



Implementing a Multi-Component Intervention to Reduce Hypertension Through DASH Diet Congregate meals and Self-Measured BP (SMBP) at Two NYC Senior Centers

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Background

Cardiovascular Disease (CVD) is highly prevalent among older adults- two thirds of adults aged 60 to 79 have one or more form of CVD [1]. Racial and ethnic minorities and people of lower socioeconomic status face higher rates of CVD and mortality [2]. Older adults are also at increased risk for developing high blood pressure (BP)- a major modifiable risk factor for CVD [3]. Seniors affected by financial need, food insecurity, or social isolation rely on agencies like **Carter Burden Network (CBN)** for community nutrition services such as on-site congregate meals, subsidized by NYC Department of Aging. **The Rockefeller University (RU)**, **Clinical Directors Network (CDN)**, and CBN formed a community/academic partnership in 2016 to address unmet health needs among CBN clients, such as widespread high/uncontrolled BP.

Here we use the **RE-AIM** planning and evaluation framework to report the project. RE-AIM expands the focus on clinical research to incorporate multiple factors that impact public health and facilitate population-based impact [4].

Methodology

Primary Aim: Test whether providing **DASH-aligned menus in an ongoing congregate meal program**, and **educational and behavioral support for Self-Measured Blood Pressure (SMBP) monitoring**, lower blood pressure among community-living seniors attending two senior centers in New York City.

Co-Primary Outcomes: Change in Mean Systolic BP at Month 1 vs. Baseline, and change in percent participants with JNC-8 defined “controlled” BP.

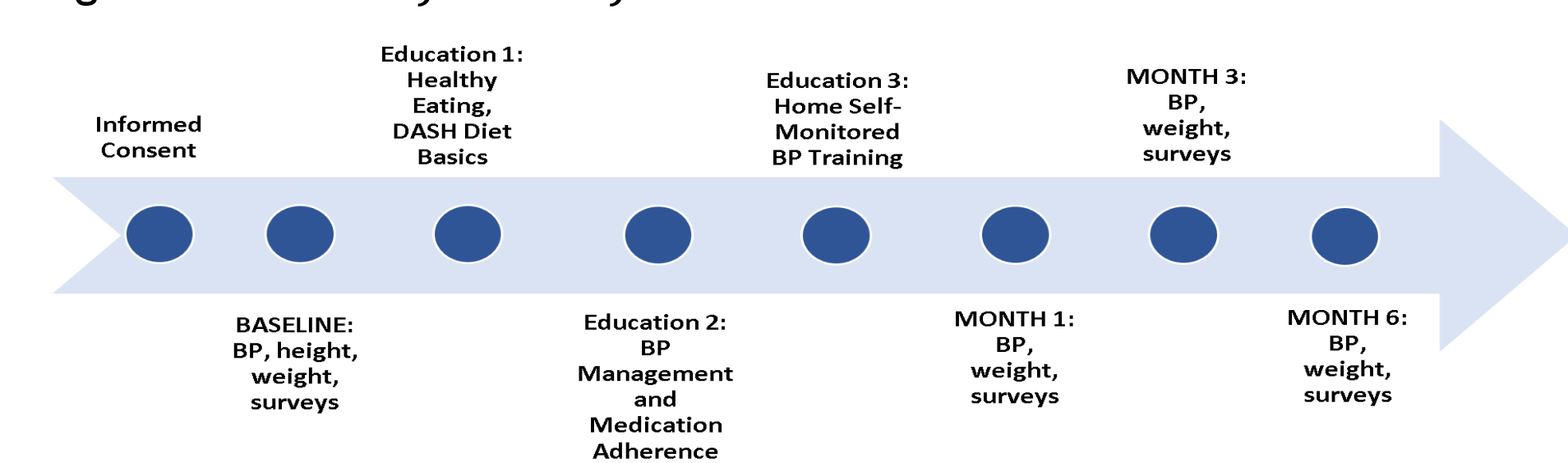
Other Aims: Adapt and implement DASH-aligned congregate meals; Optimize client acceptance; Support cognitive and behavioral change; Enhance self-efficacy for BP management; Leverage and grow a sustainable, multi-stakeholder partnership; Enhance the value of nutritional service programs.

Other Measures: DASH concordance of meals, Meal Satisfaction, Meal Attendance, Health and Psychosocial Surveys, Plate-Waste, SMBP data

Participants: Age > 60; consuming > 4 congregate meals/week. **Setting:** 2 CBN Senior Centers in East Harlem and the Upper East Side serving congregate meals.

