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RESEARCH ARTICLE

The Baltimore Community-Based Organizations Neighborhood Network: Enhancing Capacity Together (CONNECT) Cluster RCT

Albert W. Wu, MD, MPH,[1] Christine M. Weston, PhD, MSEd,[1] Chidinma A. Ibe, PhD,[2,3] Claire F. Ruberman, PhD,[4] Lee Bone, MPH, BSN,[3] Romsai T. Boonyasai, MD, MPH,[1,2] Sandra Hwang, MSPH,[1] Janice Gentry, MPA,[5] Leon Purnell, MA,[6] Yanyan Lu, MS,[7] Shuwen Liang, PhD,[7] Michael Rosenblum, PhD[4]

Introduction: This cluster RCT aimed to reduce healthcare utilization and increase the referral of patients between an academic health center and local community-based organizations (CBOs) that address social determinants of health.

Study design: Cluster RCT.

Settings/participants: Twenty-two CBOs located in Baltimore, Maryland, were randomly assigned to the intervention or control group, and 5,255 patients were allocated to the intervention or control group based on whether they lived closer to an intervention or control CBO. Data were collected in 2014−2016; the analysis was conducted in 2016.

Intervention: A multicomponent intervention included an online tool to help refer clients to community resources, meet-and-greet sessions between CBO staff and healthcare staff, and research assistants.

Main outcome measures: The primary outcomes were patient emergency department visits and days spent in the hospital. Additional outcomes for CBO clients included knowledge of other CBOs, number of referrals to CBOs by the healthcare system, and number of referrals to healthcare system by CBOs. Outcomes for CBO staff included the number of referrals made to and received from the healthcare system and the number of referrals made to and received from other CBOs.

Results: There was no significant effect of the intervention on healthcare utilization outcomes, CBO client outcomes, or CBO staff outcomes. Ancillary analyses demonstrated a 2.9% increase in referrals by inpatient staff to intervention CBOs (p=0.051) and a 6.6% increase in referrals by outpatient staff to intervention CBOs between baseline and follow-up (p=0.027). Outpatient staff reported a significant reduction in barriers related to the lack of information about CBO services (−18.3%, p=0.004) and an increase in confidence in community resources (+14.4%, p=0.023) from baseline to follow-up.

Conclusions: The intervention did not improve healthcare utilization outcomes but was associated with increased healthcare staff knowledge of, and confidence in, local CBOs.

From the [1]Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland; [2]Division of General Internal Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland; [3]Department of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland; [4]Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland; [5]Biddle Broadway, North Avenue, Chester Support Council, Baltimore, Maryland; [6]Men and Families Center, Baltimore, Maryland; and [7]Johns Hopkins HealthCare LLC, Glen Burnie, Maryland

Address correspondence to: Albert W. Wu, MD, MPH, Center for Health Outcomes and Services Research, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, 624 North Broadway, Baltimore MD 21205.
E-mail: awu@jhu.edu.
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INTRODUCTION

As evidence mounts on the impact of social determinants of health on the cost and quality of health care, as well as health outcomes, health systems and hospitals have expanded beyond their traditional role as organizations that provide clinical care for patients, to a population health model that advances the health and wellness of communities by addressing the underlying social factors that contribute to health.[1–13] One approach entails developing and sustaining partnerships with local community-based organizations (CBOs), faith-based institutions, and neighborhood associations.[14] CBOs are trusted in the communities they serve and offer services to address social factors that shape patients' health and well-being.[5] Psychosocial and material services, such as food, clothing, housing, substance abuse recovery, and job training, complement the clinical services provided by healthcare organizations.[14]

Despite the potential for improved care and cost savings from coordination between CBOs and healthcare organizations, there are barriers to developing and maintaining these partnerships.[15–18] Clinical providers are often unaware of local community resources to which they might refer. Similarly, CBO staff members struggle to identify the specific channels into the local healthcare system to meet their clients' needs. Accordingly, the team developed and implemented an RCT, Baltimore Community-based Organizations Neighborhood Network: Enhancing Capacity Together (CONNECT) to evaluate how a community engagement approach could be used to codevelop a set of interventions to link a local health system (Johns Hopkins Health System [JHHS]) and surrounding CBOs. The overarching aim was to enhance the capacity of both CBO staff and frontline hospital workers to address client needs by strengthening the bidirectional flow of information about health and social services and building networks that span both entities. Outcomes were examined in a cohort of JHHS patients, CBO clients, CBO staff, and JHHS frontline staff.

