unknown attendance for 14-day PCP post-discharge follow-up: 11 pts in intervention group, 14 pts in pre-intervention group, 8 patients in cardiology intervention period arm, and 4 patients in cardiology pre-intervention group; for 30-day PCP post-discharge follow-up: 14 pts in intervention group, 9 pts in pre-intervention group, 8 patients in cardiology intervention period group, and 4 patients in cardiology pre-intervention group; for 14-day PCP and/or cardiology post-discharge follow-up: 4 pts in intervention group, 4 pts in pre-intervention group, 3 patients in cardiology intervention period group, and 2 patients in cardiology pre-intervention group; for 30-day PCP and/or cardiology: 4 pts in intervention group, 4 pts in pre-intervention group, 3 patients in cardiology intervention period group, and 2 patients in cardiology pre-intervention group; these pts were removed from the denominator

Abbreviations: *PCP*, primary care provider; *SDOH*, social determinants of health

To our knowledge, this is among the first interventions that has explicitly incorporated Critical Race Theory into ongoing stakeholder-engaged QI. Assuming that QI initiatives will automatically improve the care for the most vulnerable is not often true[3,4]. Ongoing efforts are necessary to define best practices in applying this framework to QI initiatives for CHF patients and other disease processes.

Our intervention incorporated elements that were informed by the PHCRP such as enhanced education on the evidence basis for reducing CHF readmissions[27–30]. Our work supports AHA guidelines recommending that CHF patients undergo routine SDOH screening[31]. However, given our equivocal evaluation results, the PHCRP "race consciousness" framing suggests that to increase the impact of interventions aimed at disadvantaged populations, deeper discussions with community stakeholders are needed to prioritize which SDOH, when specifically targeted, can generate the greatest impact in reducing CHF care quality gaps. Future studies can build on our findings to address racially and ethnically linked vulnerabilities that reduce the positive impacts of QI initiatives.

Literature suggests that early post-discharge follow-up can lead to improved outcomes for patients hospitalized with CHF[27,32–40]. We observed an improvement in the scheduling of 14- and 30-day post-discharge cardiology appointments; however, we did not observe an improvement in the attendance of these visits, either compared to the pre-intervention period or compared to patients admitted to cardiology. There are many social factors that contribute to a patient's ability to attend ambulatory visits, including transportation, convenience relative to other medical visits, ability to miss work, and child care duties. We hypothesized that involving our social work colleagues to help address these potential barriers and providing patients with ride-share vouchers for their first post-discharge appointment might overcome transportation barriers, although prior literature has suggested limited impact of ride-share vouchers to improve appointment attendance[41,42]. Further interventions are needed to focus on

the role of social workers at discharge and understanding the frequency and cause of gaps between scheduling and visit completion, and on the multiple barriers to post-discharge follow-up[43,44].

We have noted an enduring interest among frontline providers in ensuring equitable care for Black and Latinx patients with CHF since the foundation observational study[14]. There is currently an initiative based in the acknowledgement-redress-closure framework[45] in which ED providers are encouraged to admit Black and Latinx patients with CHF to the cardiology service. We are also currently engaging community member stakeholders in discussing how to improve our intervention design.

Limitations

First, our study did not have sufficient power to compare quality measures between different racial and ethnic groups. Our study, however, was designed as a first test of explicitly incorporating PHCRP into routine QI intervention design and implementation. While understanding differential impacts across groups will be important in larger studies, we found that incorporating the framework into QI was feasible, a finding that should encourage efforts to regularly integrate a disparities focus into QI initiatives. Second, we performed our intervention at a single, high-resource AMC with established QI processes. Future studies should test similar interventions in other settings. Third, for patients with cardiologists outside of our hospital system, we were unable to determine if follow-up appointments had been attended; we accounted for this by censuring follow-up data on patients with outside cardiologist, further reducing our power. We also did not track whether patients were hospitalized at other acute care facilities, potentially reducing our reported readmission rates. Fourth, identification of patients with CHF may have been lower in the GMS than in the cardiology services, based on slight differences in how the services classified patients. However, we carried out chart reviews and engaged GMS teams in identifying patients; we found no evidence that we could not capture most patients on both services.

CONCLUSIONS

Our study was a first test of incorporating the Public Health Critical Race Praxis framework into a QI initiative aimed at improving CHF care on a general medicine inpatient service. The initiative may have contributed to improvements in pre-post GMS measures of 30-day readmissions and post-discharge cardiology follow-up appointment scheduling, although we cannot rule out secular trends given parallel improvements in the cardiology comparison group. Our work provides some optimism and a basis for further intervention development and testing of racism-conscious interventions as part of QI initiatives, an important contribution given the dearth of practical methods to address disparities in healthcare despite the overwhelming evidence of their importance.

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Declarations

Conflict of Interest *The authors declare that they do not have a conflict of interest.*

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