Study Timeline:

Figure 1: Summary of Study Visits and Education Sessions

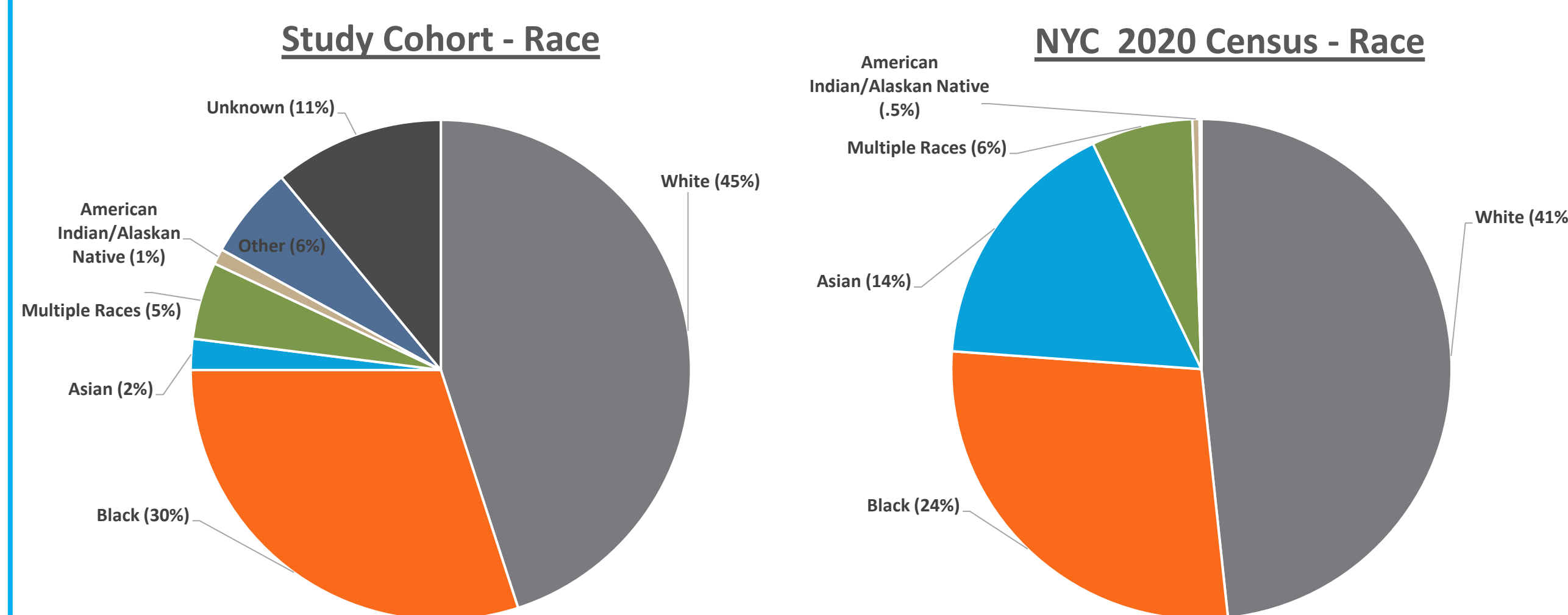


Findings: RE-AIM

Reach: Proportion & representativeness of individuals willing to participate

Of 207 clients at the two sites, 111 were screened, 96 were eligible and 94 signed informed consent. 84 completed baseline assessments. 75% of those asked enrolled in the study. The racial make-up of the study cohort was similar to that of the NYC population (Figure 1).

Figure 1: Race of Study Participants compared to New York City Census



Other Participant Characteristics (n=84): 19% had normal BP, 71% had Stage I or II hypertension; 43% reported an annual income < \$20,000; 63% of participants were overweight or obese; 42% met criteria for food insecurity at study outset.

Participation in Study Interventions:

- DASH Diet Congregate Meals:** Meal attendance (3-4 meals/week) did not change.
- Self-Measured Blood Pressure:** 76/84 (90%) conducted SMBP and downloaded at least once during Month 1; 55 (65%) continued to use SMBP during Month 5/6.
- Women (n= 22, 88%) and Black participants (n= 15, 60%) were more likely to be in the group who continued SMBP to End-of-Study (p=.002, p=.037).

Effectiveness: Impact of intervention

The interventions lowered BP at Month 1 and at end-of-study (Months 5/6) timepoints

- Change in Mean systolic BP at Month 1 was -4.41 mmHg (n=61 p=0.07) vs. Baseline.
- The percentage of participants with JNC-8 defined “controlled BP” increased by 15.7%.
- Change in Mean systolic SMBP at Months 5/6 was -6.9 mmHg (p=0.004) vs. Baseline.