For JHHS patient outcomes, the main hypothesis was that there would be a decrease, between baseline and follow-up, in the number of emergency department (ED) visits plus hospital days among JHHS patients in the intervention group versus those in the control group.

For exploratory CBO client outcomes, the hypothesis was for an increase, between baseline and follow-up, in the number of clients who reported being told about services that might be helpful to them and the number of organizations that they were told about. Similarly, there would be an increase in the number of clients reporting that they were referred from the health system to a CBO and, conversely, from a CBO to the health system. In addition, intervention CBO (iCBO) clients would report fewer difficulties finding a job, paying for utilities, getting transportation, getting food, and finding housing in the last month than control CBO (cCBO) clients.

For exploratory outcomes reported by CBO staff members, the hypothesis was for an increase, from baseline to follow-up, in the number of clients referred from the iCBOs to the health system, and in the number of referrals sent from the health system to the iCBOs. In addition, there would be an increase in the percentage of respondents expressing at least moderate confidence that they had all the information needed about the CBOs available to help their clients, and the percentage of staff expressing at least moderate confidence that they were well equipped to refer clients to appropriate intervention versus cCBOs. Furthermore, there would be a greater increase in the percentage of staff agreeing that their organization communicates frequently with other organizations among iCBOs versus cCBOs. Frontline JHHS healthcare staff were hypothesized to report fewer barriers in linking patients to community resources and to be more likely to learn about community resources through a Web-based platform (i.e., Health*ify*, New York, NY) at follow-up than at baseline. Healthcare staff were expected to express greater confidence at follow-up that (1) community resources exist to meet their patients' needs, (2) the community resources they refer to will meet their patients' needs, (3) they have all the information they need about community resources available to help their patients, and (4) they know whom to contact at a given community organization. The percentage of staff stating that healthcare and community organizations work well together was expected to increase, and staff would be more likely to report referring patients to an iCBO versus a cCBO.

METHODS

This was a cluster RCT with 22 CBOs randomly assigned to either the intervention group (iCBO) or the control group (cCBO). The

primary outcome was healthcare utilization in a cohort of JHHS patients. For each of these patients, the CBO closest to where they lived was identified and designated their proximal CBO. Healthcare outcomes were compared between patients whose proximal CBO was assigned to the intervention group and patients whose proximal CBO was assigned to the comparison group. The study was approved by the Johns Hopkins University IRB. Data were collected in 2014–2016; the analysis was conducted in 2016.

Study Population

A systematic process was used to identify the potential pool of CBOs eligible for the study. This started with the complete list of nonprofit organizations from the Internal Revenue Service Exempt Organizations Business Master File for Baltimore City, limiting these organizations to ZIP codes of interest, and thereafter using the National Taxonomy of Exempt Entities Classification System to further reduce the list to the organizations addressing social determinants of health (e.g., food, clothing, shelter, and jobs). To be eligible for the trial, organizations were required to be nonprofit organizations, provide direct services to adults, address one or more social determinants of health, and be located in or near East or Southeast Baltimore. Organizations that exclusively served youth were excluded.

The cohort of JHHS patients whose data were analyzed was enrolled in the Johns Hopkins Community Health Partnership (J-CHiP), a large-scale quality improvement project that took place at Johns Hopkins Hospital, Johns Hopkins Bayview Medical Center, and Johns Hopkins Medicine clinic sites between 2013 and 2016.[19–23] The J-CHiP outpatient intervention focused on high-risk Medicaid and Medicare patients. Patients were aged ≥18 years with at least one chronic condition, had at least one visit to a J-CHiP clinic site, and were identified as being high risk for future hospitalization through risk prediction models or referred directly into the program by their providers. Baltimore CONNECT included J-CHiP patients who (1) were identified as high risk; (2) had monthly healthcare utilization data, including ED visits and days hospitalized, during both pre- and post-intervention periods; and (3) had a known home address.

All data were collected from CBOs, patients, and hospital staff in Baltimore, Maryland.

Twenty-two CBOs located in East and Southeast Baltimore were enrolled. For each of the CBOs, data were collected from a sample of CBO staff and CBO clients. Additional information about the CBOs, including names of organizations, type of services they provide, approximate size, and ZIP codes is provided in Appendix Tables 1 and 2, available online.

The J-CHiP cohort of patients (n=6,491) resided in the aforementioned neighborhoods. Among patients assessed for eligibility, 4,917 met all the criteria and were included in the analysis. The dataset included demographic and healthcare utilization data derived from Medicare and Medicaid claims that were deidentified before conducting analyses.

Data were collected from JHHS staff, who were not subject to random assignment. Outpatient staff included social workers, case managers, community health workers, health educators, and behavioral health specialists working in Johns Hopkins Community Physicians clinics. Inpatient staff included social workers, case managers, hospitalists, and transition guides (nurses who help discharge patients to home) from Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center.

Measures

The iCBOs and research team codeveloped the multicomponent intervention.[24] The Baltimore CONNECT website was created to house a toolkit of resources for the iCBOs (www.bmoreconnect.org). These resources included contact information for iCBO members, health education materials for clients, guidance on recruiting and managing volunteers, and announcements about events and opportunities. The study provided iCBOs with a paid subscription to Health*ify* (www.healthify.us/), a search engine designed to assist case managers and other CBO staff with referring clients to appropriate social services and community resources.[25–32] Each iCBO was provided with a designated student research assistant who spent 3–10 hours per week at their site. Research assistants volunteered at their site, provided technical assistance with using Health*ify*, and served as liaisons between the study team and iCBO. In addition, five in-person meet-and-greet sessions were organized between iCBO leaders and JHHS frontline staff to increase awareness of services, establish personal contacts, and promote referrals.[33]

The primary outcome was healthcare utilization, defined as ED visits plus days in hospital. The authors analyzed ED visits, days in the hospital, and hospital admissions as secondary healthcare utilization outcomes. Exploratory outcomes were evaluated for CBO clients (knowledge of other CBOs, number of referrals to CBOs by healthcare staff, and number of referrals to healthcare organizations by CBO staff); CBO staff (number of referrals made to the health system, number of referrals from the health system, number of referrals made to iCBOs and cCBOs, knowledge about community resources, and perceived strength of the relationship with the health system); and JHHS staff (barriers to referring patients to CBOs, capacity for CBOs and healthcare organizations to work together, confidence in knowledge about community resources, confidence in the capacity of CBOs to meet their clients' needs, and number of referrals to iCBOs and cCBOs).

A restricted randomization process was conducted that constrained the allocation of organizations based on their ZIP code, client population (small, medium, or large), and the type of service offered. There was purposeful balance in the number of churches, neighborhood associations, and Hispanic-serving organizations in each group as well as the primary type of services provided (e.g., food, housing, or clothing).

For allocation of J-CHiP patients to a treatment arm, those who lived closer to an iCBO were allocated to the intervention group, and those who lived closer to a cCBO were allocated to the control group. Google application programming interfaces were used to determine the distance between each patient's residence and each of the participating CBOs.

Statistical Analysis

Changes in responses among CBO clients and CBO staff from baseline to follow-up were analyzed by calculating difference-in-differences (DID) statistics.[34] For each question on the CBO client and staff surveys, a weighted average was calculated (with weights proportional to the number of respondents at each CBO) of the baseline and follow-up responses among the iCBOs and cCBOs. The change in average responses was calculated from baseline to follow-up in the two groups, and the differences in changes for iCBOs versus cCBOs were determined. Randomization inference, a permutation-based analysis, was used to assess the significance

of the DID statistics.[35,36] Unadjusted and adjusted DID test statistics were recomputed for each of the 2,635 other possible random allocations of the treatment assignments to CBOs that met the randomization criteria. For each DID statistic, the proportion of permuted statistics with values higher in magnitude than those observed in DID (the *p*-value) was calculated.[37]

For J-CHiP patients, a monthly average of the number of ED visits and days spent in the hospital was calculated for each patient in the pre- (September 1, 2012 to March 9, 2014) and post-intervention (March 10, 2014 to September 30, 2015) periods. Utilization data were recorded on the first of the month, so the authors excluded observations from March 2014, as these observations straddled the pre- and post-intervention periods. A total of 338 J-CHiP patients who had no utilization data available for the pre- or post-intervention period were excluded. For eligible J-CHiP patients with data missing in some but not all months in the pre- or post-intervention periods, those months were omitted from the period-specific average monthly calculations.