(Continued...)

Effectiveness: Impact of intervention (continued)

Table 2: Final Regression Model

Age, BMI and Baseline BP were correlated with lowering BP during study

Observed (n = 52)	Coefficient	Standard Error (SE)	P-value
Model (F = 6.92) R ² = 52.4%			
BMI (Underweight/Normal Weight (Ref) vs. Overweight/Obese)	10.56	4.56	0.02
History of Hypertension I (No History of Hypertension (Ref), History of Hypertension)	5.07	4.30	0.24
Food Insecurity Status (Not Food Insecure (Ref), vs. Food Insecure)	3.64	4.16	0.38
Age (years)	-0.56	-0.27	0.04
Baseline Blood Pressure (mmHg)	-0.73	0.13	<0.001
Meal Attendance Baseline – Month 1 (meals/week)	0.69	0.40	0.09
SMBP Frequency Percentage* Baseline – Month 1	-0.08	0.06	0.16

Adoption: Number of settings willing to initiate program, value proposition

- RU-CDN-CBN leveraged their 7-year partnership to engage two sites, secure and share federal funding, and to develop the project, protocol and interventions in collaboration.
- Engagement with NYC Dept for the Aging during implementation facilitated approval for adopting changes to existing programs.

Implementation: Fidelity to the intervention; adaptations

Table 3: DASH Congregate Meals – As Designed vs. As Served

FOOD GROUPS	ANALYSIS OF GOALS MET AS PLANNED (B & L @ Site 1, L @ Site 2) AND COMPARED TO DAILY DASH DIET RECOMMENDATION 8*(1)			
	Site 1 GOAL Svg served M-F, B&L/svg planned M-F, B&L	Site 1 SVG M-F, B&L/DASH PRESCRIBED M-F for day	Site 2 PLANNED Svg served M-F, L/svg planned M-F, L	Site 2 SVG FOR L/DASH PRESCRIBED FOR DAY
PROTEIN*(1)	21/15-30	21/≤30	15/10-20	15/≤30
GRAINS	21/20	21/30	10/10	10/30
VEGETABLES	20/15	20/20	11/10	11/20
FRUIT	14/20	14/20	11/10	11/20
DAIRY	10/10	10/10	5/5	5/10
FAT†	7/10	7/10	5/5	5/10
SWEETS*(2)	1/4	1/≤5	1/2-3	1/≤5
NUTS, LEGUMES, DRIED PEAS AND BEANS	5/4	5/4	3/4	3/4

(1) Protein goals were maintained as previously planned at CBN
(2) Sweets – the goal set was as a maximum, not minimum
(3) Recommended Dash Diet Servings at 1800 kcal were the minimum servings, if there was a range.
*† Fat – the goal set was as a maximum, not a minimum
Red cell = over or under the goal, and unacceptable
Green cell = met goal planned or over goal planned, but acceptable, since it is closer to DASH meal plan goal for three meals

- Menus adjusted to respond to participant feedback in 1st week
- COVID interrupted congregate meals Month 3 (Site 1), and Month 1 (Site 2).
- COVID necessitated remote education, SMBP and data collection.

Maintenance: Long-term effects of program and sustainability

- Program sustainability will require agency buy-in, support for costs
- Dept. for Aging (DFTA) funds 250 senior centers in NYC
- Project and agency leadership discussed approaches to simplify program implementation and replicate the program in more diverse sites by:
 - Use the study’s DFTA-approved, DASH-aligned menus
 - Eliminate time-consuming surveys
 - Partner with local health organizations to support SMBP

Conclusions

Reach: It is feasible to implement DASH-aligned meals through an existing congregate meals program along with SMBP at NYC senior centers. Enrollment was locally representative. Black women were more likely to continue SMBP.

Effectiveness: Encouraging BP reduction demonstrated. Study may underestimate the true potential of the intervention in this setting due to inclusion of participants at less severe stages of hypertension.

Adoption: Engagement model (multi-partner collaboration that includes a government agency, nonprofit agencies and academia) paved the way for enrollment of CBN sites and DFTA approval of menus.

Implementation: COVID interrupted DASH intervention otherwise proceeding to plan. SMBP continued remotely. Surveys were High-effort, low-return burden.

Maintenance: Commitment at organizational and agency leadership levels necessary to overcome barriers to implementation. Lessons-learned will advantage future adoption. Food insecurity and low-income drive seniors to access nutrition services. Broader adoption and dissemination of programs such as this one could meaningfully impact health outcomes among seniors experiencing health disparities.

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