A change score was calculated for each patient as the difference between the average sum of the number of days spent in the hospital and ED visits in the past month, before and after implementation of the CBO-level intervention. For the secondary outcome, the change in average monthly number of inpatient admissions was assessed. Average change scores were calculated among patients linked to each of the CBOs, calculating a weighted average of the CBO averages among the iCBOs and cCBOs, with weights proportional to the number of J-CHiP patients closest to each CBO. The difference between the weighted average of the change scores among the iCBOs and cCBOs (the DID statistic), was calculated. To account for factors not balanced by design, adjusted patient-level change scores, the residuals from regressing each patient-specific change score on their baseline utilization, age, gender, and insurance type, were also calculated. As with the CBO client and staff data, Fisherian randomization-based inference was employed to test the null hypothesis that the intervention had no effect on changes in hospital utilization measures from baseline to follow-up. The CIs based on this method assume a constant treatment effect in all participants.

For JHHS inpatient and outpatient staff, changes in the responses among all the inpatient and outpatient staff surveyed at baseline and follow-up were compared using the Pearson chi-squared test for differences in proportions.

RESULTS

Although 22 CBOs were initially randomized, one iCBO dropped out before baseline data collection because of an inability to participate, and one cCBO closed shortly after the collection of baseline data. Consequently, the analyses are based on the 20 CBOs that remained in the study (Figure 1).

The closest CBO to the home address of each of the 5,255 J-CHiP patients was determined: 3,258 patients were linked to a proximal CBO assigned to the comparison arm, and 1,997 to a proximal CBO assigned to the intervention arm. A total of 205 and 133 patients were excluded in the comparison and intervention arms, respectively, who did not have any utilization data available during either the pre- or post-intervention periods. The primary analysis was conducted on 4,917 patients, 3,051 in the comparison group and 1,864 in the intervention group (Figure 1).

Study randomization was performed on March 5, 2014. On March 24, 2014, a kick-off meeting was held for CBOs assigned to the intervention arm. Codevelopment of the intervention took place from April through October 2014. Baseline data were collected in November and December 2014. The intervention period was from January 2015 through December 2015. Follow-up data were collected from December 2015 to February 2016. Data were analyzed from March 2016 to August 2016.

Baseline data for the J-CHiP patients are shown in Table 1.

The DID statistic regarding the primary outcome (change between pre- and post-intervention periods in ED visits plus hospital days per month) was 0.01 (95% CI= −0.13, 0.13, p=0.93) without adjusting for baseline variables and 0.02 (95% CI= −0.12, 0.11, p=0.63) adjusting for baseline variables. Based upon the primary DID analysis, one cannot conclude that the intervention had an effect on the before–after change in ED visits plus hospital days for patients at any of the CBOs.

The authors also estimated the average utilization in each study arm, both before and pre- and post-intervention. SEs were computed from the model-based approach of Hayes and Moulton.[38] The pre-intervention results are summarized in Table 1. Post-intervention, in the comparison arm, the mean (SE) monthly ED visits, days in the hospital, ED visits plus hospital days, and inpatient admissions (all measured per month) were 0.19 (0.0092), 0.45 (0.045), 0.64 (0.043), and 0.072 (0.0042), respectively; in the treatment arm, they were 0.21 (0.025), 0.46 (0.092), 0.68 (0.11), and 0.074 (0.015), respectively. All utilization outcomes had constant medians of 0.

The results for CBO client and staff data are presented in Table 2. For client outcomes, the DID statistic indicated no significant differences between the intervention and control groups on any of the outcomes of interest. The DID statistic also indicated no significant differences between the intervention and control groups for any of the difficulties that clients experienced. For the staff outcomes, the DID statistics were not significantly different for any of the outcomes of interest, including the number of clients referred to other CBOs or the health system, interactions with other CBOs, or confidence in making referrals.

For inpatient hospital staff, the most frequently reported challenges in linking patients with community resources were the lack of information about available community resources and the lack of accurate, up-to-date

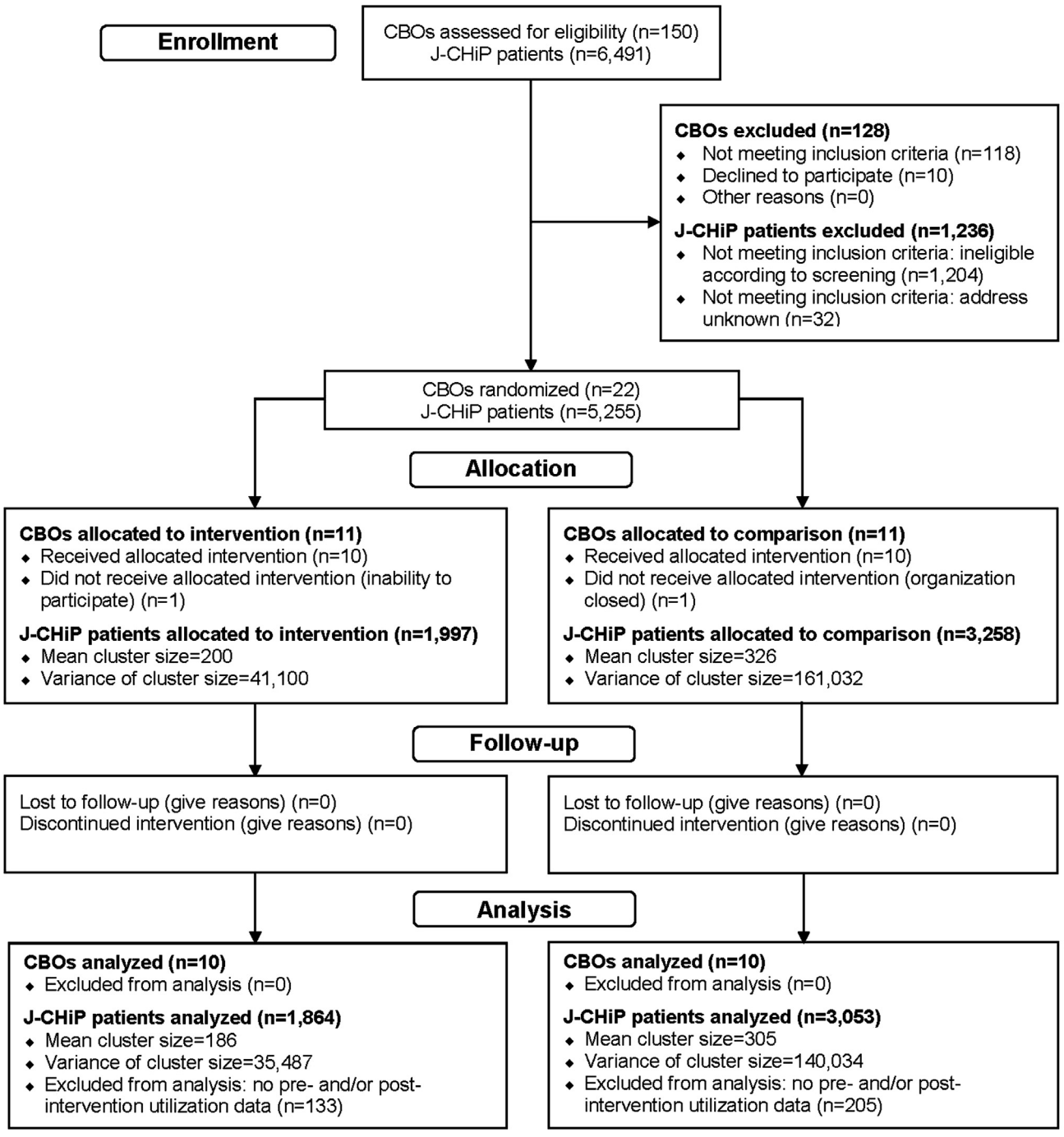

Figure 1. Baltimore CONNECT Participant Flow Diagram.

CBO, community-based organization; CONNECT, Community-Based Organizations Neighborhood Network: Enhancing Capacity Together; J-CHiP, Johns Hopkins Community Health Partnership.

information about CBO services (Table 3). There were no significant differences for the barriers to referring patients to community resources or confidence in referring patients to community resources. The only statistically significant result was that inpatient staff were more likely to refer a patient to an iCBO compared with a cCBO at follow-up. Specifically, there was a 2.9% increase in referrals made to iCBOs versus cCBOs between baseline and follow-up (p=0.051).

For the outpatient staff, the most frequently reported challenges in linking patients with community resources were also the lack of information about community

Table 1. Baseline Data for J-CHiP Patients

Characteristics	Overall	Control	Intervention
n	4,917	3,053	1,864
Age, years, mean (median)	62 (62)	62 (62)	62 (62)
Sex, *n* (%)			
Female	3,136 (64)	1,923 (63)	1,213 (65)
Male	1,781 (36)	1,130 (37)	651 (35)
Race, *n* (%)			
African American	2,689 (55)	1,591 (52)	1,098 (59)
Asian	37 (1)	19 (1)	18 (1)
White	1,927 (39)	1,281 (42)	646 (35)
Hispanic	28 (1)	15 (0)	13 (1)
Native American	10 (0)	9 (0)	1 (0)
Unknown/Other	226 (5)	138 (4)	88 (5)
Insurance type, *n* (%)			
Medicare	3,175 (65)	1,991 (65)	1,184 (64)
Priority Partners MCO	1,742 (35)	1,062 (35)	680 (36)
Monthly healthcare utilization			
ED visits, mean (SE)	0.19 (0.015)	0.19 (0.0084)	0.20 (0.027)
Hospital days, mean (SE)	0.36 (0.034)	0.35 (0.031)	0.37 (0.061)
ED visits + hospital days, mean (SE)	0.55 (0.045)	0.54 (0.032)	0.57 (0.085)
Inpatient admissions, mean (SE)	0.069 (0.0029)	0.069 (0.0031)	0.070 (0.0051)

ED, emergency department; J-CHiP, Johns Hopkins Community Health Partnership.

resources and the lack of accurate information about CBO services (Table 3). There was a statistically significant reduction in these barriers reported by the outpatient staff over time. The percentage of outpatient staff reporting these barriers decreased by 15.2% ($p<0.05$) and 18.3% ($p<0.05$), respectively, from baseline to follow-up. The percentage of outpatient staff reporting confidence in having all the information that they need about community resources to help patients increased significantly by 14.4% from baseline to follow-up. Outpatient staff were also significantly more likely to refer to an iCBO than to a cCBO during the follow-up period, with a 6.6% increase in referrals made to iCBOs versus cCBOs between baseline and follow-up ($p=0.027$).

No harm was done to any of the participants in either group.

DISCUSSION

Findings from this cluster RCT revealed that, based on the outcome measures selected for this study, the intervention did not improve J-CHiP patients' healthcare utilization outcomes, CBO client outcomes, or CBO staff outcomes. There was a suggestion that the intervention enhanced the capacity of inpatient and outpatient hospital staff to refer patients to community resources, evidenced by significant increases from baseline to follow-up in the number of referrals made by frontline staff to iCBOs, increased awareness about CBO services, and increased confidence about community resources.

The fact that Baltimore CONNECT did not impact patients' healthcare utilization outcomes as measured in this study stands in contrast to other studies that address patients' social determinants of health, which have led to reductions in ED utilization and inpatient hospitalizations.[39–42] A common feature of these studies is the delivery of interventions directly to patients through the integration of clinic and community-based services using interdisciplinary care teams,[39,40] community health workers,[41] or care managers.[42] This study suggests that for the members of vulnerable communities, connecting CBOs and health systems may be insufficient in the absence of direct care coordination interventions that address patients' health behaviors and their social and economic determinants of health. However, the findings dovetail with the observations by Lachance et al.[43] and Hsu et al.,[44] which suggest that building healthcare organizations' capacity to address social determinants of health may be achieved by purposeful efforts to establish linkages between healthcare organizations and CBOs and by fostering clinic staff's awareness of local resources.

One example of a cluster RCT similar to Baltimore CONNECT was the Community Partners in Care intervention, a community engagement and planning intervention that aimed to engage and strengthen a diverse

Table 2. CBO Client and Staff DID Analyses

	Comparison		Intervention			
CBO data	**Baseline, %**	**Follow-up, %**	**Baseline, %**	**Follow-up, %**	**DID**	***p*-value**
Client						
N	179	186	193	198	—	—
Told by a staff member about other organizations that might be helpful	67.1	63.0	68.3	66.7	3.1	0.35
Told about 7 or more organizations by staff member	17.7	12.8	16.5	15.2	2.9	0.28
Referred from the healthcare system to a CBO	7.3	11.8	12.4	15.7	−1.1	0.57
Referred from a CBO to the healthcare system	15.6	17.2	23.8	18.7	−6.0	0.80
Experienced difficulty finding a job	45.5	31.2	43.7	39.3	10.6	0.92
Experienced difficulty paying for utilities such as BGE bills	38.5	36.6	34.4	32.7	−0.5	0.48
Experienced difficulty getting transportation	32.8	33.3	28.7	32.0	2.9	0.60
Experienced difficulty getting the food needed	21.6	24.2	18.0	25.5	3.6	0.59
Experienced difficulty finding housing	22.9	22.1	28.9	31.8	4.2	0.81
Staff						
n	40	32	43	38	—	—
Personally referred 6+ clients to a CBO in the last month	52.5	59.4	67.4	63.2	−11.2	0.7
Referred clients to 6+ different CBOs in the last month	27.5	43.8	37.2	36.8	−16.6	0.74
Received 6+ client referrals from other CBOs in the last month	42.5	39.5	55.8	38.6	−15.5	0.71
Strong relationship with the staff at other CBOs	74.3	80.6	73.2	67.6	−12.0	0.73
Interacted with 3+ people who work at CBOs in Baltimore City in the last month	50.0	62.5	62.8	63.2	−12.1	0.67
Referred 1+ client to a Johns Hopkins or Bayview Medical Center doctor, clinic, treatment program, or ED in the last month	37.5	40.6	25.6	50.0	21.3	0.18
Received 1+ referral from a Johns Hopkins or Bayview Medical Center doctor, clinic, treatment program, or ED in the last month	30.0	37.5	25.6	34.2	1.1	0.48
Reported community and healthcare organizations work together moderately to extremely well	50.0	44.8	48.8	58.3	14.7	0.24
Confident that CBOs exist that can meet their clients' needs	77.1	82.8	90.2	91.9	−4.0	0.6
Confident that they have all the information they need about the CBOs that are available to help their clients	57.5	65.6	46.5	68.4	14.8	0.29
Confident that they're well-equipped to refer clients to the appropriate CBOs	79.4	69.0	72.5	77.8	15.7	0.11
Confident that the CBOs to which their clients are referred will meet their needs	90.3	96.6	95.0	94.4	−6.8	0.83
Their program/organization is well-informed about the programs/services other CBOs offer	56.4	56.3	67.4	78.9	11.7	0.29
Their program/organization communicates frequently with other CBOs	53.8	75.0	74.4	65.8	−29.8	0.87

BGE, Baltimore Gas and Electric; CBO, community-based organization; DID, difference in differences; ED, emergency department.

network of healthcare and community-based agencies to address the problem of depression in under-resourced communities in Los Angeles. Clients in the intervention arm of the study had significantly better outcomes than those in the comparison group, including improvements in health-related quality of life, physical activity, homelessness risk factors, and a reduction in behavioral health hospitalizations, suggesting that a collaborative network of CBOs can effectively improve mental health outcomes and reduce healthcare utilization.[45] Yet, recent literature

Table 3. Johns Hopkins Health System Inpatient and Outpatient Staff Data

Response options	Inpatient staff				Outpatient staff			
	Baseline, % (*n*=61)	Follow-up, % (*n*=80)	Diff, %	*p*-value	Baseline, % (*n*=124)	Follow-up, % (*n*=113)	Diff, %	*p*-value
Which of the following challenges/barriers do you face when referring patients to community resources?								
Lack information about available community resources	57.4	56.3	−1.1	0.500	53.2	38.0	−15.2	**0.014**
Lack accurate up-to-date information about community resources	55.7	57.5	1.8	0.515	57.3	38.9	−18.3	**0.004**
Lack the ability to follow-up with patients	26.2	28.7	2.5	0.56	12.9	15.0	2.1	0.613
Uncomfortable referring patients to unfamiliar places	11.5	18.8	7.3	0.828	23.4	17.7	−5.7	0.179
Unsure about the quality of services being delivered	41.0	36.3	−4.7	0.345	37.1	31.9	−5.2	0.239
How do you find out about existing community resources?								
Ask colleagues	91.8	85.0	−6.8	0.834	74.2	74.3	0.1	0.5
Internet search	75.4	85.0	9.6	0.112	75.0	77.0	2	0.418
List of places familiar with/used before	54.1	60.0	5.9	0.298	67.7	67.2	−0.5	0.5
Resource directory (paper)	39.3	31.3	−8.0	0.794	34.7	47.8	13.1	**0.028**
Web-based platform	16.4	13.8	−2.6	0.579	21.8	30.1	8.3	0.095
How well do healthcare organizations and community resource organizations work together to help patients?								
Extremely to moderately well	42.6	50.0	7.4	0.258	56.5	62.3	5.7	0.232
How confident are you about the following? (moderately to extremely confident is reported)								
There are community resources that exist that would meet your patients' needs	70.3	69.4	−0.9	0.5	74.5	73.1	−1.5	0.535
The community resources to which you refer your patients will meet their needs	56.9	62.5	5.6	0.329	74.1	76.2	2.1	0.422
You have all the info you need about the community resources available to help your patients	33.3	46.6	13.2	0.094	52.3	66.7	14.4	**0.023**
You know who to contact at a given community organization	27.8	37.5	9.7	0.170	52.3	60.0	7.7	0.156
In the last month, did you refer a patient to one of the following community resource organizations?								
Comparison CBOs	3.0	4.1	2.9 (DID)	**0.051**	10.6	12.3	6.6 (DID)	**0.027**
Intervention CBOs	5.4	9.5	—	—	11.6	19.9	—	—

Note: Boldface indicates statistical significance ($p<0.05$).
CBO, community-based organization; DID, difference in differences; Diff, difference.

reviews on the impact of integrated models of health care and social services on health and healthcare utilization outcomes have reported mixed results.[46,47]

The lack of effect on CBO staff may have been due, in part, to variable uptake of the toolkit's components. One example was the variable and generally modest utilization of Health*ify*, which appears to have been influenced by contextual factors at individual CBOs. Although CBO staff members received access to and training in using Health*ify*, they were not required to use it. Decisions on when to use Health*ify*, with which clients, and under which circumstances were left to the discretion of the staff members who interact directly with clients. A lesson learned was that staff members who considered Health*ify* redundant with their organization's existing methods were less likely to use it than staff at CBOs without an existing system for identifying community resources.

Though there was no observed change in behavior among CBO staff, the results suggest some success in raising awareness and influencing the referral patterns among healthcare system staff. At baseline, inpatient and outpatient frontline staff reported feeling ill equipped to address patients' unmet social needs and a lack of confidence about where to refer, as reported elsewhere.[48] The meet-and-greet sessions, a critical component of the intervention, were designed to address this gap in knowledge and the referral capacity between frontline providers and CBOs. Gaining the ability to call a familiar person may have led to the improvement seen in these areas.

The intervention in this study did not reduce the healthcare utilization defined primarily as ED visits plus hospital days of high-risk Medicaid and Medicare patients. These results are likely to be generalizable to similar types of interventions that target organizational-level processes (such as referral practices) as opposed to intervention strategies that are directed toward clients. The positive findings observed in this study, suggesting a decrease in barriers for healthcare staff to refer patients to CBOs, may also be generalizable: If clinical staff are provided with the opportunities to learn more about CBOs, such as through the meet-and-greet sessions, the experience may increase confidence and referral behavior.

Limitations

A fundamental limitation of this trial was that although there was access to healthcare utilization data of J-CHiP patients, the authors were unable to link J-CHiP patients with specific CBOs because of privacy concerns. In addition, because several of the CBOs do not routinely collect client names, it was not possible to directly relate CBO exposure to the outcomes, as originally planned. Instead, analyses relied on the assumption that the proximity of a J-CHiP patient to a CBO would reflect an increased probability of using the services of that CBO and that that exposure would lead to changes in patient-level outcomes. The analysis also relied on assumptions that J-CHiP patients utilized the CBO that was closest to where they lived and did not use other CBOs in the study, both of which were likely violated to some degree. Because it was not possible to directly survey J-CHiP patients, it was not possible to identify factors associated with a greater probability of using a CBO, such as trust in, perceived need for, or utility of services provided by specific CBOs.

In addition, the intervention primarily consisted of organizational-level strategies designed to increase the capacity of CBOs to refer their clients to a more comprehensive range of resources, as opposed to strategies targeted directly toward individual clients. Therefore, improvements in client outcomes were dependent on changes at the organizational level. It is possible that the intervention was not robust enough or utilized consistently or long enough for such changes to be realized. The existing knowledge CBOs have about one another introduced the possibility of contamination between the two study groups. Furthermore, the fact that there were only ten CBOs in each study arm limited the power to detect changes between groups over time.

Developing a sustainable community–academic partnership took more time than initially anticipated. As documented by others,[2,48–50] building trust with community partners takes time. A period of 3 years is a short timeline to conduct a cluster RCT, which included initiating a new academic–community research partnership with 20 CBOs, codeveloping and implementing an intervention, and evaluating the results. The intervention period of 1 year may have been too short to allow it to take hold at some of the CBOs, and the evaluation may have occurred too early to detect some of the hypothesized benefits.

CONCLUSIONS

This study adds to the growing body of literature highlighting the need for effective strategies to connect health systems with local community-based resources. Although the Baltimore CONNECT trial did not achieve significant results on individual health outcomes, it succeeded in becoming a 501c3 nonprofit organization with the mission to improve the overall health and well-being of Baltimore City residents by addressing social determinants of health.[51] The fact that this project has led to a sustained effort is itself an important outcome[52] and is

consistent with what community engagement leaders have deemed as a top priority for community engagement over the next 10 years.[53]

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SUPPLEMENTAL MATERIAL

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